Fatima Mata National College
(Autonomous)
Kollam

Scheme & Syllabus of

First Degree Programme in Chemistry

2019 Admission Onwards

B.Sc. Degree Chemistry Programme

Aim and Objective of the Syllabi

Aim

The B.Sc. Degree Programme in Chemistry covers three academic years consisting of six semesters and aims to provide the students with an in-depth understanding of and training in chemical sciences. The syllabus has been designed to stimulate the interest of the students in chemistry and prepared in order to equip the students with a potential to contribute to the academic and industrial requirements of the society. The new, updated syllabus is based on an interdisciplinary approach and is infused with a new vigour and more depth. Chemistry being an experimental science, due importance is given to the development of laboratory and instrumentation skills.

Objective

The main objective is to provide to the students an in-depth understanding of the basic concepts of chemical sciences and enable them with tools needed for the practice of chemistry, which remains a discipline with much stress on experimentation. It attempts to provide a detailed knowledge of the terms, concepts, methods, principles and experimental techniques of chemistry.

Course structure

The First Degree programme in Chemistry comprises of fourteen core courses, one project course, two elective courses, one core-specific foundation course in addition to one area-specific foundation course, the complementary courses and language courses. Among the two open/elective courses, the one offered in the fifth semester is open to students from other Majors. The details of the Course Structure are given in Table I. Table II gives the details of the contact hours and credits for the Core Courses, Foundation Course II, Open Course and Elective Course, Table III gives the details of Open Courses and Table IV gives the details of the Elective Courses and Table V gives distribution of Complementary Courses in different Semesters.

First Degree Programme in Chemistry

Table I : Course structure, Scheme of Instruction and Evaluation

Semester	Course Code	Study component	Instructional hrs/Week		Credit	Duration of Uty. Exam	Evaluation marks		Total Credit
			T	P			CE	ESE	
I	19UEN111.1	English I	5		4	3hrs	20	80	18
	19UFR/HN/ ML111.1	Additional Language I	4		3	3hrs	20	80	
	19UEN121	Foundation Course I	4		2	3hrs	20	80	
	19UMM131.2	Complementary Course I	4		3	3hrs	20	80	
	19UPY131.2	Complementary Course II	2		2	3hrs	20	80	
		Complementary Course Lab of 19UPY131.2		2	-	-	-	-	
	19UCH141	Core Course I	2			3hrs	20	80	
		Core Course Lab I of 19UCH141		2	-	-	-	-	
II	19UENS211	English II	4		3	3hrs	20	80	18
	19UEN212.1	English III	5		4	3hrs	20	80	
	19UFR/HN/ ML211.1	Additional Language II	4		3	3hrs	20	80	
	19UCH221	Foundation Course II	2	2	3	3hrs	20	80	
	19UMM231.2	Complementary Course III	4		3	3hrs	20	80	
	19UPY1231.2	Complementary Course IV	2		2	3hrs	20	80	
		Complementary Course Lab of 19UPY231.2		2	-	-	-	-	
III	19UEN311.1	English IV	5		4	3hrs	20	80	18
	19UFR/HN/ ML311.1	Additional Language III	5		4	3hrs	20	80	
	19UMM331.2	Complementary Course V	5		4	3hrs	20	80	
	19UPY331.2	Complementary Course VI	3		3	3hrs	20	80	
		Complementary Course Lab of 19UPY331.2		2	-	-	-	-	
	19UCH341	Core Course II	3		3	3hrs	20	80	
		Core Course Lab I of 19UCH341		2	-	-	-	-	
IV	19UEN411.1	English V	5		4	3hrs	20	80	24
	19UFR/HN/ ML411.1	Additional Language IV	5		4	3hrs	20	80	
	19UMM431.2	Complementary Course VII	5		4	3hrs	20	80	
	19UPY431.2	Complementary Course VIII	3		3	3hrs	20	80	
	19UPY432.2	Complementary Course Lab of 19UPY131.2, 19UPY231.2, 19UPY331.2 & 19UPY431.2		2	4	3hrs	20	80	
	19UCH441	Core Course III	3		3	3hrs	20	80	
	19UCH442	Core Course Lab I of 19UCH141, 19UCH341 & 19UCH441		2	2	3hrs	20	80	

V	19UCH541	Core Course V	3		4	3hrs	20	80	14
	19UCH542	Core Course VI	4		4	3hrs	20	80	
	19UCH543	Core Course VII	4		4	3hrs	20	80	
	19UCH544	Core Course VIII Lab II		5		3hrs	20	80	
	19UCH545	Core Course IX Lab III		4		3hrs	20	80	
	19UCH551	Open Course	3		2	3hrs	20	80	
		Project		2	-	-	-	-	
VI	19UCH641	Core Course X	3		4	3hrs	20	80	28
	19UCH642	Core Course XI	4		4	3hrs	20	80	
	19UCH643	Core Course XII	4		4	3hrs	20	80	
	19UCH544	Core Course VIII Lab II			3	3hrs	20	80	
	19UCH545	Core Course IX Lab III			2	3hrs	20	80	
	19UCH644	Core Course XIII Lab IV			3	3hrs	20	80	
	19UCH645	Core Course XIV Lab V			2	3hrs	20	80	
	19UCH661.1/ 19UCH661.2/ 19UCH661.3/ 19UCH661.4	Elective Course	3		2	3hrs	20	80	
	19UCH646	Project and Factory Visit		3	4	Viva	-	100	

A) Language Courses = 9, B) Foundation Courses = 2, C) Complementary Courses = 9,
D) Core Courses = 14, E) Open Course = 1, F) Elective Course = 1,
G) Project = 1 Total Courses = 9+2+9+14+1+1+1 = 37. Total Credits = 18+18+18+24+14+28 =120.

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Table II. Distribution of Open Course offered to students of other disciplinesSemester V

Semester	No. of Hours / Week		Credits	Course Code	Title of the Course	Instructional Hours
	Lectures	Practicals				
5	3	-	2	19UCH551.1	Essentials of Chemistry	54
				19UCH551.2	Fundamentals of Chemistry & Its Application to Everyday Life	
				19UCH551.3	Environmental Chemistry	

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Table III. Distribution of Elective Course offered in Semester VI

Semester	No. of Hours / Week		Credits	Course Code	Title of the Course	Instructional Hours
	Lectures	Practicals				
6	3	-	2	19UCH661.1	Supramolecular, Nano Particles and Green Chemistry	54
				19UCH661.2	Computational, Combinatorial and Physical Organic Chemistry	
				19UCH661.3	Polymer chemistry	
				19UCH661.4	Biochemistry	

Table IV

Distribution of Complementary Courses in different SemestersComplementary Courses -4 Total Credits – 14 One Semester – 18 Weeks

Semester	Hours/Week		Number Of Credits	Course Code	Title of Course	Instructional Hours
	Theory	Practical				
1	2	2	2	19UCH131		2×18 = 36 2×18 = 36
2	2	2	2	19UCH231		2×18 = 36 2×18 = 36
3	3	2	3	19UCH331		3×18 = 54 2×18 = 36
4	3	2	3 4	19UCH431 19UCH432		3×18 =54 2×18 = 36

GENERAL ASPECTS OF EVALUATION

MODE OF EVALUATION

Evaluation of each course shall consist of two parts:

1. Continuous Evaluation (CE), and
2. End Semester Evaluation (ESE)

The CE to ESE ratio shall be 1:4 for both Courses with or without practical. There shall be at maximum of 80 marks for ESE and maximum of 20 marks for CE. A system of performance based, indirect grading will be used. For all courses (Theory and Practical), grades are given on a 7-point scale based on the total percentage of mark (CE+ESE) as given below:

Criteria for Grading

Percentage of marks	CCPA	Letter Grade
90 and above	9 and above	A+ Outstanding
80 to <90	8 to <9	A Excellent
70 to <80	7 to <8	B Very Good
60 to <70	6 to <7	C Good
50 to <60	5 to <6	D Satisfactory
40 to <50	4 to <5	E Adequate
Below 40	<4	F Failure

1.1. CONTINUOUS EVALUATION FOR LECTURE COURSES

The Continuous evaluation will have 20 marks and will be done continuously during the semester. CE components are

i. Attendance for lecture and laboratory sessions (to be noted separately where both lecture and laboratory hours have been specified within a course);
ii. Assignment /seminar and
iii. Test

The weightage is shown in Table I.1. There will be two Internal exams with 3 marks for Class Test Evaluation (Test I) and 7 marks for Centralized Internal Exams (Test II) and the total of the two marks obtained for Test I & Test II will be awarded. Seminar for each course to be organized by the course teacher and assessed along with a group of teachers in the Department. The topic selection by the student for assignments/seminar will be with the approval of the course teacher.

No	Component	Marks
1	Attendance	5
2	Assignment / Seminar	5
3	Tests	10
	Total	20

1.1.1. ATTENDANCE:

The allotment of marks for attendance shall be as follows:

Attendance less than 75%	0 mark
75% & less than 80 %	1 mark
80% & less than 85 %	2 marks
85% & less than 90 %	3 marks
90% & less than 95%	4 marks
95% & above	5 marks

1.1.2. EVALUATION OF THE ASSIGNMENTS/SEMINAR

Each student shall be required to do one assignment or one seminar for each Course. Seminar for each course shall be organized by the course teacher and assessed by a group of teachers in the Department. The topic selection by the student for assignments/seminar shall be with the approval of the course teacher. The

assignment typed/written on A4 size paper shall be 4-6 pages. The minimum duration of the seminar shall be fifteen minutes and the mode of delivery may use audio-visual aids if available. Both the assignment and the seminar shall be evaluated by giving marks based on each of the four components shown in table 1.1.2.1. The seminar is to be conducted within the contact hours allotted for the course.

1.1.2.1. Mode of Assignments/Seminar Evaluation (maximum 5 marks)

No	Components	Marks
1	Adherence to overall structure & submission deadline	**2**
2	Content & grasp of the topic	**1**
3	Lucidity /clarity of presentation	**1**
4	References, interaction/overall effort	**1**

The explanatory guidelines in Table 1.1.2.2.are suggested (tentatively) for the assessment o! each of the above main components:

1.1.2.2. Guidelines for Assignments/Seminar Evaluation		
No	Main Component	Sub –Components
1	Adherence to overall structure & submission deadline	i. Punctual submission ii. Adequate length/duration iii. Inclusion of introduction, discussion & summary sections iv. Absence of errors/mistakes
2	Content & grasp of the topic	1. Coverage of topic 2. Understanding of topic 3. Logical organization 4. Originality (No copying from a source or plagiarism)
3.	Lucidity/Clarity	i. Clarity ii. Effective presentation/delivery iii. Neatness of presentation iv. Inclusion of appropriate diagrams/ equations/structures etc.
4	References/Interaction/Overall effort	1. Listing of references 2. Use of more than one reference source/Use of Web resource 3. Correct response to quiz/questions 4. Overall effort in preparing assignment/seminar

1.1.3. DETAILS OF THE CLASS TEST

The weightage is shown in Table I.1. There will be two Internal exams with 3 marks for Class Test Evaluation (Test I) and 7 marks for Centralized Internal Exams (Test II) and the total of the two marks obtained for Test I & Test II will be awarded. Seminar for each course to be organized by the course teacher and assessed along with a group of teachers in the Department. The topic selection by the student for assignments/seminar will be with the approval of the course teacher.

1.2. CONTINUOUS EAVALUATION FOR LABORATORY COURSES

The CE components are: (i) Attendance for laboratory sessions, (ii) Experiment (Lab) report on completion of each set of experiments, (iii) Laboratory skill and (iv) Quiz/test.

The marks for the components of practical for continuous evaluation shall be as shown below:

1	Attendance	5 marks
2	Record (lab report)	5 marks
3	Test	5 marks
4	Performance, punctuality and skill	5 marks

1.2. Components of CE for Lab Courses

1.2.1. Attendance:

The allotment of marks for attendance shall be as follows:

Attendance less than 75%	0 mark
75%& less than 80 %	1 mark
80%& less than 85 %	2marks
85%& less than 90 %	3 marks
90% & less than 95%	4 marks
95% & above	5 marks

The guidelines for evaluating the three main components 2-4 using sub-components are presented below.

1.2.2. EVALUATION OF THE EXPERIMENT (LAB) REPORT

On completion of each experiment, a report shall be presented to the course teacher. It should be recorded in a bound note-book (not on sheets of paper). The experimental description shall include aim, principle, materials/ apparatus required/used, method/procedures, and tables of data collected, equations, calculations, graphs, and other diagrams etc. as necessary and final results. Careless experimentation and tendency to cause accidents due to ignoring safety precautions shall be considered as demerits.

1.2.2.1. Mode of Experiment (Lab) Report Evaluation

No	Sub components	Marks
1	Punctual submission and neat presentation	1
2	Inclusion of aim, materials, procedure, etc.	1
3	Calculations and absence of errors/mistakes	1
4	Accuracy of the result	2

1.2.3. EVALUATION OF THE LAB SKILL

1.2.3.1. Mode of Lab Skill Evaluation

No	Sub components	Marks
1	Punctuality and completion of experiment on time	2
2	Lab skill and neat arrangements of table and apparatus in the lab	1
3	Prompt and neat recording of observations in the lab note book	1
4	Experimental skill and attention to safety	1

I.2.3. EVALUATION OF THE LAB QUIZ/TEST

For each lab course there shall be one lab test during a semester. The test for a lab course may be the form of a qui/ / practical examination. Two teachers (one of the teachers should be the course teacher) shall conduct the quiz/test within the assigned lab contact hours. The marks obtained should be converted to 5 marks for consolidating the CE.

II.1.1. END SEMESTER EVALUATION FOR LECTURE COURSES

The end semester evaluation conducted at the end of the semester shall have 80 marks. The end semester theory examination shall be of 3 hours duration. Grades A+ to F shall be awarded as per the regulations and the general aspects of evaluation.

II.1.1. END SEMESTER QUESTION PAPER PATTERN

QuestionNo	Typeof Question	Marks
Part A: 1-10	10 one word/one sentence	10
Part B: 11-22	8 out of 12; Short Answer	16
Part C: 23-31	6 out of 9; Short Essay	24
Part D: 32-35	2 out of 4; Essay	30
		Total = 80 marks

II.2. END SEMESTER EVALUATION FOR LABORATORY COURSES

The scheme of valuation of ESE of Lab courses and their marks are discussed along with the syllabi for each of such laboratory courses in the subsequent sections. Total marks for the ESE of each practical course are 80.

II.3. CONSOLIDATION OF MARKS

The marks of a course are consolidated by combining the marks of ESE and CE (80+20). A minimum of 40% marks is required for passing a course with a separate minimum of 35% for CE and ESE.

III. Project/Dissertation, Factory/R&D Institute Visit and Project based Viva-voce Evaluation of the Project & Factory/Research institution visit report (Semester VI)

The Project work may be conducted individually or by a group comprising of a maximum of 5 students during the semesters V and VI. The work of each student/ group shall be guided by one faculty member. After the completion of the work, the student shall prepare 2 copies of the project report. The copies certified by the concerned guide & the Head of the Department shall be submitted prior to the completion of the sixth semester. The typed copy of the report may have a minimum of 25 pages comprising the title page, introduction, literature review, result and discussion and references. These reports shall be evaluated by a board of two examiners. The examiners shall affix their dated signatures in the facing sheet of the project report. The evaluation/viva voce of the project report shall be conducted on a separate day. The number of students may be a maximum of 16 per day or as per regulations and the general aspects of project evaluation. The students have to present their work individually before the examiners on the day of the viva-voce. The examiners shall consult each other and award grades based on the various components given in the table below. There shall be no continuous assessment for the dissertation/project work.

The Factory/research institution visit report shall be submitted during the lab course examination/viva voce. The examiners who evaluate the report (of 16 students per day) shall affix their dated signatures in the facing sheet.

FIRST DEGREE PROGRAMME IN CHEMISTRY

Program Outcome

- Nationalistic Outlook and contribution to National development
- Fostering global competencies, and Technical and Intellectual proficiency
- Inculcating values and Social Commitment
- Affective skills and integrity of character
- Critical Thinking, Problem solving and Research-related skills
- Environment and sustainability
- Quest for excellence

Programme Specific Outcome of FDP in Chemistry (PSO)

- To train the students to attain practical and theoretical knowledge on different branches of chemistry
- To cultivate a positive attitude towards life.
- To create awareness about different chemical processes in our environment.
- To help students appreciate the hard and dedicated work of scientists
- To develop commitment in students to work for the conservation of nature.
- To make learners resourceful so that they can contribute to fields like forensic science, nano science, water quality analysis and purification, medicinal chemistry, biochemistry etc.
- Impart knowledge and confidence in students so that they can specialise in branches related to chemistry.
- To create curiosity among the students, to know more about the fascinating world of chemicals
- PSO1. Understand the nature and basic concepts of the different branches of chemistry- Inorganic, Organic, Physical, Polymer and Biochemistry
- PSO2. Analyse the relationships among the branches of science
- PSO3. Perform experiments as per laboratory standards in the areas of qualitative- chromatography, inorganic mixture analysis, organic analysis, organic preparations and quantitative analysis- volumetry, gravimetry, physical chemistry experiments, inorganic and organic estimations and research methodology
- PSO4. Understand the applications of chemical sciences in industry
- PSO5. Gains knowledge about research methodologies, effective communication and skill of problem solving.
- PSO6. Contributes the knowledge for Nation building.

Semester - I

Language Course I

19UEN111.1: LANGUAGE SKILLS

No of Credits: 4 **No of hours: 90 hours (5/week)**

COURSE OUTCOMES

1. Demonstrate all the four basic skills – listening, speaking reading and writing.
2. Listen to lectures, public announcements and news on TV and radio.
3. The students will perform reading comprehension skills and enhance vocabulary.
4. The students are expected to identify with the mechanism of writing, and presentation.

COURSE OUTLINE

Module 1 Phonetics (1 hr)

Introduction to Phonetics – The need for phonetics – Learning Phonetics – Phonemic symbols – vowels-consonants- syllables – word stress – strong and weak forms – Practice sessions in the Language Lab

Module 2 Listening and Speaking (1hr)

Listening – Importance of communication – difference between Listening and Hearing – barriers to listening – listening for details – listening to public announcements – news bulletins and weather forecast – listening to instructions and directions – listening to lectures and talks

Greetings and Introductions, Participating in Small Talk/ Social Conversations, Request and seeking permission, Making enquiries and suggestions, Expressing gratitude and apologizing, Complaining – Practice sessions with the enclosed CD

Module 3 Reading Skills (2 hrs)

Reading – Definition – skimming/ scanning – intensive/ extensive – Barriers – Methods to improve reading – exercises –

1. Alfred Noyes : *The Highwayman*
2. Ruskin Bond : *Sounds I like to Hear*
3. Eryn Paul : *Why Germans work few hours but produce more: A Study in Culture*
4. Edited Articles : Technology:
   a. *Mangalyaan: India's Mars Odyssey*
   b. *The Evolution of Smart Phones*
5. Edgar Allen Poe : *The Tell-Tale Heart*

Module 4 Writing Skills

Greetings and Introduction, Description of person, places, things – Note taking and Note Making - outline story – dialogues – proverb expansion – paragraph writing.

Core Text: Hart, Steven, Aravind R. Nair and Veena Bhambhani. *Embark English for Undergraduates*. CUP, 2016.

Further Reading

1. Kenneth, Anderson, Tony Lynch, Joan MacLean. Study Speaking. New Delhi: CUP, 2008.
2. Das, NK Mohan, Gopakumar R. English Language Skills for Communication I. New Delhi; OUP, 2015.
3. Sreedharan, Josh. The Four Skills for Communication. New Delhi, CUP, 2016.
4. Smalzer, William R. Write to be Read. New Delhi, CUP, 2014.
5. Gardner, Peter S. New Directions. New Delhi, CUP, 2013.
6. Jones, Daniel. English Pronouncing Dictionary 17th Edition. New Delhi: CUP, 2009.

MODEL QUESTION PAPER
19UEN111.1: Language Skills

Time: Three hours **Maximum Marks: 80**

Section-A

Answer **all** the questions, each in a word or a sentence. Each question carries 1 mark.

1. How many sounds are there in RP?
2. Which sound is common to the following words – union, yes, Europe?
3. How is the word 'beige' pronounced?
4. Give an expression of a phrase used to introduce oneself.
5. State the most common expression used for making a request.
6. In weather parlance, solid precipitation in the form of ice is known as _____.
7. Why was Bess plaiting a love-knot?
8. When does the croaking of frogs sound beautiful?
9. What are most Americans reminded of when they think of Germany?
10. Why did the narrator decide to murder the old man?

(10 x 1 = 10 marks)

Section-B

Answer any **eight** of the following. Each question carries 2 marks.

11. Differentiate between listening and hearing.
12. State two tips to maintain small talk.
13. Give two responses that can be used when somebody thanks you.
14. What does the phrase 'a cold front is moving in' indicate in weather parlance?
15. Describe the attire of the highwayman.
16. What are the sounds that 'walketh upon the wings of the wind'??
17. How do Germans spend their time off from work?
18. What is extensive reading?
19. How did the narrator dispose of the old man's corpse?
20. How did Apple's iPhone influence the smartphone design?
21. Differentiate between skimming and scanning.
22. Give two phrases used to express regret.

(8 x 2 = 16 marks)

Section-C

Answer any **six** of the following. Each question carries 4 marks.

23. Imagine you are the cook in a popular cookery show. Give instructions on how to prepare a dish of your choice.
24. What are the barriers to listening?
25. Divide the following words into syllables – bitterly, quite, elastic, satisfaction, session, illogical, lyrical, zoology
26. You have moved to a new neighbourhood. Frame a dialogue to find out the location of the grocery and bakery from a neighbour.
27. Describe the colours and sounds that lend life to the poem 'The Highwayman'.
28. How does Bond describe the many sounds made by water?
29. List a few things that can be borrowed from German work ethics to increase efficiency in the workplace,
30. Describe the atmosphere of dread in 'The Tell-Tale Heart.
31. What is the primary purpose of MOM and how would its success help Indian scientists in the future?

(6 x 4 = 24 marks)

Section- D

Answer any **two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Read the short lecture below and prepare notes:

The work of the heart can never be interrupted The heart's job is to keep oxygen rich blood flowing through the body. All the body's cells need a constant supply of Oxygen, especially those in the brain. The brain cells like only four to five minutes after their oxygen is cut off, and death comes to the entire body. The heart is a specialized muscle that serves as a pump. This pump is divided into four chambers

connected by tiny doors called valves. The chambers work to keep the blood flowing round the body in a circle. At the end of each circuit, veins carry the blood to the right atrium, the first of the four chambers 2/5 oxygen by then is used up and it is on its way back to the lung to pick up a fresh supply and to give up the carbon dioxide it has accumulated. From the right atrium the blood flows through the tricuspid valve into the second chamber, the right ventricle. The right ventricle contracts when it is filled, pushing the blood through the pulmonary artery, which leads to the lungs – in the lungs the blood gives up its carbon dioxide and picks up fresh oxygen. Then it travels to the third chamber the left atrium. When this chamber is filled it forces the blood through the valve to the left ventricle. From here it is pushed into a big blood vessel called aorta and sent round the body by way of arteries. Heart disease can result from any damage to the heart muscle, the valves or the pacemaker. If the muscle is damaged, the heart is unable to pump properly. If the valves are damaged blood cannot flow normally and easily from one chamber to another, and if the pacemaker is defective, the contractions of the chambers will become un-coordinated. Until the twentieth century, few doctors dared to touch the heart. In 1953 all this changed after twenty years of work, Dr. John Gibbon in the USA had developed a machine that could take over temporarily from the heart and lungs. Blood could be routed through the machine bypassing the heart so that surgeons could work inside it and see what they were doing. The era of open heart surgery had begun. In the operating theatre, it gives surgeons the chance to repair or replace a defective heart. Many parties have had plastic valves inserted in their hearts when their own was faulty. Many people are being kept alive with tiny battery operated pacemakers; none of these repairs could have been made without the heart – lung machine. But valuable as it is to the surgeons, the heart lung machine has certain limitations. It can be used only for a few hours at a time because its pumping gradually damages the blood cells.

33. Frame dialogues for the following situations
    a. Setting up an appointment by telephone at a doctor's clinic.
    b. Debating with a friend which movie to watch and the reason for your choice
    c. Two old friends who meet accidentally in a park.
34. Attempt a critical summary of the poem 'The Highwayman'.
35. Comment on Bond's choice of sounds and what they convey about life in India.

(15 x 2 = 30 marks)

Language course II (Additional Language I)

19UFR111.1: COMMUNICATION SKILLS IN FRENCH

No of Credits: 3 **No of hours: 4 Hrs/week**

COURSE OBJECTIVES:

1. To make the students conversant with a modern foreign language.
2. To introduce the students to the sounds of French.
3. To encourage students to use French for basic communication in everyday situations.
4. To acquaint students with the basics of writing simple sentences and short compositions.

COURSE OUTCOME:

The students would be able to perceive conversational French and to use French for basic communication in daily life.

SYLLABUS:

NAME OF TEXT: **ECHO-A1 méthode de français**
Authors: J. Girardet & J. Pecheur
Publisher: CLE INTERNATIONALE

- Leçon- 0 : Parcours d'initiation (Pages : IX – XVI)
- Leçon – 1 : Vous Comprenez ? (Pages : 6 – 13)
- Leçon 2 : Au Travail ! (Pages : 14 – 21)

Reference books :

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER
19UFR111.1: COMMUNICATION SKILLS IN FRENCH

TIME: 3HRS **MAX MARKS: 80**

PART-A

Répondez à toutes questions suivantes:

1. Nommez une avenue française ?
2. Est-ce que vous parlez français ?
3. Comment vous appelez-vous ?
4. Quelle est votre nationalité ?
5. Tu habites où ?
6. Quelle profession aimez-vous ?
7. Où est la tour de Londres ?
8. Nommez un pays francophone ?
9. Qu'est-ce que c'est « Le Monde » ?
10. Quel est le nom du chant national français ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Complétez avec « *un, une, des ou le, la, l', les* »:
    - Bono, qui est-ce ?
    - C'est …….chanteur. C'est …..chanteur du groupe U2.
    - Qui est Nicolas Sarkozy ?
    - C'est …….président de la France.
    - Comment s'appelle ……guide de groupe ?
    - Elle s'appelle Marie.
12. Complétez avec « à, au, en » :
    - Où habite Adriano ?……Brésil ? ……Argentine ?
    - Il habite …….Sao Paulo, …….Brésil.
13. Complétez avec « un, une, des » :
    a. ……rue
    b. …….quartier
    c. …….restaurants
    d. …….théâtre.
14. Répondez :
    a. Tu aimes les chansons françaises ?
       Non, ……
    b. Tu apprends une langue étrangère ?
       Oui, ……
15. Complétez avec « de, du, de la, de l', des » :
    a. La pyramide …..Louvre.
    b. Le nom…..étudiant.
    c. Un tableau ……Monet.
    d. Un professeur …….université de Mexico.
16. Ecrivez quatre petits mots de politesse.
17. Reliez :

a. Renault	-	des avions
b. Jean-Paul Gaultier	-	des montres
c. Airbus	-	des voitures
d. Rollex	-	des parfums

18. Complétez « le, la, l' les » :
    a. …….rue de Rivoli à Paris.
    b. ……hôtel Daneli à Venise
    c. …….Parlement européen de Strasbourg.
    d. ……musée du Louvre à Paris.

19. Mettez les phrases aux négatifs :
    a. Marie parle français.
    b. Je parle italien.
    c. Vous comprenez l'italien ?
    d. Melissa connait Florent.
20. Ecrivez les numéros en lettres :
    a. 18
    b. 25
    c. 30
    d. 12
21. Quelle est leur nationalité ?
    a. Céline Dion
    b. Michael Jackson
22. Associez :

a. Un journal	-	la BBC
b. Un film	-	le Prado
c. Un musée	-	le Times
d. Une télévision	-	Titanic

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Répondez :
    a. Vous êtes français ?
    b. Vous parlez bien français ?
    c. Vous comprenez le mot « Bonjour » ?
    d. Vous habitez à Paris ?
24. Conjuguez les verbes :
    a. Ils (parler) français.
    b. Nous (connaitre) Marseille.
    c. Je (être) secrétaire du festival.
    d. Elles (comprendre) bien italien.
25. Complétez avec le masculin et le féminin :
    a. Un étudiant - ……..
    b. Un Brésilien - …….
    c. Une artiste - ……...
    d. Un acteur – une ……..
26. Accordez le group du nom :
    a. Les [bon] [restaurant]
    b. Les [grand] [voiture]
    c. Les [femme] [beau et célèbre]
    d. Les [hôtel] [international]
27. Remplissez la fiche de renseignements ci-dessous :
    Nom : ……
    Nom de jeune fille : …….
    Prénoms : …….
    Nationalité :……..
    Adresse : ……
    N° de téléphone : ……..
    Adresse électronique : ……
28. Associez les personnes et les professions :

a. Pablo Picasso	-	scientifique
b. Beethoven	-	homme politique
c. Albert Einstein	-	artiste
d. Barack Obama	-	musician

29. Complétez avec « un, une, des, le, la, l', les » :
    - J'ai …….amis à Aix-en-Provence. Je connais ……professeurs de français de ……université et ……directeur de l'hôtel Ibis.
30. Vous êtes dans la rue avec votre ami(e). Il/elle dit bonjour à un garçon ou à une fille que vous ne connaissez pas. Vous lui demandez « Qui est-il/elle ? ». Rédigez un court dialogue.
31. Vous cherchez des amis français. Vous écrivez un message pour le site « Contact France ». Rédigez ce message.

(6x4=24)

PART-D

Répondez à **2questions suivantes** :

32. Présentez-vous.
33. Présentez votre ville.
34. Ecrivez une brève carte postale à un(e) ami(e) française.
35. Vous interrogez votre voisin(e) de vos gouts. Rédigez ce dialogue.

(2x15=30)

Language course II (Additional Language I)

19UHN111.1: PROSE AND ONE ACT PLAYS

No of Credits: 3 **No of hours: 4 Hrs/week**

Aims of the Course / Objectives

To sensitize the student to the aesthetic and cultural aspects of Literary appreciation and analysis. To introduce modern Hindi prose to the students and to understand the cultural, social and moral values of modern Hindi prose. To understand the One Act Plays.

Course Outcome

Students could get knowledge about the various forms of prose like Kahani, Atmakatha, Sansmaran, Rekhachitra, Vyangya, Jeevani etc. understanding various trends in Hindi and get an awareness of theatre in the context of One Act Plays.

Module 1 & 2

Prose & One Act Play

Prescribed textbook : 'Gadya Prathibha Evam Ekanki"
Edited by Dr. Girijakumari R.
Published by Lokbharathi Prakashan, Allhabad

Lessons to be studied

Gadya Prathibha

1. Manthra - Premchand
2. Shishtachar - Bheeshma Sahni
3. Chori aur Prayachith - Mahatma Gandhi
4. Gurudev - Haribhau Upadyay
5. Mein Narak se bol raha hum - Harisankar Parsai

Ekanki (One Act Play)

1. Ande ke chilke – Mohan Rakesh
2. Mahabharath ki ek Sanch – Bharathbhooshan Agarval
3. Bahoo ki Vida – Vinod Rasthogi

Books for General Reading

1. Hindi ka Gadya Sahitya - Ramachandra Tivari
   Rajkamal Prakashan
2. Hindi Ekanki - Siddhnath Kumar
   Radhakrishna Prakashan
3. Ekanki aur Ekankikar - Ramcharan Mahendra
   Vani Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

First Semester B.A/B.Sc Degree Examination

Language Course (Additional Language I) - HINDI

19UHN 111.1 Prose and One Act Plays

(2019 Admission onwards)

Time : 3 Hrs. **Max.Marks : 80**

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. 'चोरी और प्रायश्चित' गद्य की किस विधा की रचना है?
2. 'गुरुदेव' नामक निबन्ध के रचनाकार कौन है?
3. 'आषाढ का एक दिन' किसका नाटक है?
4. महाभारत युद्ध में परास्त दुर्योधन कहाँ छिप गये?
5. प्रेमचन्द का जन्म कहाँ हुआ?
6. भीष्म साहनी की आत्मकथा का नाम लिखिए?
7. 'बहु की विदा' की बहुएँ कौन-कौन हैं?
8. 'संगीत नाटक अकादमी' पुरस्कार से सम्मानित विनोद रस्तोगी का नाटक कौन सा है?
9. 'सत्य के मेरे प्रयोग' किसकी आत्मकथा है?
10. डाक्टर चड्ढा किस कहानी का पात्र है? (1×10=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. भीष्म साहनी का परिचय दीजिए?
12. 'नहीं-नहीं कैलाश, ईश्वर केलिए इसे छोड दो। तुम्हारे पैरों पडती हूँ।" यह किसने किससे किस अवसर पर कहा?
13. गोपाल ने अंडा खाने केलिए कमरे में क्या प्रबन्ध किया है?
14. आत्मकथा और जीवनी में कौन-सा अन्तर है?
15. युधिष्ठिर दुर्योधन को कैसे ललकारा?
16. गाँधीजी के प्रायश्चित का पिताजी पर कौन-सा प्रभाव पडा?
17. कविवर टैगोर ने अंग्रेज़ी शासन की किस नीति की निन्दा की है?
18. अपने कुत्ते को स्वर्ग में देखकर आदमी की प्रतिक्रिया क्या थी?
19. बहु और बेटी के प्रति जीवनलाल का दृष्टिकोण क्या था?
20. 'मंत्र' कहानी का सन्देश क्या है?
21. "मेरी चोट का इलाज बेटी की ससुरालवालों ने दूसरी चोट से कर दिया है।" जीवनलाल ऐसा क्यों कहता है?
22. परिवार के सब लोग एक-दूसरे से छिपाकर क्यों अंडे खाते हैं? (2×8=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. "मैं तो न जाऊँ, चाहे वह दस लाख भी दें। मुझे दस हज़ार या दस लाख लेकर क्या करना है? कल मर जाऊँगा फिर कौन भोगनेवाला बैठा हुआ है।" सप्रसंग व्याख्या कीजिए?
24. हेतु की चरित्रगत विशेषताओं पर प्रकाश डालिए?
25. 'अंडे के छिलके' एकांकी का उद्देश्य क्या है?
26. "युधिष्ठिर जाओ, जाओ मुझे मरने दो, तुम अपनी महत्वाकांक्षा को फलते-फूलते देखो। जाओ गुरुजनों और बन्धु-बान्धवों के रक्त से अभिषेक कर राजसिंहासन पर विराजो।" सप्रसंग व्याख्या कीजिए।
27. भगत ने कैलाश को कैसे बचाया?
28. प्रेमचन्द के कहानी साहित्य का परिचय दीजए?
29. कविवर टैगोर के गार्हस्थ जीवन पर प्रकाश डालिए?
30. भूखे आदमी और कुत्ते की मौत की तुलना कीजिए?
31. दहेज की प्रथा एक अभिशाप है - 'बहू की विदा' एकांकी के आधार पर इस उक्ति की चर्चा कीजिए।

(4×6=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. एकांकी के तत्वों के आधार पर 'महाभारत की एक साँझ' एकांकी की समीक्षा कीजिए?
33. 'शिष्टाचार' कहानी का सारांश लिखकर उसकी विशेषताओं पर प्रकाश डालिए?
34. 'बहू की विदा' एकांकी में चित्रित समस्याओं पर प्रकाश डालिए?
35. 'मैं नरक से बोल रहा हूँ' में मनुष्य की अकर्मण्यता और खोखले आदर्शों पर व्यंग्य किया है। इस कथन की पुष्टि कीजिए। (15×2=30 marks)

സെമസ്റ്റർ : I
കോഴ്സ് കോഡ് : 19UML111.1
ലാംഗ്വേജ് കോഴ്സ് : II (അഡീഷണൽ ലാംഗ്വേജ് : I)
സമയക്രമം : ആഴ്ചയിൽ 4 മണിക്കൂർ (18×4=72മണിക്കൂർ)
ക്രെഡിറ്റ് : 3

മലയാള കവിത

പുസ്തകം : കാവ്യമാലിക
(കേരള സർവ്വകലാശാലാ പ്രസിദ്ധീകരണം)

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ: (1) മലയാള കവിതയെ സംബന്ധിച്ച് സാമാന്യജ്ഞാനം നൽകുക. (2) പഠിതാക്കളിൽ കാവ്യഭിരുചി വളർത്തുക. (3) ആസ്വാദനത്തിനും വിശകലത്തിനും സജ്ജരാക്കുക. (4) മേൽപ്പറഞ്ഞ ലക്ഷ്യങ്ങൾ മുൻനിറുത്തി സെമിനാർ/അസൈൻമെന്റ് നൽകുക

പാഠ്യപദ്ധതി:

മൊഡ്യൂൾ ഒന്ന് (18 മണിക്കൂർ) കവിത -ആധുനിക കവിത്രയം വരെ

1. എഴുത്തച്ഛൻ - ജരിതാവിലാപം: ഖാണ്ഡവദഹനം (അരണ്യം തന്നിൽ.....കല്പിച്ചു പോയാളവൾ) 36 വരി
2. വടക്കൻ പാട്ട് - ഉണ്ണിയാർച്ചകൂത്ത് കാണാൻ പോയ കഥ(ആറ്റുംമണമ്മേലെ ..... വേഗത്തിൽ പോകുന്നു ഉണ്ണിയാർച്ച)
3. കുമാരനാശാൻ - ചണ്ഡാലഭിക്ഷുകി - (തൂമതേടും....തെല്ലിട സുന്ദരി 96 വരി)

മൊഡ്യൂൾ ര് (18 മണിക്കൂർ) കവിത്രയാനന്തര കവിത

4. ചങ്ങമ്പുഴ - മനസ്വിനി
5. വൈലോപ്പിള്ളി - ജലസേചനം
6. ഇടശ്ശേരി - പുത്തൻകലവും അരിവാളും
7. എൻ.വി. കൃഷ്ണവാര്യർ - എലികൾ

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ) ആധുനിക പൂർവ്വ- ആധുനിക ഘട്ടം

8. ഒ.എൻ.വി - ഒരു തൈ നടുമ്പോൾ
9. സുഗതകുമാരി - കാളിയമർദ്ദനം
10. അയ്യപ്പപ്പണിക്കർ - ഗോപികാദണ്ഡകം
11. എൻ.എൻ.കക്കാട് - സഫലമീ യാത്ര

മൊഡ്യൂൾ നാല്(18 മണിക്കൂർ) ആധുനിക - ആധുനികാനന്തരഘട്ടം

12. കടമ്മനിട്ട രാമകൃഷ്ണൻ - കുഞ്ഞേ മുലപ്പാൽ കുടിക്കരുത്
13. ശ്രീകുമാരൻതമ്പി - അമ്മയ്ക്കൊരു താരാട്ട്
14. എ. അയ്യപ്പൻ - നിനക്ക്
15. റോസ്മേരി - ചാഞ്ഞുപെയ്യുന്ന മഴ
16. റഫീക്ക് അഹമ്മദ് - മൊബൈൽഫോൺ
17. വി.എം. ഗിരിജ - ജീവജലം

സഹായകഗ്രന്ഥങ്ങൾ

1. ആധുനിക സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ – ഡോ.കെ.എം.ജോർജ്ജ് (എഡിറ്റർ)
2. കൈരളിയുടെ കഥ – എൻ. കൃഷ്ണപിള്ള
3. മലയാള കവിതാസാഹിത്യ ചരിത്രം – ഡോ.എം. ലീലാവതി
4. കവിയും കവിതയും രാം വാല്യം – പി.നാരായണക്കുറുപ്പ്
5. കവിയരങ്ങ് – കെ.എസ്. നാരായണപിള്ള
6. കുമാരാനാശാന്റെ കാവ്യപ്രപഞ്ചം – മലയാളവിഭാഗം, കേരള സർവ്വകലാശാല
7. ഖണ്ഡകാവ്യ പ്രസ്ഥാനം – എം.വി. പണിക്കർ
8. ചങ്ങമ്പുഴ കൃഷ്ണപിള്ള – എൻ.മുകുന്ദൻ
9. ചങ്ങമ്പുഴ കൃഷ്ണപിള്ള നക്ഷത്രങ്ങളുടെ സ്നേഹ ഭാജനം – എം.കെ.സാനു
10. കുമാരനാശാന്റെ രചനാശിൽപ്പം – എം.എം. ബഷീർ
11. കാല്പനികത – ഹൃദയകുമാരി
12. ആധുനിക മലയാളസാഹിത്യം – പി.കെ. പരമേശ്വരൻ നായർ
13. ഇടശ്ശേരിക്കവിത – മേലത്തു ചന്ദ്രശേഖരൻ
14. സിംബലിസം മലയാളകവിതയിൽ – ഡോ.കെ.എം. വേണുഗോപാൽ
15. ആധുനികത മലയാളകവിതയിൽ – ഡോ.എൻ.അജയകുമാർ
16. കേരളകവിതയിലെ കലിയും ചിരിയും – പ്രസന്നരാജൻ
17. ഉത്തരാധുനികത – ബി.ഉണ്ണികൃഷ്ണൻ
18. മലയാളകവിതാപഠനങ്ങൾ – സച്ചിദാനന്ദൻ
19. മലയാളകവിതയിലെ ഉയർന്നശിര ുകൾ – ഡോ.എം.എൻ. രാജൻ
20. കടമ്മനിട്ടയിലെ കവി – ഡോ.കെ.എസ്.രവികുമാർ
21. ദലിത് പഠനം സ്വത്വം,സംസ്കാരം സാഹിത്യം – ഡോ. പ്രദീപൻ പാമ്പിരിക്കുന്ന്
22. ആധുനിക മലയാള കവിതയിലെ സ്ത്രീപക്ഷസമീപനങ്ങൾ – ഡോ.പി.ഗീത
23. പാഠങ്ങൾ പഠനങ്ങൾ – സച്ചിദാനന്ദൻ
24. കവിതവായനയും പ്രതികരണവും – എൻ.രാജൻ
25. കവിതയിലെ പുതുവഴികൾ – നെല്ലിക്കൽ മുരളീധരൻ

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

First Semester BA Degree Examination May 2019

CBCSS

19UML 111.1

മലയാള കവിത (കാവ്യമാലിക)

Time : 3 Hrs. **Max.Marks : 80**

Section A

I. **ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്ക് വീതം**

1. ആശാനെ വിപ്ലവത്തിന്റെ ശുക്രനക്ഷത്രം എന്ന് വിശേഷിപ്പിച്ച നിരൂപകൻ ആര്?
2. ആധുനിക കവിത്രയം ആരെല്ലാം?
3. കാല്പനിക പ്രസ്ഥാനത്തിലെ പ്രധാനപ്പെട്ട രണ്ട് കവികളുടെ പേരെഴുതുക.
4. 'ശക്തിയുടെ കവി' എന്ന് വിശേഷിപ്പിക്കുന്നതാരെ?
5. ആധുനിക മലയാള ഭാഷയുടെ പിതാവ് ആര്?
6. 'ആർദ്രമീ ധനുമാസ രാവുകളിലൊന്നിൽ' - ഏത് കവിതയിലെ വരികളാണ്?
7. മലയാളത്തിലെ രണ്ട് പരിസ്ഥിതി കവിതകളുടെ പേരെഴുതുക.
8. ഉണ്ണിയാർച്ച കൂത്ത് കാണാൻ പോയ കഥ ഏത് സാഹിത്യശാഖയിൽ പെടുന്നു?
9. അധികാരം കൊയ്യണമാദ്യം നാം-

   അതിനു മേലാകട്ടെ പൊന്നാര്യൻ" - ഏതു കവിതയിലേതാണ് ഈ വരികൾ?
10. "സ്വന്തമെന്ന പദത്തിനെന്തർത്ഥം

    ബന്ധമെന്ന പദത്തിനെന്തർത്ഥം" - ഈ വരികൾ മലയാളികൾക്കു സമ്മാനിച്ച കവിപ്രതിഭ ആര്?

(1×10=10)

Section B

II. ഏതെങ്കിലും 8 ചോദ്യത്തിന് അരപ്പുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 2 മാർക്ക് വീതം.

11. "നിർഘൃണനായ പിതാവിവറ്റെയുപേക്ഷിച്ചാൻ"-വിവക്ഷിതമെന്ത്?
12. "പെണ്ണായ ഞാനും വിറയ്ക്കുന്നില്ല-

    ആണായ നിങ്ങൾ വിറപ്പതെന്തേ?" - ആരുടേതാണീ വാക്കുകൾ?
13. "അല്ലല്ലെന്തു കഥയിതു കഷ്ടമേ?" - വിവക്ഷിതം വ്യക്തമാക്കുക.
14. ഒറ്റപ്പത്തിയൊടായിരമുടലുകൾ

    കെട്ടുപിണഞ്ഞൊരു മണിനാഗം" - പരാമർശമെന്ത്?

PTO

15. “സങ്കടം കാൺകിലും കാണാതെ പോകയോ
മംഗലേ നീയൊരു മങ്കയല്ലേ?” - സന്ദർഭമേത്?

16. “നിങ്ങൾക്കിതൊന്നും മനസ്സിലാകുന്നില്ല” - ഈ ഉപഹാസത്തിന്റെ അർത്ഥമെന്ത്?

17. ‘ഒരു തൈ നടുമ്പോൾ’ എന്ന കവിതയുടെ പ്രമേയമെന്ത്?

18. ‘വരളുന്ന ചുണ്ടിലെ നനവാർന്ന ഓർമ്മ’യെന്നു കവി വിശേഷിപ്പിച്ചതെന്തിനെ?

19. “അന്യോന്യമൂന്നു വടികളായ് നിൽക്കാം” - വിവക്ഷിതമെന്ത്?

20. ‘പൂതനാമന്ത്രം പുരണ്ടതായി’ കവി കാണുന്നതെന്തെല്ലാം?

21. ‘നിനക്ക്’ എന്ന കവിതയുടെ കേന്ദ്രതലമെന്ത്?

22. ‘അമ്മയ്ക്കൊരു താരാട്ട്’ എന്ന കവിതയുടെ രചനാ പശ്ചാത്തലം വ്യക്തമാക്കുക.

(8×2=16)

Section C

III. ഏതെങ്കിലും 6 ചോദ്യത്തിന് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 4 മാർക്ക് വീതം.

23. എഴുത്തച്ഛനെ ആധുനിക മലയാളഭാഷയുടെ പിതാവ് എന്ന് വിശേഷിപ്പിക്കുന്നതിനുള്ള കാരണമെന്ത്?

24. നാടൻപാട്ടുകളെ കുറിച്ച് ഒരു ലഘുവിവരണം തയ്യാറാക്കുക.

25. കാല്പനികതയുടെ സവിശേഷതകൾ മനസ്വിനിയെ ആസ്പദമാക്കി വിശദീകരിക്കുക.

26. ജനങ്ങളിൽ പുതിയ കർമ്മവീര്യം ഉണർത്തുന്നതാണ് ഇടശ്ശേരി കവിതകൾ. പുത്തൻ കലവും അരിവാളും ആസ്പദമാക്കി വിചിന്തനം ചെയ്യുക.

27. സുഗതകുമാരി കവിതകളിലെ ബിംബകല്പന കാളിയമർദ്ദനത്തെ ആസ്പദമാക്കി വിശകലനം ചെയ്യുക.

28. കുഞ്ഞേ മുലപ്പാൽ കുടിക്കരുത് ഉണർത്തുന്ന സാമൂഹ്യമായ വെല്ലുവിളികൾ പരിശോധിക്കുക.

29. അമ്മയ്ക്കൊരു താരാട്ട് എന്ന കവിതയ്ക്ക് ഒരു ലഘു ആസ്വാദനം തയ്യാറാക്കുക.

30. റഫീക്ക് അഹമ്മദിന്റെ കവിതകളിലെ സമകാലീന ബിംബങ്ങൾ പരിശോധിക്കുക.

31. ചൂഷണം ചെയ്യപ്പെടുന്ന പരിസ്ഥിതിയും സ്ത്രീയും ജീവജലത്തിൽ എപ്രകാരം ആവിഷ്കൃതമാകുന്നു എന്ന് ചർച്ച ചെയ്യുക. (6×4=24)

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ രണ്ടുചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

32. ആശാന്റെ സ്നേഹസങ്കല്പം ചണ്ഡാലഭിക്ഷുകിയെ ആസ്പദമാക്കി വിശകലനം ചെയ്യുക.

33. ആക്ഷേപഹാസ്യ പ്രവണത ‘എലികൾ’ എന്ന കവിതയെ ആസ്പദമാക്കി ചർച്ച ചെയ്യുക.

34. അയ്യപ്പ പണിക്കരുടെ ഗോപികാദണ്ഡകം എന്ന കവിതയ്ക്ക് ഒരു ആസ്വാദനം തയ്യാറാക്കുക.

35. റോസ്മേരിയുടെ ചാഞ്ഞുപെയ്യുന്ന മഴയിലെ സ്ത്രീ സ്വത്വാവിഷ്കാരം ചർച്ചചെയ്യുക.

(15×2=30)

Foundation Course I

19UEN121: WRITINGS ON CONTEMPORARY ISSUES

No of Credits: 2 **No of hours: 72(4 per week)**

Course Outcome:

1. To sensitize students to the major issues in the society and the world.
2. To encourage them to read literary pieces critically.
3. To have an overall understanding of some of the major issues in the contemporary world.
4. To respond empathetically to the issues of the society.
5. To understand the grave issues of the society, respond to it and to bring about positive changes in individual outlook
6. To read literary texts critically.

Module I: Human Rights

Grim Realities, Hopeful Hues	: V.R Krishna Iyer
Poverty is the Greatest Threat	: N.R Madhava Menon
The Little Black Boy	: William Blake

Module II: Globalization

Going Local; the Economics of Happiness	: Helene Norberg-Hodge
Towards Sustainable and Beneficial Co-existence	: Christabel P.J
Freedom	: Balachandran Chulllikkad

Module III: Gender

Violence Against Women	: Gail Omvedt
The Goddess of Revenge	: Lalithambika Antharjanam

Module IV: Intoxicants/ Drug Abuse

The Ban of Alcoholism	: Dr Adithi.N
The Substance Use Disorders in Children and Adolescents	: Dr Ajeesh PR
The Alcoholic at the Dawn	: Jeet Thayil

Core Text: 'Perspectives on Contemporary Issues' Publisher: : 'Emerald' Chennai.

MODEL QUESTION PAPER
19UEN121: Writings on Contemporary Issues

Time: Three hours **Maximum Marks: 80**

Section-A

Answer **all** the questions, each in a word or a sentence. Each question carries 1 mark.

1. Expand NHRC.
2. What according to Dr Menon is the foundation of all rights?
3. What is the cloud referred to in the poem, "The Little Black Boy"?
4. What has been the focus of the women's liberation movement in India since its inception?
5. What information did Tatri hide from the men who were attracted towards her?
6. What is TRIPS?
7. What is meant by the term, "food miles"?
8. Why is sleep a kind of freedom?
9. What is pre-alcoholic phase?
10. Why does the cup rattle?

(10 x 1 = 10 marks)

Section-B

Answer any **eight** of the following. Each question carries 2 marks.

11. What is the significance of PILS in our society?
12. How can Third World economies counter the ill effects of globalisation?
13. What does the poet convey by the phrase "bereav'd of light"?
14. What do you know of the "virangana" in Indian culture?
15. According to the woman who appears in the story, what kind of a woman was Tatri?
16. Explain the process by which globalisation occurs in a country.
17. What is the Breakaway Strategy advocated by Hodge?
18. In the poem, 'Freedom', what does the train running north stand for?
19. How does alcohol affect the nervous system?
20. What are the after effects of the misuse of depressants?
21. How can substance abuse be diagnosed in adolescence?
22. What does the phrase "beached whale convey"?

(8 x 2 = 16 marks)

Section-C

Answer any **six** of the following. Each question carries 4 marks.

23. According to V.R. Krishna Iyer, what are the grim ground realities in India at the close of the millennium?
24. Explain the mother's worldview in "The Little Black Boy".
25. How does the social structure influence violence perpetuated against women in India?
26. How did the woman try to avenge her mother, her sisters, and countless other women who had been weak and helpless?
27. What does Joseph E. Stiglitz say about pro-globalisation policies worldwide?
28. Comment on the biblical overtones in 'Freedom'.
29. How is alcoholism categorised?
30. Write a note on the treatment of adolescent substance abuse?
31. Explore the impact of the unusual imagery in 'The Alcoholic at Dawn'.

(6 x 4 = 24 marks)

Section- D

Answer any **two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Write an essay on the imagery and symbolism in the poem, 'The Little Black Boy'.
33. How does Gail Omvedt examine violence against women in India?
34. Explain Hodge's views on globalisation as outlined in the article, 'Going Local'.
35. "Jeet Thayil's poems are honest in their autobiographical touch, unique in their imagery and attention to form." Explain this statement in the light of 'The Alcoholic at Dawn'.

(15 x 2 = 30 marks)

Core Course - I

19UCH141: Inorganic Chemistry I

(Lecture -Tutorial-Lab: 2-0-2)

No. of Credits: 2 **No. of instructional hours per week: 3**

Total hours 54

Course outcome

CO1: Learn the fundamental characteristics of science with its impact on human life.
CO2: Enable the students to systematically pursue Chemistry in relation to other disciplines that come under the fabric of Science.
CO3: Study the application of scientific methods for scientific data interpretation.
CO4: To introduce the students to bioethical issues in science related to research, publication, patents, plagiarism etc.
CO5: To familiarizes students with the understanding of tools and techniques in Chemistry.
CO6: To introduce the students to various career options and research institutions in Chemistry.

Course outline

Module I- Atomic Structure and Periodicity ***6 hrs.***

Introduction to the structure of atom - Dual nature of electron - de Broglie equation - matter waves and electromagnetic waves - experimental verification of de Broglie relation - Heisenberg's uncertainty principle - expression and significance. Wave mechanical concept of the atom - Schrodinger equation (Derivation not required) -. Quantum numbers - Pauli's exclusion Principle - Aufbau Principle – Hund's rule - Electronic configuration of atoms - classification of elements into s, p, d, f blocks - electronegativity- Pauling's scale, Mulliken and Allred - Rochow scale-(Including numerical problems)

Module II-Hydrogen **6hrs**

Position of hydrogen in the periodic table. - Similarities and differences in properties compared with alkali metals and halogens- Atomic and physical properties of hydrogen; Preparation of hydrogen- Reactions of hydrogen. Nascent, atomic and active hydrogen- Ortho and Para hydrogen -Deuterium and tritium –Uses of hydrogen- Hydrogen as next generation fuel-Hydrides- Types of hydrides, properties
Hydrogen bond- types-consequences of hydrogen bond.
Heavy water- preparation, properties and uses.

Module III- S-block elements and their compounds **9hrs**

General characteristics, atomic and ionic radii, ionisation enthalpy, electropositive character, formation of univalent positive ions, hydration of ions, reducing properties, Reactivity, characteristic flame colouration, lattice enthalpy.
Chemical properties of alkali & alkaline earth metals and their uses.
Comparison of lithium with other members of the family, resemblance of lithium and magnesium, comparison of beryllium with other members of the family.
Compounds of elements of group 1& II – comparative study-oxides, hydroxides, halides, carbonates & bicarbonates, Comparison of solubility products of hydroxides and sulphates
Composition and applications of : Gypsum, Plaster of Plaster, Portland cement.

Module IV* -Acids, Bases and Non Aqueous Solvents** ***6hrs

Arrhenius concept: Role of water in causing dissociation of acids and bases, Hydronium ion; Lowry-Bronsted concept: Conjugate acids and bases; and Lewis concepts of acids and bases, pH scale.
Introduction to *HSAB* principle.
Non Aqueous Solvents: General properties- classification- self ionization and levelling effect- Reactions in protic and aprotic non aqueous solvents- examples- solutions of metals in liquid ammonia- self ionization of liquid ammonia- liquid SO_2, liquid HF
Alkali metals in liquid ammonia-characteristics and properties

Module V - Environmental Chemistry – Air, Water and Soil Pollution ***9 hrs.***

Environmental Pollution- Sources, Effects on human health, Types of pollutants

Air pollution – Causes, harmful effects, consequences- Green house effect, Ozone layer depletion, Acid rain, Smog, Particulates; Control of air pollution.

Water pollution- Sources: Heat, Heavy metals, industrial waste, sewage water, detergents, agricultural pollutants; Impact on health.

Treatment of industrial waste water-Activated charcoal, Synthetic resin, reverse osmosis and electro dialysis

Quality of drinking water - Indian standard and W H O standard - Dissolved oxygen - BOD, COD

Soil pollution - Pesticides, Fertilizers, Industrial waste, Plastics - Control of pollution.

References

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2. The Golem : What everyone should know about science. H.Collins and T.Pinch. Cambridge Univ Press 1993
3. Alexis Leon & Mathews Leon: Introduction to Computers, Vikas Publishing House, 2009
4. Soti Sivendra Chanthra: Contemporary Science Teaching, Surjeet Publications, 1999.
5. Manas Chanda: Atomic Structure and Chemical Bonding including Molecular spectroscopy, McGraw Hill, 1974.
6. E.S. Gilreath : Fundamental Concepts of Inorganic Chemistry, McGraw Hill, 2005.
7. Puri, Sharma and Kalia: Inorganic Chemistry, Vishal Publishing Co., 2017.
8. Madan: Modern Inorganic Chemistry, S. Chand, 1987.
9. S. Manku: Theoretical principles of Inorganic Chemistry, McGraw Hill, 1982.
10. M. C. Day and J. Selbin: Theoretical Inorganic Chemistry, Literary Licensing, 2012.
11. F A Cotton and G. Wilkinson: Basic Inroganic Chemistry, Wiley, 1994.
12. S. K. Banerji: Environmental Chemistry, PHI Learning, 2004.
13. A. K. De: Environmental Chemistry - An introduction, New Age International Publishers, 2018.
14. B. K. Sharma: Air Pollution, Goel Publishing, 2019.
15. V. K. Ahluwalia: Environmental Chemistry, Ane Books, 2014.
16. G.W. vanLoon and S. J. Duffy: Environmental Chemistry: A global perspective, Oxford University Press, 2018.

MODEL QUESTION PAPER
19UCH141: INORGANIC CHEMISTRY I

Time: Three Hours **Maximum Marks: 80**

SECTION A (Answer **all** questions in one word/one sentence. Each question carries **1** mark)

1. Mention about the flame colouration of II group elements.
2. Write an example of classic smog.
3. State Heisenberg's uncertainty principle.
4. What are matter waves?
5. Which is the conjugate base of HF.
6. Define covalent radius.
7. Write the reason for eutrophication?
8. In the stratosphere, fluorine from the CFC's change to which compound.
9. What is active hydrogen?
10. Mention any use of alkali metals.

(1 X 10 = 10marks)

SECTION B (Answer any **8** questions. Each question carries **2** Marks)

11. Calculate the wavelength of electron moving with a velocity of 10^6 ms^{-1}.
12. A cricket ball weighing 100 g is to be located within 0.1 Å. What is the uncertainty in its velocity?
13. What are eigen values and eigen functions?
14. How first element differs from other elements in a group?
15. What is COD?
16. What are ortho and para hydrogens.
17. Write HSAB principle?
18. Comment about the hydration of alkali metals?
19. State and illustrate Pauli's Exclusion Principle.
20. Distinguish between levelling solvents and differentiating solvents.
21. Write a note on green house effect.
22. What is acid rain? Explain the various types of hydrogen bonds.

(2 X 8 = 16marks)

SECTION C (Answer any **6** questions. Each question carries **4** Marks)

23. Discuss the following reactions in liquid SO_2?
    (i) Solvation (ii) acid- base reaction
24. Discuss the structure of beryllium chloride
25. Derive Schrodinger wave equation.
26. Briefly explain about the Davisson and Germer's experimental verification of wave nature of electron.
27. What is smog? What are the different types of smog?
28. How ozone layer is depleted?
29. What is the trend of Ionization enthalpy and electron gain enthalpy in the periodic table?
30. What are hydrides? Explain.
31. Discuss about the redox property of alkali metals

(4 X 6 = 24marks)

SECTION D (Answer any **2** questions. Each question carries **15** Marks)

32. (a) Briefly discuss about the various air pollutants (5 Marks)
    (b) Write a note on Ozone depletion (5 Marks)
    (c) Explain about the various water quality Parameters (5 marks)
33. 33.(a) What are quantum numbers? Explain (5 Marks)
    (b) Write a note on various electronegativity scales (5 Marks)
    (c) Explain about the various rules for writing electronic configuration. (5 Marks)
34. (a) What is the difference between inter and intra molecular hydrogen bonding with example.
    (b) Discuss the topic hydrogen as next generation fuel
    (c)Liquid ammonia is a better solvent for organic compounds. Why?
35. (a) What are the common characteristics of solvents?
    (b) Discuss the various methods for removal of permanent hardness
    (c) Compare the solubility products of hydroxides and sulphates of alkaline earth metals.

(15 X 2 = 30marks)

Complementary Course I

19UMM131.2: Calculus with applications in Chemistry - I

No. of Credits:3 **Instructional hours per week: 4**

Aim:
To provide a knowledge on differentiation and integration with applications to chemistry, complex numbers and hyperbolic functions and basic vector algebra.

Course outcome:
Students will be able to demonstrate an understanding of numbers and functions and productively discuss maths in a group setting.

Module 1: Differentiation with applications to Chemistry (18 Hours)
(The following topics should be quickly reviewed before going to advanced topics; students should be asked to do more problems from exercises, and these problems should be included in assignments:) Differentiation of products of functions; the chain rule; quotients; implicit differentiation; logarithmic differentiation; Leibnitz theorem
The following topics in this module should be devoted more attention and time.
Special points of a function (especially, stationary points); curvature; theorems of differentiation - Rolles', Mean Value Theorems
Chapter 2, sections 2.1.2, to 2.1.7, (Review of ideas through problems), sections 2.1.8, 2.1.9, 2.1.10
More exercises related to the topics in this module can be found in chapter 2 and chapter 3 of reference [1], ***which is not to be included in ESE.***

Module 2 : Complex numbers and hyperbolic functions (18 hours)
Basic operations (Addition and subtraction; modulus and argument; multiplication; com-plex conjugate; division), Polar representation of complex numbers (Multiplication and division in polar form), de Moivre's theorem (trigonometric identities; finding the nth roots of unity; solving polynomial equations), Complex logarithms and complex powers, Applications to differentiation and integration, Hyperbolic functions (De finitions; hyperbolic trigonometric analogies; identities of hyperbolic functions; solving hyperbolic equations; inverses of hyperbolic functions;calculus of hyperbolic functions)
Chapter 3, sections 3.1 to 3.7
More exercises related to the topics in this module can be found in chapter 6 of reference [1] and chapter 13 of reference [4], ***which is not to be included in ESE.***

Module 3: Basic vector algebra (18 Hours)
Scalars and vectors, Addition and subtraction of vectors, Multiplication by a scalar, Basis vectors and components, Magnitude of a vector, Multiplication of vectors (Scalar product; vector product; scalar triple product; vector triple product), Equations of lines, planes and spheres, using vectors to find distances (Point to line; point to plane; line to line; line to plane)
Chapter 7, sections 7.1 to 7.8
More exercises related to the topics in this module can be found in chapter 11 of reference [1] and chapter 6 of reference [2], ***which is not to be included in ESE.***

Module 4: Basic integration with applications to Chemistry (18 Hours)
Integration by parts; reduction formulae; infinite and improper integrals; plane polar coordinates; integral inequalities; applications of integration (finding area, volume etc)
Chapter 2, sections 2.2.8 to 2.2.13
More exercises related to the topics in this module can be found in chapter 4, 5 and 7 of reference [1], ***which is not to be included in ESE.***

Note: In all modules, proofs of theorems are to be omitted

Text

K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

References

Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons
Ref. 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley
Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press
Ref. 4 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India

MODEL QUESTION PAPER

19UMM131.2: Calculus with applications in Chemistry-I

Time 3 hours **Total marks 80**

Part I

Answer all questions ($1\times 10 = 10$marks)

1. State Leibnitz's theorem for differentiation.
2. Find $\frac{dy}{dx}$ where $y = a^x$.
3. Find the conjugate of $(3+4i)^2$.
4. Find $z_1 z_2$ given $z_1 = 3e^{2i}$ and $z_2 = 2e^{3i}$.
5. If a and b are two non-zero vectors, then a unit vector normal to both a and b is _____.
6. The area of the parallelogram with sides $a = i + k$ and $b = j + k$ is _____.
7. Wind is blowing from a direction with velocity $3i - 2j$ and from another direction with velocity $2i - 3j$. Find the velocity of the resulting wind.
8. Find $\int \ln x \, dx$.
9. Length of the curve $y = f(x)$ between $x = a$ and $x = b$ is _____.
10. For a polar curve $\rho = \rho(\varphi)$, the area covered as φ varies from φ_1 to φ_2 is _____.

Part II

Answer any 8 questions ($2\times 8 = 16$ marks)

11. Find $\frac{dw}{dt}$, if $w = \tan x$ and $x = 4t^3 + t$.
12. Find $\frac{dy}{dx}$ at $x = 1$, where $2y + \sin y + 5 = x^4 + 4x^3 + 2\pi$.
13. Verify Rolle's theorem for $f(x) = x^2 + x$.
14. Find the conjugate of $\frac{3-2i}{-1+4i}$.
15. Show that $cosh^{-1}x = \ln\left(\sqrt{x^2-1} + x\right)$.
16. Solve the equation $z^3 = 1$.
17. Find the angle between the vectors $a = 3i + 2j - k$ and $b = i + 2j - 3k$.
18. Find the distance from origin to the line $r = a + \lambda b$, where $a = i + j + k$ and $b = i + 2j + 3k$.
19. Find the direction of line of intersection of the two planes $x + 3y - z = 5$ and $2x - 2y + 4z = 3$.
20. Evaluate $\int x^3 e^{-x^2} dx$.
21. Evaluate $\int_0^\infty \frac{x}{(x^2+a^2)^2} \, dx$.
22. Find the average value of the function $f(x) = x^2$ in the interval $[-1,1]$.

Part III

Answer any 6 questions. ($4\times 6 = 24$ marks)

23. Find the position and nature of the stationary points of the function $f(x) = 3x^4 + 4x^3 - 12x^2 + 6$.
24. Verify Mean Value Theorem for $f(x) = \sqrt{x+1}$ in $[0,3]$. Find all values of c in the interval which satisfy the conclusion of the theorem.
25. Find the radius of curvature at a point (x, y) on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
26. Solve the equation $z^6 - z^5 + 4z^4 - 6z^3 + 2z^2 - 8z + 8 = 0$.
27. Show that i^{-21} is a real number.
28. Use De Moivre's theorem to show that $\cos 4\theta = 8cos^4\theta - 8cos^2\theta + 1$.
29. Find the position vector of the centroid of the triangle with vertices A, B ,C having position vectors a, b, c respectively with respect to origin O.
30. Find the distance from a point P with coordinates $(1,1,1)$ to the plane that contains the points A, B, C having coordinates $(1,0,0)$, $(0,1,0)$ and $(0,0,1)$ respectively.
31. Find the volume of the parallelopiped with sides $a = 3i + 2j + k$, $b = 3i - 2j - k$ and $c = i + j + k$.

Part IV

Answer any two questions ($15\times 2 = 30$ marks)

32. (a) Find $\int e^{ax} \cos bx \, dx$.
    (b) Solve the hyperbolic equation $\cosh x - 5 \sinh x - 5 = 0$.
33. (a) Find the area and perimeter of the cardiod whose equation is $\rho = a(1 - \sin \varphi)$.
    (b) Find the surface area of a cone formed by rotating about the x- axis the line $y = 2x$ between $x = 0$ and $x = 2$.
34. (a) Show that the differential equation $4x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + (4x^2 + 3)y = 0$ has a solution of the form $y(x) = x^n \sin x$, and find the value of n.
    (b) Show that $I_n = \frac{3n}{3n+1} I_{n-1}$, where $I_n = \int_0^1 (1 - x^3)^n dx$. Hence evaluate $\int_0^1 (1 - x^3)^2 dx$
35. (a) Find the radius ρ of the circle that is the intersection of the plane $\hat{n} \, . r = \rho$ and the sphere of radius centered on the point with position vector c.
    (b) Identify the surfaces
        i. $|r| = k$
        ii. $r.u = 1$
        iii. $r.u = m|r|$ for $-1 \leq m \leq 1$.

Complementary Course II

19UPH131.2: Rotational Dynamics and Properties of Matter

No.of credits: 2 **Instructional hours per week: 4 (36 hours)**

Course Outcome

- Understand the dynamics of rigid bodies, various theorems involved and derivations of expressions of moment of inertia of bodies of different shapes
- Understand the bending of beams and analyze the expression for young's modulus
- Understand the basics of surface tension and viscosity of fluid
- Analyse the basics of wave motion and oscillations

Unit I (28 hours)

Dynamics of rigid bodies (7 hours)

Theorems of M.I with proof -Calculation of M.I of bodies of regular shapes-
rectangular lamina, uniform bar of rectangular cross section, annular disc, circular disc, solid cylinder, solid sphere-K.E of a rotating body-Determination of MI of a flywheel(Theory and Experiment).

Oscillations and waves (13 hours)

Examples of S.H oscillator-compound pendulum-determination of g-torsion pendulum-oscillations of two particles connected by a spring-vibration state of a diatomic molecule- Wave motion-general equation of wave motion-plane progressive harmonic wave - energy density of a plane progressive wave -intensity of wave and spherical waves-

Mechanics of solids (8 hours)

Bending of beams-bending moment-cantilever-beam supported at its ends-and loaded in the middle-uniform bending-experimental determination of Y using the above principles with pin and microscope-twisting couple on a cylinder-angle of twist and angle of shear-torsional rigidity.

Unit II (8hours)

Surface Tension (5 hours)

Excess of pressure on a curved surface-force between two plates separated by a thin layer of liquid-experiment with theory to find surface tension and its temperature dependence by Jaeger' method-equilibrium of a liquid drop over solid and liquid surfaces.

Viscosity (3 hours)

Flow of liquid through a capillary tube-derivation of Poiseuille's formula -limitations-Ostwald's viscometer-variation of viscosity with temperature.

References

1. Mechanics: J.C.Upadhyaya, Ram Prasad & Sons
2. Oscillations&Waves: K.RamaReddy, S.B.badami & V.Balasubramaniam (University Press)

MODEL QUESTION PAPER

19UPH131.2: Rotational Dynamics and properties of Matter

Time: 3Hrs **Maximum Marks: 80**

Part A

Answer all questions each in a word or a sentence .Each question carries 1 mark.

1. Give the relation for moment of inertia for a rectangular lamina about an axis perpendicular to its plane and passing through the center of mass.
2. What is meant by amplitude of simple harmonic motion?
3. Give one example for harmonic oscillator.
4. Give the expression for energy density for a plane progressive wave.
5. Define the term flexural rigidity.
6. Give the advantage of I shaped steel girders.
7. Give the dimensional formula for coefficient of viscosity.
8. Write the expression for the viscous force
9. Define surface energy.
10. Write the expression for excess pressure inside a spherical liquid drop.

(10 x 1 =10marks)

Part B

Answer any 8 questions. Each question carries 2 marks.

11. Derive an expression for moment of intertia of a thin circular ring.
12. Obtain the relation for kinetic energy of a rotating body.
13. Define simple harmonic motion.
14. From the differential equation of simple harmonic motion obtain the relation for acceleration of simple harmonic motion.
15. What is meant by periodic motion
16. What is meant by energy current of a plane progressive wave.
17. Obtain the relation for work down in twisting a wire.
18. Define the term bending moment.
19. What is meant by surface tension.Obtain the dimensional formula for surface tension.
20. Obtain the expression for force required to separate two plates enclosing a thin liquid film.
21. How the viscosity varies with temperature.
22. What is meant by velocity gradient?

(8 x 2 =16marks)

Part C

Answer any 6 questions .Each question carries 4 marks.

23. A solid sphere of mass 100 gm and diameter 20 cm rolls without slipping with uniform velocity 5 cm/s along a horizontal plane. Calculate the total kinetic energy.
24. A circular disc of radius 20 cm oscillates as a pendulum about a point on its circumference. Calculate the period of oscillation.
25. The frequency of the fourth harmonic in a stretched string of length 20 cm is 600 Hz .What is the velocity of the wave in the string? If now the tension is doubled,what will be the final velocity of the waves?
26. Find the frequency period and wavenumber for the light of wave length 6000 A.U given $c=3X10^{8}$ ms^{-1}
27. The pressure amplitude is 0.5 Nm-2 for a plane harmonic sound wave for frequency 1000 Hz in air. What are the displacement and velocity amplitude.
28. A circular bar one meter long and 8 mm diameter is rigidily clamped at one end in the vertical position.A couple of magnitude 2.5 Nm is applied at the other end.As a result a mirror fixed at the end deflects a sport of light by 15 cm on the scale on meter away.Calculate the modulus of rigidity of the bar.
29. The rectangular cross-section of a cantilever has sides in the ratio 1:2.Calculate the ratio of the depression under the same load when (1)the smaller side is vertical(2)the longer side is vertical.
30. Two plane glass plates have a water drop pressed between them spreading as a circle of diameter 10cm. The plates are 0.005mm apart. What force perpendicular to the plates will be required to separate them? Surface tension of water is 72 $X10^{-3}$ Nm^{-1}.

31. Find the velocity of water that will flow per minute through a pipe of diameter 4 cm and length 200 m when a pressure of 5 Pa is applied, assuming that the flow is streamlined. Viscosity of water =0.001 SI unit.

(6x 4 =24 marks)

Part D

Answer any 2 questions. Each question carries 15 marks.

32. A. Derive an expression for moment of inertia of a solid sphere (i)About it diameter(ii)about it tangent
    B. State and prove the theorem of parallel axis in moment of inertia.
33. Derive an expression for the period of oscillation of a compound pendulum .Show that the center of suspension and oscillation are reversible.Also describe an experiment to determine g using the pendulum.
34. Describe with relevant theory an experiment to determine the Young's modulus of the material of the bar of uniform bending.
35. Calculate the difference of pressure across an element of the curved surface of a liquid in terms of surface tension and the principal radii of curvature of the element. And hence calculate the excess pressure inside a bubble.

(2x 15 =30marks)

Semester - II

Language Course III

19UENS211: ENVIRONMENTAL STUDIES

Credits: 4 **Total Lecture Hours: 90 (5/week)**

Course Outcome

The course seeks to introduce students to the major concepts of environmentalism, conservation, intellectual property rights and human rights.

The Course aims to develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones**.**

COURSE OUTLINE

MODULE 1

Unit 1: **The Multidisciplinary Nature of Environmental Studies**

Significance of Environmental Studies, Definition, scope and importance, WED - Need for public awareness.

Literary Section: Matthew Olzmann's ***Letter to Someone Living Fifty Years from Now***

Unit 2: Natural Resources

History of our Global Environment, Changes in Land and Resource use, Earth's Resources and Humans – Atmosphere, Hydrosphere, Lithosphere, Biosphere

Natural cycles between the spheres, Renewable and Non-renewable resources, Natural Resources and Associated problems – Sustainable lifestyles

a. Forest resources: Importance, Functions,Use and over-exploitation, deforestation.
b. Water resources: Sources of Water, Use and over-utilization of surface and ground water, Global climate change – floods, drought, conflicts over water, Sustainable water management, Dams.
c. Mineral resources: Strategic Mining, Mining, Conservation of Mineral Resources, Use and exploitation
d. Food resources: World food problems, Food security, Fisheries, Loss of Genetic Diversity, Alternate food sources

   Assignment Topic: Energy resources: Growing energy needs, Types of energy – Conventional or Non-renewable Energy sources, Oil and its environmental impacts, Coal and its environmental impacts., Renewable energy – hydroelectric power – drawbacks, Solar energy, Photovoltaic energy, Solar thermal electric power, Biomass energy, Biogas, Wind power, Tidal and Wave power, Geothermal energy, Nuclear power, Energy conservation
e. Land resources: Land as a resource, land degradation. Soil Erosion

Role of an individual in the conservation of Natural Resources – Equitable use of Resources for Sustainability.

Literary Section: Sugatha Kumari's ***Hymn to the Tree***

MODULE 2

Unit 3: Ecosystems

Concept of an Ecosystem, Understanding Ecosystems, Ecosystem degradation, Resourec Utilisation, Structure and functions of an ecosystem, Biotic components – Producers, consumers and decomposers. Abiotic components – Physical factors – Chemical Factors – Biotic community and Tropic level –Food chains, food webs and ecological pyramids.Energy Flow in the Ecosystem – The WaterCycle, The Carbon Cycle, The Nitrogen cycle – Integration of Cycles in Nature, Ecological Succession - Types of Ecological succession.

Assignment Topic

Types of Ecosystem: Terrestrial and Aquatic - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Cropland Ecosystem, Mangrove Ecosystem, Aquatic ecosystems – Pond, lake, wet land, River, Delta and Marine – Threats to Aquatic Ecosystems, Conservation of Aquatic Ecosystems – Mullaperiyar Issue - Assignment

Literature: Wangari Maathai's ***Unbowed***

Unit 4: Biodiversity and Its Conservation

Introduction to Biodiversity, definition, Classification: Genetic, Species and Ecosystem diversity. Evolution and the Genesis of Biodiversity, Biogeographic classification of India, India's Biogeographic zones, Value of Biodiversity – Consumptive Use Value and Productive Use Value, Social Values, Ethical and Moral values, Aesthetic value, Option Value. Biodiversity at Global, National and Local levels,.India as a Mega Diversity Nation. Hot-spots of

biodiversity.

Assignment Topic: Threats to biodiversity: habitat loss, poaching of wildlife, human/wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity. Humans and the Web of life, Rights of Species
Literature: Olivia Judson's ***Big Bird***

MODULE 3

Unit 5: Environmental Pollution

Definition of Environmental pollution, Classification of Pollutants.
Major forms of Pollution: Air pollution – Causes, Effects, Ozone Depletion, Control Measures, Water pollution – Causes, Consequences, State of India's Rivers, Ganga Action Plan- Assignment Topic. Control Measures, Soil pollution – Causes, Effects, Control measures. Marine pollution – Causes, Effects, Control Measures. Pollution due to organic wastes, Control measures, Noise pollution – Causes, Effects, Control Measures. Acid rain, Greenhouse Effect, Thermal pollution – Causes, Effects, Controlling Thermal Pollution. Nuclear hazards – Sources, Effects, Radiation Control Measures.
Waste: Solid Waste Management Classification, Role of Individuals, Disaster management – **Case Study**: Endosulfan Tragedy, "Marble Cancer" of Taj Mahal, Chernobyl disaster in Ukraine, The Exxon Valdez Oil Spill, Chandigarh as "City Beautiful", The Swachh Bharat Abhiyan, Plachimada struggle in Palakkad
Literature: ***God's Own Country*** , an extract from Arundathi Roy's ***God of Small Things***

Unit 6: Social Issues and the Environment

Introduction to Social Issues and the Environment – From unsustainable to sustainable development.Think Globally, Act Locally. Urban problems related to energy, Water conservation and Strategies, Rain water harvesting, Watershed management. Resettlement and Rehabilitation of people: Problems and concerns,
Environmental ethics: Issues and possible solutions, Equity-Disparity in the Northern and Western Countries, Urban and Rural Equity, Gender Equity, Preservation of resources for future generations. The Ethical Basis of Environmental Education and Awareness. Conservation Ethic and Traditional value systems of India,

Assignment Topic: Environmental Issues of Grave Consequences: Climate change, Global warming, Acid rain, Ozone Layer depletion, Nuclear Accidents and Nuclear Holocaust, Wasteland reclamation, Consumerism and Waste Products, The Environment Protection Act, Issues involved in Enforcement of Environmental Legislation – Environment Impact Assessment, Citizen actions and Action Groups, Environmental Clearance. Public Awareness
Literature: Salim Ali's ***Man and Nature in India: The Ecological Balance***

MODULE 4

Unit 7: Human Population and the Environment

Introduction to Human Population and the Environment, Urbanisation, Environment day and Human health, Human Rights, Value Education, Women and Child Welfare. Role of Information technology in Environment and Human health
Literature: Sujatha Devi's ***Government Protocol***

Books for Reference: Core Text: 'Our Fragile Earth - Home' [To be published by the Dept]

- Adams, W.M. Future Nature: A Vision for Conservation. London: Earthscan, 2003.
- Arnold, David and Ramachandra Guha, ed. Nature, Culture and Imperialism:Essays on the Environmental History of South Asia. New Delhi: Oxford UPM 2001.
- Bahuguna, Sunderlal. "Environment and Education". The Cultural Dimension of Ecology. Ed. Kapila Vatsyayan. New Delhi: D.K. Printworld. 1998.
- Crson, Rachel. Silent Spring. Boston: Houghton Mifflin, 1962.
- Guha, Ramachandra- Environmentalism: A Global History,New Delhi: Oxford UP, 2000.
- Hayward, Tim. Ecological Thought: An Introduction: Cambridge; polity, 1994.
- Merchant, Crolyn. The Death of Nature. New York: Harper, 1990.
- Gleick H.P. 1993. Water in Crisis, Pacific Institute for Studies in development Environment and security. Stockholm Env Institute. OUP 473 p.
- Heywood V and Watson R.E. 1995. Global biodiversity Assessment. CUP 1140p
- Odum FP. 1971. Fundamentals of Ecology. W.B Saunders Co. USA 574p
- Rao. M. N and Dutta A.K. 1987. Waste Water Treatmentt. Oxford and IBH Publ Co Pvt.
- Wagner K.D. 1998. Environmental Management. WB Saunders Co. Philadelphia, USA. 499p.

MODEL QUESTION PAPER
19UENS211: Environmental Studies

Time: Three hours **Maximum Marks: 80**

Section-A

Answer **all the questions**, each in a word or a sentence. Each question carries 1 mark.

1. Define the term environment.
2. Name the three 'R' s.
3. What forms the abiotic part of nature?
4. Bhopal Gas Leak Tragedy was caused by the release of _____ gas.
5. Expand IUCN.
6. What is ecocriticism?
7. What, according to Salim Ali, is the most important remedy for ecological balance?
8. How did the river appear in Rahel's eyes??
9. Why are humans called "ungrateful ones"?
10. What sinks to grief according to Frost?

(10 x 1 = 10 marks)

Section-B

Answer **any eight** of the following. Each question carries 2 marks.

11. Write a brief note on the four dynamic constituents of the environment.
12. What is deforestation?
13. Write a note on Women and Child Welfare
14. Explain watershed management.
15. What are the main characteristics of biodiversity hotspots?
16. What is Municipal Solid Waste?
17. Why is the History House described as having turned its back on Ayemenem?
18. What is Chandiram's complaint against the narrator?
19. How are frogs useful in paddy cultivation?
20. What were Wangari Maathai's mother's views about the fig trees?
21. Why is the tree compared to Lord Neelakanta?
22. What does the phrase "seagulls rippled with jet fuel" refer to?

(8 x 2 = 16 marks)

Section-C

Answer **any six** of the following. Each question carries 4 marks.

23. Define alternate food sources.
24. What are the important methods of conservation of biodiversity?
25. Write a short note on rainwater harvesting.
26. Write a note on AIDS.
27. Why is Environmental Studies considered multidisciplinary in scope?
28. Why is the Australian rainforest described as a living museum?
29. What does Salim Ali mean by saying that senseless use of advanced technology has tended to boomerang on humans?
30. Describe the ambience around the stream named Kanungu.
31. How does the narrator seek to establish that her generation was capable of refined thinking?

(6 x 4 = 24 marks)

Section- D

Answer **any two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Discuss the various types of pollution and the effective strategies to contain them.
33. What is an ecosystem? What are the main types of ecosystems?
34. How does Sugatha Kumari present the importance of tree to the environment as a whole and to humans in particular?
35. Why does Sujatha Devi say, "Summits should take place inside the mind. Not at Rio"?

(15 x 2 = 30 marks)

Language Course IV

19UEN212.1: ENGLISH GRAMMAR AND COMPOSITION

Credits: 3 **Total Lecture Hours: 72 (4/week)**

Course Outcome:

On completion of the course, the students should be able to

1. Have an appreciable understanding of English grammar.
2. Produce grammatically and idiomatically correct spoken and written discourse.
3. Spot language errors and correct them.
4. Have a good understanding of modern English grammar.
5. Produce grammatically and idiomatically correct language.
6. Improve their verbal communication skills.
7. Minimise mother tongue influence.
8. Write essays and letters on general topics enabling them to excel in competitive exams
9. Write CVs and Resumes to apply for various posts

COURSE OUTLINES

Module 1

Parts of Speech – Infinitive – gerund – nouns – pronouns- adjectives – verbs – adverbs – prepositions – conjunctions – determiners

Module 2

Sentence types – simple – complex – compound – sentence types based on sense – interrogative – assertive –negative – imperative – exclamatory – modal verbs– conditional clauses.

Module 3

Tenses – articles – voices – active – passive – reported speech. Subject verb agreement – Remedial grammar

Module 4

Précis writing – comprehension – letters – CV – cover letter – reports – essays.

Core Text: Hart, Steven, Aravind R. Nair and Veena Bhambhani. *Embark English for Undergraduates*. CUP, 2016.

Further Reading:

1. Moothathu, V. K. Concise English Grammar. Oxford University Press, 2012.
2. Leech, Geoffrey et al. English Grammar for Today: A New Introduction.2nd Edition. Palgrave, 2008.
3. Carter, Ronald and Michael McCarthy. Cambridge Grammar of English.CUP, 2006.
4. Greenbaum, Sidney. Oxford English Grammar. Indian Edition. Oxford University Press, 2005.
5. Sinclair, John ed. Collins Cobuild English Grammar. Harper Collins Publishers, 2000.
6. Driscoll, Liz. Common Mistakes at Intermediate and How to Avoid Them.CUP, 2008.
7. Tayfoor, Susanne. Common Mistakes at Upper-intermediate and How to Avoid Them.CUP, 2008.
8. Powell, Debra. Common Mistakes at Advanced Level and How to Avoid Them.CUP, 2008.
9. Burt, Angela. Quick Solutions to Common Errors in English. Macmillan India Limited, 2008.
10. Turton. ABC of Common Grammatical Errors. Macmillan India Limited, 2008.
11. Leech, Geoffrey, Jan Svartvik. A Communicative Grammar of English. Third Edition. New Delhi: Pearson Education, 2009.

MODEL QUESTION PAPER
19UEN212.1/19UEN211.2: English Grammar and Composition

Time: **Three hours** Maximum Marks**: 80**

Section A

Fill in the blanks as directed. **Answer all the questions**.

1. She plays the violin well,……..? (Add a suitable question tag)
2. The leaves fluttered _____ in the breeze. (Use the correct adverbial form of "slight")
3. Chinese is a language ……. I find difficult. (Fill in with a suitable relative pronoun)
4. Gayathri _____ sing at the concert ((Choose will/could))
5. Sanjay has been living here …… 2000. (Choose for/since)
6. It is a deserted street. (Identify the adjective)
7. Neither of the boys ……. absent. (Choose is/are)
8. Prevention is…… than cure. (Fill in with the suitable comparative)
9. The teacher put the papers ….. the drawer.(Supply a suitable preposition)
10. Pass the salt, please. (Identify the type of sentence)

(10 x 1 = 10 marks)

Section B

Answer any eight of the following questions as directed:

11. Fill in the blanks using "a", "an", "the' or the "zero article", wherever they are appropriate
    _____ chair I am sitting on is hard. But with _____ couple of pillows, I can make myself comfortable. Do you mind giving me _____ red pillow placed on _____ cot there?
12. Correct the following sentences:
    1. Despite of his illness he came to school.
    2. I am still remembering his service.
13. Rewrite the sentences beginning with "It":
    1. To smoke too much is dangerous.
    2. This problem is not easy to solve.
14. Convert the following sentences as directed:
    1. How cold it is today! (Change into assertive)
    2. She obeys her parents. (Change into a question.)
15. Change into comparative and positive:
    Bangalore is the cleanest city in India.
16. Use the correct form of Question tag:
    1. She expects to meet him at the station.
    2. He hid behind the door.
17. Use the correct tense form of the verbs given in brackets:
    1. He never (talk) while he (drive) a car.
    2. By next year, he..... (complete) this novel and started the next.
18. Rewrite as directed.
    1. She came back. (Put the following adverbs – at six; hurriedly; to her room – in the right order)
    2. She has a ..... ribbon. (Put the following adjectives – blue, long – in the right order)
19. Do as directed.
    1. When I saw her last, she (live) with her aunt. (Use the correct tense form)
    2. He was killed by a robber by a knife. (Correct the sentence)
20. Rewrite as directed
    1. I am interested in cooking, and _____ prepare a feast in two hours. (Use can/could)
    2. The thief saw the police. He fled. (Combine the sentences using no sooner . . . than)
21. Rewrite the sentences.
    1. He talks English in a <u>fluent way</u>. (Convert the underlined phrase into an adverb)
    2. He is known for his <u>honesty</u>. (Convert the underlined noun into an adjective)
22. Fill in the blanks with the appropriate adverb or adjective
    1. The drunkards behaved _____ towards one another. We are experiencing _____ weather today. (rough/roughly)
    2. I can _____ understand what you have written. You have to work _____ to improve your handwriting. (hard/hardly)

(8 x 2 = 16 marks)

Section C

Answer <u>any six</u> questions from the following sections (23 to 31):

23. Correct the following sentences: **(All questions should be attempted)**
    1. The chief guest gave a brilliant speech.
    2. When I entered the room, I found my watch is stolen.
    3. Ooty is notorious for its sceneries.
    4. He carried all his luggages alone.
24. Fill in the blanks with appropriate tense forms
    I _____ just _____ (finish) my project here in the US. Now I _____ (go) back to Nigeria. I _____ (stay) there for the rest of my life. It _____ (be) summer in Nigeria this time of the year. I _____ (know) this but all my life I _____ (think) of "overseas" as a cold place of woollen coats and snow. So I _____ (buy) the thickest sweaters I could find.
25. Rewrite as directed. (All questions should be attempted)
    1. On Teacher's Day, students of our school handle all the classes (Change into passive)
    2. The Redfort is a very fascinating historical monument in India. (Change into the Comparative Degree)
    3. Among all the professions, medicine is the oldest. (Change into Positive)
    4. Vivek said, "The boys in the room are practicing a song to be sung at the Annual Day". (Change into indirect speech)
26. Rewrite as directed. (All questions should be attempted)
    1. Prakash said, "My parents are coming home tomorrow so I have arranged a party". (Rewrite into reported speech)
    2. She said, "What a lovely flower!" (Change into indirect speech)
27. Change the voice:
    1. The teacher has given a book to Ravi.
    2. The CEO is briefing the Secretary on the corrections to be made in the speech.
    3. My friend stole my watch.
    4. Ravi buys chocolates for me from the newly opened Bakery.
28. Your parents have visited you in your boarding school. Introduce your best friend to your parents.
29. Write five sentences on the "Importance of Value Education Classes".
30. Write a paragraph on "Reading".
31. Imagine you are the headmaster of a school. Write a letter to a book distributor regarding the purchase of books for the school library, requesting information about the price, availability of discounts etc.

(6x 4 = 24 marks)

Section D

Answer **<u>any two</u>** of the following:

32. You are Abhisekh Sharma, a postgraduate in Journalism. Prepare a cover letter and resume for the post of Sub-editor in "The Indian Chronicles", leading English daily.
33. (i) Write a précis on the following passage. (7 marks)

    Differences, big or small, can always be noticed even within a national group, however closely bound together it may be. The essential unity of the group becomes apparent when it is compared to another national group, though often the differences between two adjoining groups fade out or intermingle near the frontiers, and modern developments are tending to produce a certain uniformity everywhere. In ancient and medieval times, the idea of the modern nation was non-existent, and feudal, religious, racial or cultural bonds had more importance. Yet I think that at almost at any time in recorded history an Indian would have felt more or less at home in any part of India and would have felt as a stranger and alien in any other country. He would certainly have felt less of a stranger in countries which had partly adopted its culture or religion. Those who professed religion of non-Indian origin, or, coming to India, settle down here, became distinctively Indian in the course of a few generations, such as Christians, Jews, Parsees, Muslims. Indian converts to some of these religions never ceased to be an Indian on account of their change of faith. They were looked upon in other countries as Indians and foreigners, even though there might have been a community of faith between them. (217 words)

    (ii**) Answer the following questions from the passage given above**: (8 marks)
    1. Which phenomenon is noticed at the frontiers of different nations?
    2. What features were prominent in ancient times?
    3. What happened to the immigrants in India in the course of a few generations?
    4. What is the quality of Indian converts? **(7+ 8 = 15 marks)**
34. Write an essay on "The Role of Media" (Answer in about two to three pages) **(15 marks)**
35. Write a report on the following topic in about 300 words.

    Stray dog menace in your locality. **(15 marks)**

Language course V (Additional Language II)

19UFR211.1: TRANSLATION AND COMMUNICATION IN FRENCH

No of Credits: 3 **No of hours: 4 Hrs/week**

COURSE OBJECTIVES:

1. To ameliorate the level of language proficiency
2. To analyse the translated texts.
3. To enhance the ability to translate to the target language.

COURSE OUTCOME:

The students would be able to enhance their communication skills with the assistance of translation.

SYLLABUS:

NAME OF TEXT: **ECHO-A1 méthode de français**
Authors: J. Girardet & J. Pecheur
Publisher: CLE INTERNATIONALE

- Leçon 3 : On se détend ? (Pages : 22 -29)
- Leçon 4 : Racontez-moi (Pages : 30 – 44)
- Leçon 5 : Bon Voyage ! (Pages : 46 – 53)

Reference books:

- Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
- Le Nouveau Sans Frontières Vol I by Philippe Dominique
- Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER

19UFR211.1: TRANSLATION & COMMUNICATION IN FRENCH

TIME: 3HRS **MAX MARKS: 80**

PART-A

Répondez à toutes questions suivantes:

1. Quels loisirs aimez-vous ?
2. Qui est Jean Paul Sartre ?
3. Qu'est-ce que c'est « TV5 Monde » ?
4. Nommez un monument français ?
5. Qu'est-ce que c'est « SNCF » ?
6. Qu'est-ce que c'est « le Nouvel Observateur » ?
7. Quelles villes connaissez-vous en France ?
8. Quelle heure est-il maintenant ?
9. Nommez deux moyens du transport ?
10. Qui est le président actuel de la France ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Ecrivez en chiffres:
    a. Trois heures dix
    b. Cinq heures et quart
    c. Huit heures moins vingt-cinq
    d. Midi
12. Répondez par « vrai » ou « faux » :
    a. Le français est très utilisé en Suisse et au Maroc.
    b. Le Québec est une région de France.
    c. Une commune est un petit village.
    d. Les Français déjeunent entre 14h et 15h 30.
13. Complétez avec les prépositions qui conviennent :
    a. Antonio est né ….. Espagne.
    b. Il est venu …. Paris pour passer une semaine de vacances.
    c. Il est arrivé hier ….. 10 heures.
    d. Il habite …..un ami.
14. Choisissez le bon article :
    a. Le week-end, Marie fait [le/du] sport. Elle aime [le/du] tennis. Elle fait aussi [un/du] vélo avec des amis.
    b. Je connais [le/un] bon restaurant sur l'avenue des Champs-Élysées.
15. Quels sont les jours de la semaine ?
16. Rédigez un message de deux phrases :
    a. Vous recevez l'invitation d'une amie pour la soirée au Saturne. Vous refusez.
17. Traduisez en français :
    a. Are you interested ?
    b. Clermont is a pleasant city.
    c. See you soon.
    d. Paul and Sophie work together.
18. Faites des comparaisons:
    a. Entre L'Australie et La France
    b. Entre Paris et Milan
19. Complétez avec « ce, cet, cette, ces » :
    a. Qui sont …..personnages ?
    b. Je connais…..acteur. c'est Depardieu.
    c. Et …..chanteuse, c'est Laurie.
    d. Regarde …..visiteur. C'est un personnage de cire !

20. Complétez avec « moi, toi, lui, elle, nous, vos, eux, elles » :
    a. Flore fait du sport avec Pierre et Antoine ?
        - Oui, elle fait du tennis avec ……..
    b. Flore habite chez Marie ?
        - Oui, elle habite chez ……
    c. Elle travaille pour M. Dumont ?
        - Oui, elle travaille pour ……
    d. Elle vient en vacances avec nous ?
        - Oui, elle vient avec ……..
21. Complétez avec « pouvoir, vouloir, devoir » :
    a. Tu ……faire du ski ?
        - Je voudrais bien mais je ne …..pas skier.
    b. Et toi, Flore, tu viens ?
        - Désolée. Je ne …..pas. Je ……travailler tout le week-end.
22. Formulez les informations suivantes comme dans l'exemple :
    Ex : 03-02-1970. Naissance de Celia. → Celia est née le 3 février 1970.
    a. 1992. Entrée a l'université.
    b. Juin 1995. Diplôme de professeur d'anglais.
    c. 25-08-1994. Rencontre avec William
    d. Septembre 1998. Départ pour l'Australie.

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Mettez les verbes au passé composé :
    « Je (aller) au cinéma avec Pierre. Nous (voir) un film très amusant. Puis nous (faire) une promenade au jardin des Tuileries. Apres, je (rentrer) chez moi. »
24. Ecrivez l'heure :
    a. 09 :20
    b. 15 :30
    c. 16 :45
    d. 00 :15
25. Trouvez les questions:
    a. ……..? Non, Je n'ai pas compris.
    b. ……..? Non, Je n'ai pas lu le texte.
    c. ……..? Oui, J'ai travaillé bien.
    d. ……..? Oui, j'ai écouté bien.
26. Accordez les mots entre parenthèses :
    « [Cher] Eva,
    Je suis à Paris pour quinze [jour] avec des [copain]. C'est une très [beau] ville. »
27. Répondez :
    a. Est-ce que Tina est française ? Non, elle…….
    b. Est-ce qu'elle parle bien français ? Non, elle…….
    c. Est-ce qu'elle apprend le français ? Oui, elle ……
    d. Est-ce qu'elle a des amis à Paris ? Oui, …….
28. Traduisez en anglais :
    « Chers amis,
    Il fait beau. La mer est bonne et l'ile d'Oléron est magnifique. Laurent fait du gold. Moi, du vélo. On rencontre des gens sympas. Voulez-vous venir le week-end du24 ? On a envie de découvrir deux ou trois restos avec vous. »
29. Complétez avec les adjectives possessives :
    « Noémie montre des photos à Lucas »
        - Regarde ! Voici ……appartement à Laval.
        - Ici, c'est la maison de……parents avec …..jardin.

- Voici, ……amie Charlotte.

30. Traduisez en anglais :
    « Je me suis inscrite à une école de langue pour travailler mon français. J'ai eu mon premier cours. Je suis rentrée à 10 heures, fatiguée. Je suis allée sur Internet et J'ai chatté jusqu'à minuit. J'adore parler avec Tom. Il connait le monde entier. »
31. Traduisez en français :
    a. Of course! We can also take a taxi.
    b. Do you want to come to discover the region?
    c. They do a lot of activities.
    d. I am very happy.

(6x4=24)

PART-D

Répondez à 2 questions suivantes:

32. Vous allez habiter en France chez madame et monsieur Duval. Ils ne vous connaissent pas. Ecrivez-leur pour vous présenter. Indiquez votre nom, votre âge, votre profession, votre nationalité, votre niveau en français, vos loisirs.
33. Vous avez visite la ville de Cannes. Vous écrivez une carte postale a une amie. Rédigez cette carte postale.
34. Choisissez un voyage que vous avez fait et présentez-le.
35. C'est vendredi soir. Vous êtes seul(e). vous n'avez pas envie de rester chez vous. Vous avez envie de sortir. Vous téléphonez à vos amis. Rédigez ce dialogue.

(2x15=30)

Language course V (Additional Language II)

19UHN211.1: FICTION, SHORT STORY & NOVEL

No of Credits: 3 **No of hours: 4 Hrs/week**

Aims of the Course / Objectives

To guide the students to the world of Hindi Fiction (Novel and short story). To develop the capacity of creative process and communication skills.

Course Outcome

The fiction generally activates the consciousness among young people. To facilitate in students a love for reading, assessing the character and the use of language. Develop many essential skills of vocabulary enhancement and sentence structure.

Module 1

Short story – 'Swarna Kahaniyam' – edited by
Dr. Girijakumari R.
Published by Lokbharathi Prakashan, Allahabad

Stories to be studied (Detailed)

1. Dooth ka Dam - Premchand
2. Heelibone ki Bathakein - Agyeya
3. Hathiyare - Amarkanth
4. Nail cutter - Udaya Prakash
5. Hari Bindi - Mridula Garg
6. No Bar - Jayaprakash Kardam

Module 2

Novel (Non-Detailed)

Mobile - Kshama Sharma
Rajkamal Prakashan, Delhi

Books for General Reading

1. Adhunik Hindi Kahani - Dr. Lakshmi Narayan Lal
   Vani Prakashan
2. Hindi Kahani ka Ithihas 1, 2, 3
   - Gopal Rai
   Raj kamal Prakashan
3. Hindi Upanyas ka Ithihas - Gopal Rai
   Rajkamal Prakashan
4. Adhunikatha aur Hindi Upanyas
   - Indranath Madan, Rajkamal Prakashan
5. Kahani, Nayi kahani - Namvar Singh, Rajkamal Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Second Semester B.A/B.Sc Degree Examination

Language Course (Additional Language II) - HINDI

19UHN 211.1 Fiction, Short Story & Novel

(2019 Admission onwards)

Time : 3 Hrs. **Max.Marks : 80**

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. प्रेमचन्द का जन्म कहाँ हुआ?
2. मधू का पूरा नाम क्या है?
3. 'नदी के द्वीप' किसका उपन्यास है?
4. नवीन खन्ना क्या काम करता है?
5. चन्द्रा कौन है?
6. मधु और फरहत कहाँ काम करती थी?
7. 'पालगोमरा का स्कूटर' किसका कहानी संग्रह है?
8. मधु की बेटियों के नाम लिखिए?
9. राजेश किस कहानी का पात्र है?
10. फरहत के अनुसार आजकल टी.वी. पर कैसी सीरियलों की बाढ आयी है? (1×10=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. मधु ने टी.वी में युद्ध का कौन-सा दृश्य देखा?
12. प्रेमचन्द के चार उपन्यासों के नाम लिखिए?
13. मधु की माँ ने अपनी नौकरी क्यों छोड दी?
14. बाबु महेशनाथ कौन थे? गाँव के जच्चेखानों के सुधार में क्या-क्या बाधाएँ थी?
15. फरहत क्यों कहती है कि 'घर की राजनीति, देश की राजनीति से ज़्यादा मुश्किल है।?
16. शिकार की तलाश में गये हीली-बोन और कैप्टन दयाल ने लोमडी के बिल में क्या देखा?
17. फरहत की पारिवारिक स्थिति कैसी है?
18. कहानीकार जयप्रकाश कर्दम का परिचय दीजिए?
19. मधु मोबाइल क्यों खरीदना चाहती है?
20. महिला स्वतंत्रता का चित्रण हरी बिन्दी में कैसे किया है?
21. दफ़्तर के लोग मधु को सत्य हरिश्चन्द्र की नातिन क्यों कहते थे?
22. माँ अपनी हथेली कथावाचक के सामने क्यों फैला दी? (2×8=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. 'प्रेमचन्द अब भी समकालीन है' - पठित कहानी के आधार पर विचार कीजिए।

24. विट्ठल भैया और मधु के संबन्ध पर प्रकाश डालिए?

25. कैप्टन दयाल ने हीली-बोन की क्या सहायता की?

26. "वह एक रात को चुपके से मेरे घर आ पहुँचा। गिडगिडाकर बोला जब तक मदद न करेंगे, मेरी किताब लिखी नहीं जाएगी। मुझे दया आ गई कि आदमी शरीफ है और इस केलिए कुछ कर देना चाहिए।" सप्रसंग व्याख्या कीजिए।

27. फरहत का चरित्र-चित्रण कीजिए।

28. हरी बिन्दी की नायिका पात्र की विशेषताएँ लिखिए?

29. 'नो बार' कहानी का उद्देश्य क्या है?

30. मधु को इन्क्रीमेन्ट मिलने पर साथियों की प्रतिक्रिया क्या थी?

31. क्षम शर्मा के व्यक्तित्व और कृतित्व पर प्रकाश डालिए?

(4×6=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. उपन्यास के तत्वों के आधार पर 'मोबाइल' उपन्यास की समीक्षा कीजिए?

33. 'दूध का दाम' कहानी सामाजिक रीति-रिवाज़ों पर तीखा प्रहार है।" इस उक्ति की आलोचन कीजिए?

34. 'हत्यारे' कहानी की कथावस्तु संक्षेप में लिखकर उसकी विशेषताओं पर प्रकाश डालिए?

35. मधु का चरित्र-चित्रण कीजिए? (15×2=30 marks)

സെമസ്റ്റർ	**:**	**II**
കോഴ്സ് കോഡ്	**:**	**19 UML 211.1**
ലാംഗ്വേജ് കോഴ്സ്	**:**	**V (അഡീഷണൽ ലാംഗ്വേജ് : II)**
സമയക്രമം	**:**	**ആഴ്ചയിൽ 4 മണിക്കൂർ**
ക്രെഡിറ്റ്	**:**	**3**

ഗദ്യസാഹിത്യം

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ:

1. വിദ്യാർത്ഥികളുടെ ആശയവിനിമയശേഷി വർദ്ധിപ്പിക്കുക.
2. ഔദ്യോഗിക/ഭരണകാര്യങ്ങളും ശാസ്ത്രവിഷയങ്ങളും മലയാളഭാഷയിലൂടെ അവ ത രി പ്പി ക്കാ നുള്ള കഴിവുാകുക.
3. ഭാഷാപരമായ പാകപ്പിഴകൾ പരിഹരിക്കുക, ഭാഷാശുദ്ധിനിലനിർത്തുക
4. വിവർത്തനത്തിൽ പ്രായോഗിക പരിശീലനം നൽകുക:
5. മാധ്യമ മലയാളത്തിൽ വിനിമയലോകം മന ിലാക്കുക.
6. മലയാള ഗദ്യസാഹിത്യത്തിലെ പ്രധാനസാഹിത്യ കൃതികൾ പരിചയപ്പെടുത്തുക
7. രചനകളെ സ്വയം വിശകലനത്തിന് വിധേയമാക്കുക.

പാഠ്യപദ്ധതി

മൊഡ്യൂൾ ഒന്ന് (27 മണിക്കൂർ) മാധ്യമ മലയാളം, ഉപന്യാസം

മാധ്യമങ്ങൾ-സമൂഹവും മാധ്യമങ്ങളും - മാധ്യമങ്ങൾ തുറന്നുതരുന്ന വിനിമയസാധ്യതകൾ - സൈബർമലയാളം - സൈബർസാഹിത്യം - സാഹിത്യേതര രചനകൾ

താഴെപ്പറയുന്ന ലേഖനങ്ങളുടെ വിശദപഠനം

1. മാധ്യമഭാഷ ഇന്ന് (മലയാളഭാഷയും ആഗോളവത്കരണവും) കേരള യൂണിവേഴ്സിറ്റി പ്രസിദ്ധീകരണം ഡോ. അനിതകുമാരി
2. മലയാളകാല്പനികത - ഡോ.പി.വി. വേലായുധൻപിള്ള
3. ജീവിതമെന്ന അത്ഭുതം - (ആമുഖം) ഡോ. വി.പി.ഗംഗാധരന്റെ അനുഭവങ്ങൾ
4. നമ്മുടെ ലോകം നാം സൃഷ്ടിക്കുന്നു - കെ.പി. കേശവമേനോൻ
5. വാക്കിന്റെ വരവ് - (ആലോചന എന്ന സമാഹാരത്തിൽ നിന്ന്) എം.എൻ. കാരശ്ശേരി

മൊഡ്യൂൾ ര് (27 മണിക്കൂർ)

ചെറുകഥ

മലയാള ചെറുകഥയുടെ വികാസപരിണാമങ്ങളെപ്പറ്റിയുള്ള സാമാന്യജ്ഞാനം. ആഖ്യാന തന്ത്രങ്ങളുടെ വൈചിത്ര്യം. പ്രമേയത്തിലും രൂപശിൽപ്പത്തിലും സംഭവിച്ച മാറ്റങ്ങൾ എന്നിവ മന ിലാക്കുന്ന തരത്തിലുള്ള ബോധനസമ്പ്രദായങ്ങൾ സ്വീകരിക്കുക.

1. എനിക്ക് ആത്മഹത്യ ചെയ്യാൻ മതിയായ കാരണമില്ലയോ? - സി.വി. കുഞ്ഞിരാമൻ
2. പൊതിച്ചോറ് - കാരൂർ
3. കടൽത്തീരത്ത് - ഒ. വി. വിജയൻ
4. പത്രം - സക്കറിയ
5. ഹിഗ്വിറ്റ - എൻ. എസ്. മാധവൻ
6. വീഡിയോ ചിത്രങ്ങൾ - അഷ്ടമൂർത്തി
7. കൃഷ്ണഗാഥ - കെ. ആർ മീര
8. തല്പം - സുഭാഷ് ചന്ദ്രൻ

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

നോവൽ

മലയാളസാഹിത്യത്തിന്റെ വികാസ പരിണാമങ്ങളെക്കുറിച്ചുള്ള സാമാന്യജ്ഞാനം ഉകുന്നതരത്തിലുള്ള ബോധനസമ്പ്രദായം സ്വീകരിക്കുക. (സന്ദർഭവും സ്വാരസ്യവും വ്യക്തമാക്കുകയെന്നതരത്തിലുള്ള ചോദ്യത്തിനു നാലുകെട്ടിന്റെ ആദ്യനാലധ്യായം മാത്രമേ ഉപയോഗിക്കാവൂ)

വിശദപഠനം:

നാലുകെട്ട്: എം.ടി വാസുദേവൻ നായർ

റഫറൻസ് ഗ്രന്ഥങ്ങൾ

1. സമ്പൂർണ്ണ മലയാള സാഹിത്യ ചരിത്രം – എഡിറ്റർ പന്മന രാമചന്ദ്രൻ നായർ
2. കൈരളിയുടെ കഥ – എൻ. കൃഷ്ണപിള്ള
3. ആധുനിക സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ – ഡോ.കെ.എം. ജോർജ്ജ്
4. മലയാളനോവൽ സാഹിത്യ ചരിത്രം – ഡോ.കെ.എം.തരകൻ
5. മലയാള ചെറുകഥാ സാഹിത്യചരിത്രം – ഡോ.എം.എം.ബഷീർ
6. നോവൽ സാഹിത്യം – കെ.സുരേന്ദ്രൻ
7. നോവൽ സ്വരൂപം – കെ.സുരേന്ദ്രൻ
8. നോവൽ സിദ്ധിയും സാധനയും – പി.കെ.ബാലകൃഷ്ണൻ
9. നോവൽ സാഹിത്യപഠനങ്ങൾ – ഡോ. ഡി.ബഞ്ചമിൻ
10. ആധുനിക നോവൽ ദർശനങ്ങൾ – കെ.എം. തരകൻ
11. ചെറുകഥാ പ്രസ്ഥാനം – എം.പി. പോൾ
12. ചെറുകഥ ഇന്നലെ, ഇന്ന് – എം. അച്യുതൻ
13. ചെറുകഥ - വാക്കുംവഴിയും – കെ.എസ്.രവികുമാർ
14. നോവൽ പഠനങ്ങൾ – ഡോ.പന്മന രാമചന്ദ്രൻ നായർ
15. ചെറുകഥാ പഠനങ്ങൾ – ഡോ.പന്മന രാമചന്ദ്രൻ നായർ
16. കഥയും ഫാന്റസിയും – ഡോ.വത്സലൻ വാതുശ്ശേരി
17. കഥയിലെ ആത്മീയസഞ്ചാരങ്ങൾ – ഡോ.ഇ. രമാഭായി
18. കഥ അനുഭവവും ആഖ്യാനവും – ഡോ.കെ.പി.അപ്പൻ
19. കഥയും ഭാവുകത്വപരിണാമവും – ഡോ.കെ.എസ് രവികുമാർ
20. ഏകാന്തനഗരങ്ങൾ – ഡോ.പി.കെ രാജശേഖരൻ
21. ഭാരതപര്യടനം – കുട്ടികൃഷ്ണമാരാർ
22. മാധ്യമങ്ങളും മലയാളസാഹിത്യവും – കേരളഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട്
23. മാധ്യമങ്ങളും മലയാളസാഹിത്യവും – എം.വി. തോമസ്, കേരള സാംസ്കാരിക പ്രസിദ്ധീകരണവകുപ്പ്
24. തെറ്റില്ലാത്ത മലയാളം – പ്രൊഫ. പന്മന രാമചന്ദ്രൻ നായർ
25. തെറ്റുംശരിയും – പ്രൊഫ. പന്മന രാമചന്ദ്രൻ നായർ

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS),KOLLAM

Second Semester BA/BSc Degree Examination

CBCSS

Language Course

19UML211.1: ഗദ്യസാഹിത്യം

Model Question Paper

Time: 3Hrs. **Max. Marks: 80**

Section A

ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്കു വീതം.

1. മലയാളത്തിലെ ആദ്യ ചെറുകഥ ഏത്?
2. കാരൂരിന്റെ രണ്ട് കഥകളുടെ പേരെഴുതുക.
3. അധ്യാപക കഥകളെഴുതിയ ചെറുകഥാകാരൻ ആര്?
4. 'പത്രം' ആരുടെ ചെറുകഥയാണ്?
5. 'കുടല്ലൂരിന്റെ കഥാകാരൻ' എന്നറിയപ്പെടുന്നതാര്?
6. അസുരവിത്ത് ആരുടെ നോവലാണ്?
7. 'വീഡിയോ ചിത്രങ്ങൾ' എന്ന കഥ എഴുതിയതാര്?
8 'കൂൾഡ്രിങ്ക്' ആരുടെ ചെറുകഥയാണ്?
9. 'മാധ്യമഭാഷ ഇന്ന്' എന്ന ലേഖനത്തിന്റെ കർത്താവ്?
10. 'വാക്കിന്റെ വരവ്' ആരുടെ ലേഖനമാണ്?

(10x1=10മാർക്ക്)

Section B

അരപ്പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും എട്ടെണ്ണത്തിന് ഉത്തരമെഴുതുക. 2 മാർക്ക് വീതം.

11. അധ്യാപക കഥ എന്ന നിലയിൽ പൊതിച്ചോറിന്റെ പ്രസക്തി വ്യക്തമാക്കുക.
12. പത്രം എന്ന ചെറുകഥയ്ക്ക് ഒരു ആസ്വാദനക്കുറിപ്പ് തയ്യാറാക്കുക.
13. മാധ്യമഭാഷയുടെ പ്രസക്തി വിശദമാക്കുക.
14. മലയാള സാഹിത്യത്തിൽ കാല്പനികതയ്ക്ക് എത്രത്തോളം പ്രാധാന്യമുണ്ട്? വിശദമാക്കുക.
15. 'ജീവിതമെന്ന അത്ഭുതം'എന്ന ലേഖനത്തിൽ ഡോ. വി. പി. ഗംഗാധരൻ വിശദമാക്കുന്ന അനുഭവങ്ങൾ എന്തെല്ലാം?

16. വാക്കിന്റെ ഉത്ഭവത്തെക്കുറിച്ച് എം. എൻ കാരശ്ശേരി കണ്ടെത്തുന്ന അഭിപ്രായങ്ങൾ എന്തെല്ലാം?

17. തെറ്റുണ്ടെങ്കിൽ തിരുത്തുക.

    1. പീഡനം 2. പ്രക്രിതി 3. അർത്ധം 4. രാജ്ഞി

18. തെറ്റു തിരുത്തുക.

    അവിരാമമായി പെയ്തുകൊണ്ടിരുന്ന മഴയിലേക്ക് ഒടുവിൽ ഗത്യന്തരമില്ലാതെ അയാൾ സ്വയം ആത്മഹത്യ ചെയ്യുന്നതിനെക്കുറിച്ച് ആലോചിച്ചുകൊണ്ടിരുന്നു.

19. വീഡിയോചിത്രങ്ങൾ എന്ന കഥയിൽ ഉത്തരാധുനികതയുടെ അംശങ്ങൾ കണ്ടെത്താമോ? വിലയിരുത്തുക.

20. സി. വി. കുഞ്ഞിരാമന്റെ രചനാശൈലി വ്യക്തമാക്കുക.

21. നമ്മുടെ ലോകം എങ്ങനെയായിരിക്കണമെന്നാണ് കെ. പി. കേശവമേനോൻ അഭിപ്രായപ്പെടുന്നത്?

22. ആഗോളവത്കരണത്തെക്കുറിച്ച് ഡോ. ടി. അനിതാകുമാരിയുടെ അഭിപ്രായമെന്ത്?

(8x2=16മാർക്ക്)

Section C

ഏതെങ്കിലും 6 ചോദ്യങ്ങൾക്ക് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക. 4 മാർക്ക് വീതം.

23. എം. ടി. വാസുദേവൻനായരുടെ രചനാശൈലി 'നാലുകെട്ടി'നെ ആസ്പദമാക്കി പരിശോധിക്കുക.

24. മൂന്നിലൊന്നായി സംഗ്രഹിക്കുക.

    എത്ര മഹത്തായ കവിതയെഴുതിയ കവിയാണെങ്കിലും പുതുതായി എഴുതുന്ന കവിതയെക്കുറിച്ച് വായനക്കാർ അതെങ്ങനെ സ്വീകരിക്കുമെന്നോർത്ത് ഉത്കണ്ഠപ്പെടുകയും വിറകൊള്ളുകയും ചെയ്യുന്ന കവിമനസ്സുകളെക്കുറിച്ച് കേട്ടിട്ടുണ്ട്. വലിയ എഴുത്തുകാരിലും ഇത്തരം ഉത്കണ്ഠകളുണ്ടാകാറുണ്ട്. എന്നാൽ നമ്മുടെ നാട്ടിലെ ചില കവികൾക്ക് തങ്ങളെഴുതുന്ന എല്ലാറ്റിനെക്കുറിച്ചും വലിയ മതിപ്പാണ്, അഭിമാനവുമാണ്. തങ്ങളുടെ കവിതകളുടെ മഹത്ത്വം മനസ്സിലാക്കാത്ത നിരൂപകരോട് അവർക്ക് വിദ്വേഷമാണ്, പുച്ഛവുമാണ്.

25. ആശയ വിപുലനം ചെയ്യുക.

    "കാരസ്കരത്തിൻ കുരു പാലിലിട്ടാൽ
    കാലാന്തരേ കയ്പു ശമിപ്പതുണ്ടോ"?

26. ആധുനിക ചെറുകഥയുടെ സവിശേഷതകൾ വിശദമാക്കുക.

27. മലയാളകവിതയിലെ കാല്പനികതയുടെ കടന്നുവരവ് എപ്രകാരമായിരുന്നു?

28. 'എനിക്ക് ആത്മഹത്യ ചെയ്യാൻ മതിയായ കാരണമില്ലയോ' എന്ന ചെറുകഥയ്ക്ക് ഒരു ആസ്വാദനം തയ്യാറാക്കുക.

29. ആധുനിക ചെറുകഥകളിൽ സക്കറിയയുടെ കഥകൾക്കുള്ള സ്ഥാനം വ്യക്തമാക്കുക.

30. ഉത്തരാധുനികതയുടെ സവിശേഷതകൾ വിശദമാക്കുക.

31. മലയാളത്തിലേക്ക് വിവർത്തനം ചെയ്യുക.

Twinkle twinkle little star

How I wonder what you are

Up above the world so high

Like a diamond in the sky

(6x4=24മാർക്ക്)

Section D

മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

32. പരിസ്ഥിതിക കേന്ദ്രീകൃത വികസനത്തെക്കുറിച്ച് ഉപന്യസിക്കുക.
33. ആദ്യകാല ചെറുകഥകളുടെ സവിശേഷതകൾ ക്രോഡീകരിക്കുക.
34. മലയാള നോവൽ സാഹിത്യത്തിൽ 'നാലുകെട്ടി'നുള്ള പ്രാധാന്യം വിലയിരുത്തുക.
35. 'നമ്മുടെ ലോകം നാം സൃഷ്ടിക്കുന്നു' എന്ന ലേഖനത്തിൽ കെ. പി. കേശവമേനോൻ കണ്ടെത്തുന്നത് എന്തെല്ലാം? വിവരിക്കുക.

(2x15=30മാർക്ക്)

Foundation Course

19UCH221: Methodology and Perspectives of Sciences and General Informatics

(Lecture-Tutorial-Lab: 2-0-2 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 36hrs lecture and 36 hrs related lab instruction)

No. of credits: 3 **No. of instructional hours per week: 4**

Total hours: 36

Course outcome

CO1: To impart knowledge about the methodology and perspectives of Science and the importance of Science in the development of culture.
CO2: To get an understanding of the history of evolution of chemistry as a major branch of science.
CO3: To inculcate an overview of the computer based application in analysis and presentation of experimental data
CO4: To impart knowledge on elementary aspects of analytical principles, safety measures in the laboratory and toxicity of chemicals
CO5: To study the experimentation work and research in chemistry under the guidance and supervision of a mentor.

Course outline

Module – 1 : Methods and Tools of Science & Experimentation in Science ------6 Hrs

Laws of science – Basis for scientific laws and factual truths -hypothesis – observations and proofs. Revision of scientific theories and laws.
Importance of models, simulations and virtual testing in chemistry-
Design of an experiment – experimentation - observation – data collection – types of data – examples-interpretation and deduction –repeatability and replication-units and dimensions, unit conversions .
Documentation of experiments –record keeping

Module II – Evolution of Chemistry as a discipline of science ----------6Hrs

Evolution of Chemistry - ancient speculations on the nature of matter, early form of chemistry-alchemy, Robert Boyle and the origins of modern chemistry in the latter 1600s - Antoine Lavoisier and the revolution in chemistry -Chemical atomism—background and thought of John Dalton. Atom models- Daltons, J. J. Thomson, Rutherford, Bohr model – Major contributions of Friedrich Wöhler, Mendeleev, Michael Faraday and Marie Skłodowska-Curie. Structure of chemical science: scope of chemical science, branches of chemistry. Basic ideas of interdisciplinary areas involving Chemistry

Module III Research Methodology in Chemistry 6 Hrs

Selecting a topic – hypothesis- Design of an experiment –- observation – data collection – experimentation. Documentation of experiments – nature and types of data – typical example. Interpretation and deduction – importance of units and dimensions – Accuracy and precision, variables, correlation and causality, sampling, Use of controls, experimental bias, analysis, results, discussion of results, models.
Statistical analysis of experimental data using computers, mean, mode, deviation, standard deviation. -Plotting graph, preparation of seminar papers, project using computers.
Latest Nobel prize topics in chemistry (present year data from Nobel website).

Module IV – Overview of Information Technology & Introduction to Cheminformatics 6 Hrs

Features of the modern personal computer and peripherals computer network and internet – Operating systems and softwares. Data information and knowledge. Knowledge management – Internet as a knowledge repository, Creating your cyber presence – open access. – Open active publishing models – Basic concepts of IPR, copy right and patents – plagiarism – Cybercrime. Introduction to use of IT in teaching and learning process – Educational softwares – INFLIBNET, NICNET, BRNET, NPTEL, VIRTUAL LABS OF MHRD academic services (elementary level only).
Basics of cheminformatics, applications of cheminformatics, storage & retrieval, file formats – MOL, SDF, CML, PDB formats. SYBYL Line Notation, SMILES of simple molecules like methane, benzene , cyclohexane. Structure drawing, spread sheet and chemistry related softwares. Molecular visualization tools. Chemical

Databases.

Module V - Analytical Principles 6 hrs.

Inorganic qualitative analysis - Common ion effect - solubility product - precipitation of cations. Microscale analysis – Advantages

Quantitative Analysis –

Volumetric Analysis : Theory of titration - acid-base, redox, precipitation and complexometric titrations. Theory of indicators - acid-base, redox, adsorption and metallochromic indicators.

Gravimetric Analysis – Types of filter papers, Types of crucibles, Mechanism of precipitate formation - Factors affecting solubility of precipitates – co-precipitation and post precipitation - Effect of digestion - washing, drying and ignition of precipitates.

Module VI - Safety measures & Disaster management in Laboratory 6 hrs.

Introduction to lab safety-regulatory requirements-labels, material safety. Knowledge of hazard warning information and symbols.

Explosive compounds (brief idea), potentially dangerous mixtures- Fire hazards (idea
about flammable solvents, ignition sources used in laboratories, metal hydrides),

Toxicity of chemicals : Concentrated mineral acids and alkalis, glacial acetic acid, bromine, benzene, phenol, aniline, chloroform & carbon tetrachloride

Emergency procedures in chemical splashes (acids, alkalis) to skin and eyes, burns and electric shock. (Refer MSDS)

References

1. T.F.Gieryn: Cultural boundaries of science Univ. Chicago Press 1999.
2. The Golem : What everyone should know about science. H.Collins and T.Pinch. Cambridge Univ Press 1993
3. Alexis Leon & Mathews Leon: Computers Today, Vikas Publishing House, 2009.
4. Soti Sivendra Chanthra: Contemporary Science Teaching,Surjeet Publications, 2009.
5. Alexis & Mathews Leon, Fundamentals of Information Technology. Vikas Publishing House, 2009.
6. Ramesh Bangia: Learning Computer Fundamentals, Khanna Book Publishers, 2010.
7. Barbara Wilson: Information Technology, The Basics, McMillan International Higher Education, 2016.
8. Calvin W Tayler and Frank Barron: Scientific Creativity: Its Recognition and Development, Wiley, 1963.
9. Louise Cohen, Lawrence Manion& Keith Morrison: A Guide to Teaching Practice, Psychology Press, 2004.
10. Encyclopaedia of Modern Methods of Teaching and Learning, Edited V K Rao, Anmol Publications, 2002.
11. Haseen Taj: Current Challenges in Education, Neel Kamal Publications, 2011.
12. Radha Mohan: Research Methods in Education, Neel Kamal Publications, 2010.
13. R T Mishra: Teaching of Information Technology,
14. M Ravikumar: Information Technology for Higher Education, Sonali Publications, 2004.
15. Kolasani Sunil Kumar: Methods of Teaching Chemistry, Discovery Publishing House, 2004.
16. V. Rajaram: Introduction to Information Technology, Prentice Hall, 2003.
17. Newton R G: The Truth of Science, Viva Books, 2010.
18. Andrew R. Leach and V.J. Gillet: An Introduction to Chemoinformatics, Springer, 2003.
19. N.C. Datta: The Story of Chemistry , University Press, 2005.
20. http://www.vlab.co.in
21. http://nptel.iitm.ac.in/
22. A. I. Vogel: Text book of Quantitative Inorganic Analysis, Pearson, 2012.
23. Day & Underwood: Quantitative analysis: Laboratory Manual, Prentice Hall, 1991.
24. A.H Ahluwalia,Renu Aggarwal: Comprehensive Practical Organic Chemistry, University Press, 2001.
25. Hazards in chemical laboratories and guide to safe practices in chemical laboratories published by Royal Society of Chemistry.
26. Vogel's text book of practical organic chemistry, Pearson Education, 2003.
27. *https://www.**nobelprize**.org*

MODEL QUESTION PAPER

19UCH221: Methodology and Perspectives of Sciences and General Informatics

Time: Three Hours **Maximum Marks: 80**

Section- A

Each question carries one mark

Answer **all** Questions. Answer in one word / sentence. Each question carries 1 mark.

1. Who is the father of modern chemistry?
2. Define null hypothesis.
3. What is NPTEL?
4. What you meant by plagiarism?
5. What are the contributions of Dmitri Mendeleev?
6. What are variables?
7. Define common ion effect
8. What are redox indicators?
9. Define accuracy
10. Write the name of two toxic chemicals used in chemistry laboratory.

Section B (short answer type)

(Answerany8questionsfromthefollowing. Each answer carries 2 mark)

11. What is co-precipitation?
12. Define standard deviation.
13. Write a short note on a chemical which is skin irritant.
14. What is meant by data representation?
15. Name four chemistry related softwares?
16. Mention the toxicity of strong acids
17. What is a chemical database?
18. Explain basic concepts of IPR?
19. What are the features of modern personal computer?
20. What are acid base indicators ?
21. What is post precipitation?
22. Which are the factors affecting solubility of precipitates.

Section C (Short essay type)

(Answer **any 8** from the following. Each question carries **4** marks)**.**

23. What is meant by revision of scientific theories and laws?
24. Explain documentation of experiments.
25. Explain the applications of cheminformatics.
26. Explain copy right and patents.
27. Explain enquiry vs discovery approach?
28. Discuss about the carcinogenic chemicals used in the laboratory.
29. What is the scope of chemical science?
30. Write a short note on the theory of an acid base indicator
31. Explain the principle of gravimetric analysis with an example.

Section D

Answer **any 2** from the following. Each question carries **15** marks

32. (a) Explain the various types of file formats (5 marks)
    (b) Databases used in cheminformatics ? (5 marks)
    (c) Write the SMILES of Methane, Benzene and cyclohexane. .(5 marks)
33. (a) Discuss about chemical safety.
    (b) Discuss about the theory of titration.
    (c) Write a note on the knowledge of hazard warning informations.
34. (a) Write a short note on the evolution of modern chemistry.
    (b) Write a note on induction-deduction methods in knowledge transfer process.
35. (a) Explain the applications of common ion effect and solubility product in analysis of cations. (10 marks)
    (b)Write a short note on method to avoid accidents in chemical laboratory. (5marks)

Complementary Course III

19UMM231.2: Calculus with applications in Chemistry - II

No. of Credits: 3 **Instructional hours per week: 4**

Aim:
To familiarize students with partial differentiation, infinite series and limits, vector differentiation and multiple integrals.

Course outcome:
Students will be able to grasp the concepts of differentiation and integration and apply them in problem solving.

Module 1 : Partial differentiation **(18 Hours)**
Basics, The total differential and total derivative, Exact and inexact differentials, theo-rems of partial differentiation, The chain rule, Change of variables, Taylors theorem for many-variable functions, Stationary values of many-variable functions, Stationary values under constraints
Chapter 5, sections 5.1 to 5.9
More exercises related to the topics in this module can be found in chapter 13 of reference [1], ***which is not to be included in ESE.***

Module 2: Infinite series and limits **(18 Hours)**
Definition, Summation of series of various types (Arithmetic series; geometric series; arithmetico-geometric series; the difference method; series involving natural numbers; transformation of series) Convergence of in nite series (Absolute and conditional con-vergence; series containing only real positive terms; alternating series test) Operations with series (Sum and product)
Power series (Convergence of power series; operations with power series)
Taylor series (Taylors theorem need not be proved, but the statement should be explained through problems); approximation errors; standard Maclaurin series
Chapter 4, sections 4.1 to 4.6, (Exercise questions 4.1-4.15)
More exercises related to the topics in this module can be found in chapter 9 of reference [1] and chapter 1 of reference [2], ***which is not to be included in ESE.***

Module 3 : Vector differentiation **(18 Hours)**
Differentiation of vectors , Composite vector expressions; differential of a vector, Integration of vectors, Space curves, Vector functions of several arguments, Surfaces, Scalar and vector fields
Vector operators, Gradient of a scalar field; divergence of a vector field; curl of a vector field, Vector operator formulae, Vector operators acting on sums and products; combinations of grad, div and curl, Cylindrical and spherical polar coordinates
Chapter 10, sections 10.1 to 10.9
More exercises related to the topics in this module can be found in chapter 3 of reference [3], ***which is not to be included in ESE.***

Module 4 : Multiple integrals **(18 Hours)**
Double integrals, Triple integrals, Applications of multiple integrals (Areas and volumes), Change of variables in multiple integrals, Change of variables in double integrals; evaluation some special infinite integrals, change of variables in triple integrals; general properties of Jacobians
Chapter 6, sections 6.1 to 6.4
More exercises related to the topics in this module can be found in chapter 14 of reference [1], ***which is not to be included in ESE.***

Note: In all modules, proofs of theorems are to be omitted

Text
K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

References

Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons
Ref. 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley
Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press
Ref. 4 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India

UNIVERSITY OF KERALA

First Degree Programme in Mathematics

Model Question Paper(2018 Scheme)

Semester II, MM 1231.2 Complementary Course for Chemistry

Calculus with applications in Chemistry – II

Time: Three hours Maximum marks : 80

Section I

All the ftrst ten questions are compulsory. They carry 1 mark each.

1. Find f_{yx} of the function $f(x, y) = 2x^3y^2 + y^3$
2. Define saddle point.
3. Sum the integers from 1 to 1000 .
4. State whether true/false:$\sum_{n=1}^{\infty} \frac{1}{n!}$ converges.
5. State the comparison test for convergence of infinite series.
6. If r = $xi + yj + zk$, find $\nabla \cdot \mathbf{r}$
7. Define divergence of a vector field.
8. Find the gradient of the scalar field $x^3z \sin(x + y)$
9. Evaluate$\int_0^1 \int_0^1 xydxdy$.
10. If x=$cos\theta\ sin\emptyset\ and\ y = cos\theta cos\emptyset$ Find $\frac{\partial(\theta,\emptyset)}{\partial(x,y)}$.

Section II

Answer any 8 questions from among the questions 11 to 22.
These questions carry 2 marks each.

11. Find the total differential of the function $f(x, y) = ye^{x+y}$
12. Show that the differential $xdy + 3ydx$ is inexact.
13. Given that $x(u) = 1 + au$ and $y(u) = bu^3$, find the rate of change of $f(x, y) = xe^{-y}$ with respect to u
14. Sum the series $S = 2 + \frac{5}{2} + \frac{8}{2^2} + \frac{11}{2^3} + \cdots$
15. Determine the range of values of x for which the power series $p(x) = 1+2x+4x^2+8x^3+\cdots$ converges.
16. Expand $f(x) = \sin x$ as a Maclaurin series about $x = 0$
17. Find the Laplacian of a scalar field $\varphi = xy^2z^3$.
18. Show that $\nabla \cdot (\nabla\varphi \times \nabla\psi) = 0$ where φ and ψ are scalar fields
19. Show that curlgrad$\varphi = 0$
20. By changing the order of integration,evaluate $\int_0^2 \int_{\frac{y}{2}}^1 e^{x^2} dxdy$.
21. Evaluate $\int_{-1}^2 \int_0^3 \int_0^2 12xy^2z^3 dzdydx$.
22. Find the moment of inertia of a uniform rectangularlamina of mass m with side a and b about one of the sides of length b.

Section III
Answer any 6 questions from among the questions 23 to 31.
These questions carry 4 marks each.

23. Find the Taylor expansion of $f(x, y) = ye^{xy}$ about $x = 2, y = 3$

24. The temperature of a point (x, y) on a unit circle is given by $T(x, y) = 1 + xy$. Find the temperature of the hottest points on the circle.

25. Evaluate $\sum_{n=1}^{N} \frac{1}{n(n+1)}$

26. Sum the series $S(\theta) = 1 + \cos\theta + \frac{\cos 2\theta}{2!} + \frac{\cos 3\theta}{3!} + \cdots$

27. The position vector of a particle at time t in Cartesian co-ordinates is given by $r(t) = 2t^2i + (3t - 2)j + (3t^2 - 1)k$. Find the speed of the particle at $t = 1$ and the component of acceleration in the direction $s = i + 2j + k$.

28. Find the divergence and curl of the vector field $\mathbf{a} = x^2y^2i + y^2z^2j + x^2z^2k$

29. Show that $\nabla \times (\varphi\mathbf{a}) = \nabla\varphi \times \mathbf{a}$, where φ is a scalar field and $\mathbf{a}$ is a vector field.

30. Evaluate $\iint_R x^2ydxdy$, where R is the triangular area bounded by the lines $x = 0$, $y = 0$ an $x + y = 1$

31. Evaluate the Jacobian of $x = r\sin\theta\cos\varphi$, $y = r\sin\theta\sin\varphi$ and $z = r\cos\theta$

Section IV
Answer any 2 questions from among the questions 32 to 35.
These questions carry 15 marks each.

32. Find the stationary points of $f(x, y, z) = x^3+y^3+z^3$ subject to the constraint $x^2+y^2+z^2 = 1$ and $x + y + z = 0$

33. Determine the convergence of the following series

(a) $\sum_{n=1}^{\infty} \frac{1}{(n!)^2}$

(b) $\sum_{n=1}^{\infty} \frac{4n^2 - n - 3}{n^3 + 2n}$

(c) $\sum_{n=1}^{\infty} \frac{1}{n^n}$

34. (a) Derive the total surface area of a sphere of radius a.

(b) Find the rate of change with respect to distance s of $\varphi = x^2y + yz$ at the point $(1, 2, -1)$ in the direction $\mathbf{a} = i + 2j + 3k$. In which direction is the rate of change of φ greatest at this point and what is its value in this direction.

35. (a) Find the volume of the tetrahedron bounded by three coordinate surfaces $x = 0$, $y = 0, z = 0$ and the plane $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$

(b) Find the volume of the region bounded by the paraboloid $z = x^2 + y^2$ and the plane $z = 2y$

Complementary Course IV

19UPH231.2: Thermal Physics

No.of credits: 2 **Instructional hours per week: 4 (36 hours)**

Course Outcome

- Understand the various diffusion phenomena
- Understand the various phenomena of transference of heat
- Understand the fundamental thermodynamic properties and various laws of thermodynamics
- Solve problems using the properties and relationships of thermodynamic systems
- Understand the concept of entropy during various types of processes

Unit I – Diffusion (4 hours)

Graham's law of diffusion in liquids-Fick's law-analogy between liquid diffusion and heat conduction-methods of estimating concentrations-determination of coefficient of diffusivity.

Unit II. Transmission of Heat (16 hours)

Thermal conductivity and thermometric conductivity – Lee's Disc experiment- Radial flow of heat- cylindrical flow of heat-thermal conductivity of rubber- Weidmann and Franz law (statement only) -Radiation of heat-black body radiation-Kirchoff's laws of heat radiation-absorptive power-emissive power-Stefan's law (no derivation) -energy distribution in the spectrum of black body and results-Wien's displacement law - Rayleigh-Jeans law-their failure and Planck's hypothesis -Planck's law-comparison-solar constant-temperature of sun.

Unit III – Thermodynamics (8 hours)

Isothermal and adiabatic processes-work done-isothermal and adiabatic elasticity. Heat engines-carnot's cycle -derivation of efficiency-petrol and diesel engine cycles-efficiency in these two cases-second law of thermodynamics-Kelvin and Clausius statements.

Phase transition- first order and second order- liquid helium- super fluidity.

Unit IV – Entropy (8 hours)

Concept of entropy-change of entropy in reversible and irreversible cycles-principle of increase of entropy-entropy and disorder-entropy and available energy-T-S diagram for Carnot's cycle-second law in terms of entropy-calculation of entropy when ice is converted into steam.

References

1. Heat & Thermodynamics: N.Subramaniam & Brijlal, S.Chand & Co
2. Heat & Thermodynamics: W.Zemansky, McGraw Hill
3. Heat & Thermodynamics: C.L.Arora.

MODEL QUESTION PAPER
19UPH231.2: Thermal Physics

TIME : 3 HOURS **TOTAL MARK: 80**

Section A (Answer all; one mark each)

1. We smell kerosene when a kerosene bottle is opened, why?
2. Obtain the dimensions of concentration gradient.
3. Explain the process of diffusion.
4. How will entropy in a reversible cycle?
5. Define entropy.
6. State Stephan's law.
7. Name the experiment used to find out the thermal conductivity of a bad conductor.
8. Write down the properties of Liquid He II.
9. Name the working substance in Carnot's engine.
10. Give the heat change associated with adiabatic expansion of a gas.

Section B (Answer any eight. Two marks each)

11. State the principle of increase of entropy.
12. How is entropy related to disorder of a system?
13. Derive an expression for change in entropy for a reversible cycle.
14. State Graham's laws of diffusion.
15. Define coefficient of diffusion. Write down the dimensions of it.
16. State and explain Fick's law.
17. Draw the T-S diagram for Carnot's cycle.
18. Explain first order and second order phase transitions?
19. Obtain an expression for work done in an isothermal process?
20. Draw the spectrum of a blackbody.
21. State and explain Planck's hypothesis.
22. Draw the indicator diagram of an adiabatic change.

Section C (Answer any six . four marks each)

23. Obtain an expression for the work done in adiabatic process?
24. Exp lain that the energy available for useful work depends on temperature difference.
25. One mole of a gas at 27°C expands adiabatically until its volume is doubled. Calculate the work done. Given $\gamma=1.4$
26. Find the efficiency of a Carnot's engine working between 127°C and 27°C.
27. A body of 1500K emits maximum energy at wavelength 20000A°. if the sun emits maximum energy at wavelength 5500A°, what would be the temperature of the sun?
28. Calculate the surface temperature of the sun from the following data. Radius of the sun $=6.96\times10^{8}$m; mean distance of the sun and earth $=1.497\times10^{11}$m; solar constant $=1400 Jm^{-2}s^{-1}$. Stefans constant $=5.7\times10^{-8}\ Wm^{-2}K^{-4}$.
29. Compare diffusion and thermal conduction using the equations representing the processes. Explain the notations in the equations.
30. A refrigerator is driven by 1.5 kW motor having an efficiency of 75%. What is the time required to freeze 50 kg of water at 0^0C when the outside temperature is 27^0C. Specific latent heat of fusion of ice = 3.34 x 10 5 J $Kg^{-1}K^{-1}$.
31. (a) Calculate the total change in entropy when 100 g of water at 20^0C is mixed with 120 g of water at 50^0C and the mixture is then heated to its boiling point. Specific heat capacity of water = 4200 J $Kg^{-1}K^{-1}$.
    (b) Find the efficiency of a Carnot's engine working between 127^0C and 27^0C.

Section D (Answer any two. 15 marks each)

32. Obtain the differential equation for diffusion. Show that the concentration varies linearly with distance when the diffusion reaches steady state.
33. Explain what you mean by entropy of a substance. What is temperature-entropy diagram? Draw the T-S diagram of a reversible Carnot's cycle and derive an expression for the efficiency of a Carnot's engine.
34. Explain the Lee's disc experiment.
35. Explain the working of a Carnot's engine. Derive an expression for the efficiency of it.

Semester - III

Language Course VI

19UEN311.1: READINGS IN LITERATURE I

No of Credits: 4 **No of hours: 90 (5 per week)**

COURSE OUTCOME

On completion of the course, the students should be able to:

1. Understand the various genres of English literature
2. Understand and appreciate Indian literary discourse.
3. Look at the best pieces of Indian writings in English critically.
4. Analyze Indian literature as a cultural and interactive phenomenon.
5. Learn the English language through literature
6. Developan understanding of the aesthetic, cultural and social aspects of Indian literature.
7. Help them analyze and appreciate literary texts in the Indian context.
8. Learn structures of the English language through the text.

Module 1: Introduction to Literature

What is literature – genres –Poetry: lyric, ode, ballad, sonnet, dramatic monologue – Drama: tragedy, comedy, one-act plays – Fiction: Novel, short story – Non-Fiction: Impersonal essay, Personal essay, biography, autobiography

Module 2: Prose

M.K.Gandhi : ***The Need for Religion***
Nirad C. Chaudhuri : ***Money and the English Man***
Arundhati Roy : ***The End of Imagination***

Module 3: Poetry

Rabindranath Tagore : ***Silent Steps***
Sarojini Naidu : ***The Soul's Prayer***
Nissim Ezekiel : ***The Railway Clerk***
Jayanta Mahapatra : ***An October Morning***
A.K. Ramanujan : ***The Striders***
Arun Kolatkar : ***An Old Woman***
Kamala Das : ***Nani***
Meena Alexander : ***Her Garden***

Module 4: Short Stories

Rabindranath Tagore : ***The Homecoming***
Mahasweta Devi : ***Arjun***
Abburi Chaya Devi : ***The Woodrose***
Anita Desai : ***Circus Cat, Alley Cat***

Core Text

Haneefa, S. and N.P. Rajendran, *Our Country, Our Literature*. Foundation Books. 2015

Further Reading:

1. Abrams, M.H. **A Glossary of Literary Terms** (Rev. ed.)
2. Hobsbaum, Philip. ***Metre, Rhythm and Verse Form: The New Critical Idiom***. Indian Reprint. Routledge, 2007.
3. Prasad, Birjadish. ***A Background to the Study of English Literature.*** Macmillan, 2012.
4. Wainwright, Jeffrey. ***Poetry: The Basics***. Indian Reprint. Routledge, 2009.
5. Hudson, W.H. ***An Introduction to the Study of English Literature.*** Maple Press. 2012.

MODEL QUESTION PAPER
19UEN311.1: Readings in Literature 1

Time: 3 hours **Max. Marks: 80**

Section A
Answer all the ten questions:

1. Where, according to Gandhi, does God reside?
2. What do the Indians rely upon, when their efforts are inadequate?
3. What is a cold war?
4. What does the expression 'silent steps' mean?
5. Death is the _____ of my face.
6. The poem 'The Railway Clerk' has been taken from _____.
7. The picture of the morning presented in the poem "An October Morning" is_____.
8. A.K. Ramanujan was not only a poet, but a ____ as well.
9. What does the poet compare the hill's crack to in 'An Old Woman'?
10. Who is the clumsy puppet in the poem 'Nani'?

(10 x 1 = 10 marks)

Section B
Answer any eight of the following questions in a sentence or two:

11. Why do we, according to Gandhi, live in a state of perpetual fear?
12. Why does chandhuri say that spending is the positive urge of English people and saving the corrective one.
13. What does roy call the theory of deterrence?
14. What are the various wordly sorrows according to the poem "Silent Steps".
15. What, according to God , is life and death in "The Soul's Prayer".
16. How does the speaker express his subordination in "The Railway Clerk".
17. What is the significance of the morning being compared to the jackal's snort.
18. What is the poet say, "Not only prophets walk on water"
19. Can you distinguish between the speaker and the poet in the poem "An Old Women"?
20. Does the poet identify herself with Nani?
21. Why did Phatik's cousins jeer at him more than the other boys?
22. What really happened to Anna's child in 'Circus Cat, Alley Cat'?

(8 x 2 = 16 marks)

Section C
Answer any six of the following questions in about 100 words:

23. How can we be fearless in the world in Gandhi's opinion
24. Describe Chandhuri's experience with the BBC.
25. Comment on Roy's views on nuclear deterrence.
26. Explore the poet's concept of God as reflected in the poem "Silent Steps".
27. What are the poet's implorations to God in "The Soul's Prayer" ?
28. How does the use of Indianisms highlight the theme of the poem "The Railway Clerk"
29. Why do you think the morning is 'out of joint' in 'An October Morning'?
30. What is the significance of the title of the poem "The Stiriders" ?
31. Can you trace out the anguish of cultural rootlessness in the poem 'An Old Woman' ?

(6 x 4 = 24 marks)

Section D
Answer any two of the following essays in about 300 words:

32. How does Gandhi establish the need for religion in the essay.
33. How forcefully does Arundhati Roy argue against the dangers of nuclear weapons?
34. How far is Ketu representative of the dispossessed tribesmen of India?
35. Bring out the symbolism of the story 'Circus Cat, Alley Cat'.

(2 x 15 = 30 marks)

Language course VII (Additional Language III)

19UFR311.1: LITERATURE IN FRENCH

No of Credits: 4 **No of hours: 5 Hrs/week**

COURSE OBJECTIVES:

1. To enhance literary sensibility.
2. To introduce students to the world of French and Francophone literature.

COURSE OUTCOME:

The students would be acquainted with the French & Francophone literature and thereby they would be equipped to enrich their vocabulary.

SYLLABUS:

NAME OF TEXT : **ECHO-A1 méthode de français**
Authors: J. Girardet & J. Pecheur
Publisher: CLE INTERNATIONALE

- Lecon – 6 : Bon appetit ! (Pages : 54 – 61)
- Lecon – 7 : Quelle journee ! (Pages : 62 – 69)
- Lecon – 8 : Qu'on est bien ici ! (Pages : 70 – 81)

The following poems to be studied:

1. Le Pont Mirabeau - Guillaume Apollinaire
2. Déjeuner du Matin - Jacques Prévert
3. Noel - Théophile Gautier
4. Chanson d'Automne - Paul Verlaine
5. Soir d'hiver - Émile Nelligan
6. La cigale et la fourmi - Jean de la Fontaine

Reference books:

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet
4. A bouquet of French poems (Polyglot house) by Prof. T.P Thamby

MODEL QUESTION PAPER
19UFR311.1: LITERATURE IN FRENCH

TIME: 3HRS **MAX MARKS: 80**

PART-A

Répondez à toutes questions suivantes:

1. A quelle heure dinez-vous ?
2. Quel logement préférez-vous?
3. Quel pays voulez-vous visiter ?
4. Quel temps fait-il ?
5. Nommez deux pièces qu'on trouve dans un appartement ?
6. Quelle est la plus grande bibliothèque de la France ?
7. Qui a écrit le poème « Soir d'Hiver » ?
8. Nommez un pont français.
9. Quel est votre jour préfère de la semaine?
10. Que prenez-vous pour le déjeuner ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Quelles sont les saisons de l'année ?
12. Exprimez leur état physique ou leur besoin :
    Ex : il n'a rien mangé. → Il a faim.
    a. Elle a fait 20km à pied.
    b. Il a bu trop de whisky.
    c. Il est au pôle Nord.
    d. Il fait très chaud.
13. Complétez avec « aller » ou « venir » :
    - Aux vacances de février, je ….. dans les Alpes faire du ski. Tu peux …….avec moi ?
    - Je ne peux pas. Je ……en Grèce avec Marie. Mais l'été prochain, je voudrais ……chez toi, dans ta maison de campagne. Tu es d'accord ?
14. Complétez avec l'article qui convient :
    - Vous voulez …….verre de vin ou vous prenez ……eau ?
    - J'ai préparé ….. rôti de bœuf. Vous n'êtes pas végétarien ? Vous mangez ……bœuf ?
15. Mettez les verbes entre parenthèses a la forme qui convient :
    « *Deux femmes parlent de leur emploi du temps* »
    a. Je suis employée dans un cinéma. Alors je (se coucher) tard.
    b. Et bien sûr, vous (se lever) tôt.
    c. Non, je na (se lever) pas avant 9 heures !
    d. Et qui (s'occuper) des enfants ?
16. Complétez :
    Apres le repas
    - Tu veux …..the ?
    - Non, merci, je n'aime pas….the. Je préfère ….café.
    - Alors….café ?
17. Complétez les réponses avec une forme « à + *pronom »* :
    Ex : C'est ton portable ? Oui, il est à moi.
    a. C'est le dictionnaire de Pierre ?
       Oui, ……
    b. Les enfants, ce sont vos jeux vidéo ?
       Oui, ……
    c. Ce sac est à Marie ?
       Non, il …….. Il est à Julie.
    d. Ce stylo n'est pas à toi, Pierre ?
       Si, …….
18. Transformez à l'impératif :
    a. Tu dois te lever.
    b. Tu dois te préparer.

c. Nous devons être en forme.
d. Nous devons nous réveiller à 7h.

19. Complétez avec « quelque chose, ne…..rien, quelqu'un, ne…..personne » :
    - J'ai …… à te dire. Mais ne raconte cette histoire à …….
    - D'accord.
    - Melissa n'est pas partie seule au stage de Bruxelles. Elle est partie avec ……..
    - Son mari sait…… ?
20. Dites si les phrases suivantes sont vraies ou fausses :
    a. Avec le TGV, on peut traverser Paris très vite.
    b. Il y a un aéroport à Nantes.
    c. Les Français prennent le petit déjeuner en famille.
    d. Beaucoup de restaurants n'acceptent plus de clients après 14h 30.
21. Complétez ce dialogue avec les questions :
    a. …… ? Oui, Je pars en vacances.
    b. …… ? Dans les Alpes.
    c. ……... ? En aout.
    d. ……. ? Avec Marie, Vanessa et Luc.
22. Complétez avec un adjectif possessif ou la forme « à + moi, toi, lui etc » :
    Pierre montre une photo à un ami :
    « Regarde cette photo, c'est …….maison de campagne. Là, ce sont …..enfants et ici, c'est ……chien.
    - Tu loues cette maison ou elle est ……. ? »

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Répondez :
    a. Alexandre est venu ? Non, il ……
    b. Tu as dansé avec François ? Non, je ……..
    c. Vous avez bien mangé ? Non, je ……
    d. Luc et Marie ont joué de la guitare ? Non, ……..
24. Mettez les verbes entre parenthèses a la forme qui convient :
    - Tu (prendre) un croissant ?
    - Non, merci. Je (faire) un régime. Et Marie aussi. Nous ne (manger) plus de pâtisseries et nous ne (boire) plus de boissons sucrées.
25. Donner-leur des conseils. Utilisez les verbes indiqués :
    - Demain, ils vont jouer un match de football.
      Se coucher tôt – bien manager – ne pas se fatiguer – se détendre.
26. Quelle est la morale de « La Cigale et La fourmi » ?
27. Décrivez le poème « Noel » ?
28. Pourquoi le poète est triste dans le poème « Chanson d'autonome » ?
29. Que savez-vous du poème « Le Pont Mirabeau » ?
30. Quelle est l'humeur du poète dans le poème « Soir d' Hiver » ?
31. Qui signifie-t-il, le poème « Déjeuner du Matin » ?

(6x4=24)

PART-D

Répondez à 2 questions suivantes :

32. Présentez votre logement idéal.
33. Vous logez à l'hôtel Astérix, rue de Rivoli. Une amie doit venir vous voir. Envoyez un message à cette amie pour expliquer comment aller jusqu'à votre hôtel.
34. Vous avez changé de domicile. Envoyez un message à un(e) ami(e) et écrivez en quelque phrase :
    - La ville ou le village
    - Le quartier et la rue
    - L'immeuble et les voisins
    - L'appartement.
35. Vous allez déjeuner au restaurant « L'Assiette » avec Un(e) ami(e). Rédigez ce dialogue.

(2x15=30)

Language course VII (Additional Language III)

19UHN311.1: POETRY AND GRAMMAR

No of Credits: 4 **No of hours: 5 Hrs/week**

Aims of the Course / Objectives

To sensitize the student to the aesthetic aspects of literary appreciation and to introduce Hindi poetry. To understand the grammar of Hindi.

Course Outcome

Understanding the role played by the poets of Bhakti cult in Literature and Society. Developing philosophy of life inspiring by the vision of eminent modern Hindi poets. Develop approach of Hindi Grammar

Module I

Poetry Collection (Detailed) – Kavya Sudha
Edited by Dr. V. Bhaskar
Javahar Pusthakalaya, Mathura

Poems to be studied

1.	Kabeer	Doha	1 to 5
		Pada	1
2.	Thulsidas	Pada	3 & 5
3.	Soordas	Pada	1,3 & 4
4.	Nirjjar	- Maidhilisharan Gupth	
5.	Prathibimb	- Sumithranandan Panth	
6.	Kahde mem kya ab Dekkoom	-	Mahadevi Varma
7.	Oh Megh	-	Mukthibodh
8.	Kavitha ki bath	-	Agyeya
9.	Machali	-	Sarveswar Dayal Saxena
10.	Dhabba	-	Kedarnath Singh
11.	Proxy – 4	-	Venugopal
12.	Machiz	-	Sunitha Jain

Module 2

Long Poems (Non-Detailed)

Prescribed Text book – 'Panchrang' Edited by Dr. V.V. Viswam
Hindi Vidyapeth, Kerala

Poems to be studied

1.	Vah phir jee Udhi	-	Nagarjun
2.	Ek yathra ke Dauran	-	Kumvar Narayan

Module 3

Grammar- Vyavaharik Hindi Vyakaran: Anuvad tatha Rachana
By Dr H Parameswaran
Published by Radhakrishna Prakashan, Delhi

Topics to be studied

Varna, Ling, Vachan, Karak, Sangya, Sarvanam, Visheshan, Kriya, Kal

Book for General Reading

1.	Hindi Kavya Ka Ithihas	-	Ramswaroop Chathurvedi Lokbharati Prakashan
2.	Kabir, Soor, Thulsi	-	Yogendra Pratap Singh Lokbharati Prakashan
3.	Adhunik Hindi Kavitha	-	Viswanath Prasad Tivari Lokbharati Prakashan
4.	Lambi Kavithayen Vaicharik Sarokar	-	Dr. Bal dev Vanshi Vani Prakashan

5.	Nayi Kavitha	-	Dr. Jugadish Gupt Rajkamal Prakashan
6.	Samakaleen Hindi Kavitha	-	Viswanath Prasad Tivari Lokbharati Prakashan
7.	Hindi Vyakaran	-	Kamatha Prasad Guru Vani Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Third Semester B.A/B.Sc Degree Examination

Language Course (Additional Language III) - HINDI

19UHN 311.1 Poetry and Grammar

(2019 Admission onwards)

Time : 3 Hrs. **Max.Marks : 80**

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. 'रामचरितमानस' के रचनाकार कौन है?
2. कबीरदास की प्रामाणिक रचना का नाम क्या है?
3. वचन किसे कहते हैं?
4. द्विवेदी युग के प्रतिनिधि कवि का नाम लिखिए?
5. 'लोकायतन' किसका महाकाव्य है?
6. 'घर' शब्द का बहुवचन क्या है?
7. 'यामा' काव्यकृति के लिए किसको ज्ञानपीठ पुरस्कार मिला था?
8. कवि वेणुगोपाल का जन्म कहाँ हुआ?
9. 'आत्मजयी' किसका प्रबन्धकाव्य है?
10. 'क्रिया' किसे कहते हैं? (10×1=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. पुरुषवाचक सर्वनाम किसे कहते हैं? उसके भेदों को समझाइए?
12. 'वह फिर जी उठी' कविता का प्रतिपाद्य क्या है?
13. 'माचिस' कविता में नारी जीवन की किस त्रासदी का वर्णन किया है?
14. संज्ञा किसे कहते हैं? उसके कितने भेद हैं?
15. कबीरदास के अनुसार सच्चे गुरु का लक्षण क्या है?
16. तुलसीदास की नवधा भक्ति का स्वरूप समझाइए?
17. स्त्रीलिंग शब्दों के बहुवचन कैसे बनाये जाते हैं?
18. 'ओ मेघ' कविता का सन्देश क्या है?
19. 'कह दें मैं क्या अब देखूँ' कविता में अभिव्यक्त कवयित्री की विचारधारा का परिचय दीजिए?
20. अज्ञेय द्वारा प्रतिपादित 'कविता की बात' क्या है?
21. हर बार प्लेट में मछली को देखने पर कवि को क्या लगता है?
22. संख्या वाचक विशेषण और परिमाणवाचक विशेषण में क्या अन्तर है? (8×2=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. 'निर्झर' कविता का सारांश लिखिए?
24. 'प्रतिबिंब' कविता का भाव समझाए?
25. कारक किसे कहते हैं? कारक के भेदों को सोदाहरण समझाइए?
26. सूरदास की 'बाललीला वर्णन' पर प्रकाश डालिए?
27. प्राक्सी-4 कविता में चित्रित मध्यवर्गीय मानसिकता पर प्रकाश डालिए?
28. लिंग परिवर्तन के नियम लिखिए?
29. सूरदास की भक्ति पद्धति का परिचय दीजिए।
30. कवि नागार्जुन के कृतित्व पर प्रकाश डालिए?
31. भावार्थ लिखिए।

    जाके मुंह माथा नाहीं, नाहिं रूप कुरूप।

    पुहुप वास ते पातरा, ऐसा तत अनूप।। (6×4=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. 'धब्बा' कविता का मूल्यांकन कीजिए?
33. 'एक यात्रा के दौरान' कविता का सारांश लिखकर उसकी विशेषताओं पर प्रकाश डालिए?
34. सर्वनाम किसे कहते हैं? उसके भेदों को सोदाहरण समझाइए?
35. काल किसे कहते हैं? काल के भेदों को सोदाहरण समझाइए? (2×15=30 marks)

സെമസ്റ്റർ : III
കോഴ്സ് കോഡ് : 19 UML 311.1
ലാംഗ്വേജ് കോഴ്സ് : VII (അഡീഷണൽ ലാംഗ്വേജ് : III)
സമയക്രമം : ആഴ്ചയിൽ 5 മണിക്കൂർ (18×5=90 മണിക്കൂർ)
ക്രെഡിറ്റ് : 4

ദൃശ്യകലാസാഹിത്യം

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ:

1) ദൃശ്യകലാ സംസ്കാരത്തിന്റെ സമ്പന്നതയെക്കുറിച്ചുള്ള അറിവ് നേടുക. കഥകളി, തുള്ളൽ, നാടകം, സിനിമ എന്നീ ദൃശ്യകലകളെയും അവയ്ക്ക് ആധാരമായ സാഹിത്യപാഠങ്ങളെയും പരിചയപ്പെടുത്തുക.

പാഠ്യപദ്ധതി

മൊഡ്യൂൾ ഒന്ന് (36 മണിക്കൂർ)

ആട്ടക്കഥാ, തുള്ളൽ, സാഹിത്യം

കഥകളിയുടെ ഉത്ഭവവികാസ പരിണാമങ്ങൾ, പ്രധാന ആട്ടക്കഥാകൃത്തുക്കൾ

1. നളചരിതം ആട്ടക്കഥ (നാലാംദിവസം) - ഉണ്ണായിവാര്യർ
   (നളദമയന്തീ സംവാദം വരെ)
2. കാർത്തവീര്യാർജ്ജുനവിജയം തുള്ളൽ - കുഞ്ചൻ നമ്പ്യാർ

മൊഡ്യൂൾ ര് (36 മണിക്കൂർ)

നാടക സാഹിത്യം

സംസ്കൃത നാടക പ്രസ്ഥാനം - മലയാള വിവർത്തന നാടകങ്ങൾ

1. മലയാള ശാകുന്തളം(വിവ:) - എ.ആർ.രാജരാജവർമ്മ (നാലാം അങ്കം വിശദപഠനം. മറ്റ് അംഗങ്ങൾ സാമാന്യപഠനം)

2. ആ മനുഷ്യൻ നീതന്നെ - സി. ജെ. തോമസ്

3. രാവുണ്ണി - പി. എം. താജ്

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

തിരക്കഥാപഠനം

ഒഴിമുറി - ജയകാന്തൻ

റഫറൻസ് ഗ്രന്ഥങ്ങൾ

1. കേരള സാഹിത്യ ചരിത്രം - ഉള്ളൂർ
2. സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ - ഡോ.കെ.എം.ജോർജ്ജ്
3. കൈരളിയുടെ കഥ - എൻ.കൃഷ്ണപിള്ള
4. നാട്യശാസ്ത്രം - ഭരതമുനി
5. കഥകളി - ജി.കൃഷ്ണപിള്ള
6. കഥകളിരംഗം - കെ.പി.എസ്. മേനോൻ

7. കഥകളിയും സാഹിത്യവും – മാടശ്ശേരി
8. കഥകളി വിജ്ഞാന കോശം – അയ്മനം കൃഷ്ണകൈമൾ
9. നളചരിതം വ്യാഖ്യാനം – എം.എച്ച്. ശാസ്ത്രികൾ
10. കഥകളി മഞ്ജരി – ഡോ.എസ്.കെ നായർ
11. ആത്മകഥ – പി.കൃഷ്ണൻ നായർ
12. ദി ആർട്ട് & ലിറ്ററേച്ചർ ഓഫ് കഥകളി – ഡോ.എസ്.കെ. നായർ
13. നാടകദർപ്പണം – എൻ.എൻ. പിള്ള
14. നാടകം ഒരു പഠനം – സി.ജെ.തോമസ്
15. ഉയരുന്ന യവനിക – സി.ജെ.തോമസ്
16. നാടക പഠനങ്ങൾ – എഡിറ്റർ പന്മന രാമചന്ദ്രൻ നായർ
17. കഥയും തിരക്കഥയും – എ.ജി. രാജ്കുമാർ
18. സിനിമയും മലയാളസാഹിത്യവും – മധു ഇറവങ്കര
19. മലയാള സിനിമ – സിനിക്
20. ചലച്ചിത്രത്തിന്റെ പൊരുൾ – വിജയകൃഷ്ണൻ
21. ചലച്ചിത്ര സമീക്ഷ – വിജയകൃഷ്ണൻ
22. സിനിമയുടെ രാഷ്ട്രീയം – രവീന്ദ്രൻ

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Third Semester BA Degree Examination

CBCSS Malayalam (Aditional Language - 1)

19UML311.1 ദൃശ്യകലാസാഹിത്യം

Time : 3 Hrs. **Max.Marks : 80**

Section A

I. **ഒരു വാക്കിലോ/ വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്ക് വീതം**

1. നളചരിതം ആട്ടക്കഥയ്ക്ക് ഏ.ആർ.രാജരാജവർമ്മ രചിച്ച വ്യാഖ്യാനമേത്?
2. രാമനാട്ടത്തിന്റെ ഉപജ്ഞാതാവാര്?
3. "അഗ്നിയല്ലാതെ ദഹിപ്പിക്കുമോ?" ആരെക്കുറിച്ചാണ് പറയുന്നത്?
4. അഭിജ്ഞാന ശാകുന്തളത്തിന്റെ ആദ്യ മലയാളവിവർത്തനമേത്?
5. മണിപ്രവാളശാകുന്തളം ആരുടെ കൃതിയാണ്?
6. നാടകത്തിലെ പഞ്ചസന്ധികൾ ഏതെല്ലാം?
7. 'നളോപാഖ്യാനം' മഹാഭാരതത്തിലെ ഏത് പർവ്വത്തിൽ ഉള്ളതാണ്?
8. നളചരിതത്തെ മലയാളത്തിലെ ശാകുന്തളം എന്ന് വിശേഷിപ്പിച്ചതാര്?
9. പന്മന രാമചന്ദ്രൻ നായരുടെ നളചരിത വ്യാഖ്യാനമേത്?
10. കൃഷ്ണനാട്ടത്തിന് ആധാരമായ കൃതിയേത്? (1×10=10)

Section B

II. അരപ്പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും 8 ചോദ്യത്തിന് ഉത്തരമെഴുതുക. 2 മാർക്ക് വീതം.

11. "ഈ ആശ്രമം ഹന്തഃ ശമപ്രധാനം; കയ്യോ തുടിക്കുന്നിതു; കാര്യമെന്തോ?" സന്ദർഭമെന്ത്?
12. "ചെന്തളിരിനൊപ്പമധരം; ചെറുശാഖകളോടിട-

    ഞ്ഞിടുന്നു ഭുജം;

    പൂമലർപോലെ മനോജ്ഞം പൂമേനിയതിൽ

    ത്തികഞ്ഞ താരുണ്യം" - ആരെക്കുറിച്ചാണ് ഇപ്രകാരം പറയുന്നത്? വിശദീകരിക്കുക.
13. "സുകൃതമില്ലാത്തവർക്കു സുചിരം പ്രയത്നം കൊണ്ടും സുജനസംഗമമുണ്ടോ സുലഭമായി വരുന്നു" സന്ദർഭം എഴുതി ആശയം വിശദീകരിക്കുക.
14. "ഉർവ്വീസുരചാപലം പെരുതേ പാരിൽ-

    സർവ്വവിദിതം കേവലം" - ഇങ്ങനെ പറയാൻ കാരണമെന്ത്?
15. "നേർന്ന നേർച്ചകളും മമ സഫലാനീ" - ഇങ്ങനെ ചിന്തിക്കാൻ കാരണമെന്ത്?
16. "മര്യാദയോർത്തു വെളിവായ്ത്തെളിയിച്ചുമില്ല;

    മാരന്റെ ചേഷ്ടയവളൊട്ടു മറച്ചുമില്ല" - സന്ദർഭം വിശദമാക്കുക.
17. "സന്താപമേകാനുമകറ്റുവാനും ചെന്താർശരൻ

    താനൊരു ഹേതുവായി;

    ഇക്കണ്ട ലോകത്തിനു വർഷമേകാൻ

കാർകൊണ്ടെഴും വാസരമെന്നപോലെ" - ആശയം വ്യക്തമാക്കുക.

18. "ഇഷ്ടപ്രവാസമതിനാലുളവാമവസ്ഥ
കഷ്ടം!തുലോമബലമാർക്കൊരുതർക്കമില്ല" ഈ വരികളുടെ സാംഗത്യമെന്ത്?

19. "ഏറ്റവസ്തു തിരികെകൊടുത്ത പോ-
ലേറ്റവും തെളിമപൂണ്ടിതെൻ മനം" - ആരുടെ വാക്കുകൾ? കാരണമെന്ത്?

20. "വിരഹം മേ മർമ്മദാരണം; അതിലേറെനല്ലുമാരണം" ഇങ്ങനെ ചിന്തിക്കാൻ കാരണമെന്ത്?

21. "മുറ്റുമതിന്നായി സംഗതി വന്നു
മറ്റൊരു കാര്യവുമേതുമില്ല" - സന്ദർഭം വിശദമാക്കുക.

22. "ക്ലേശവിനാശത്തിനുനൂനം കൗശലമേതത്" - സന്ദർഭമേത്? (8×2=16)

Section C

III. ഒന്നര പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും ആറ് ചോദ്യത്തിന് ഉത്തരമെഴുതുക. 4 മാർക്ക് വീതം

23. കാശ്യപൻ ദുഷ്യന്തനു നൽകുന്ന സന്ദേശത്തിന്റെ അർത്ഥതലങ്ങൾ എന്തൊക്കെ? വിശദമാക്കുക.

24. കാളിദാസ സൃഷ്ടികളായ അനസൂയാ പ്രിയംവദമാർക്ക് ശാകുന്തളം നാടകത്തിലുള്ള സ്ഥാനമെന്ത്?

25. ശകുന്തള ആശ്രമത്തിൽ നിന്ന് യാത്രയാകുമ്പോൾ പ്രകൃതിയ്ക്കുണ്ടാകുന്ന ഭാവമാറ്റങ്ങൾ എന്തെല്ലാം? വിശദമാക്കുക.

26. ഋതുപർണ്ണൻ - കഥാപാത്ര നിരൂപണം ചെയ്യുക.

27. നളനോടു ദമയന്തി തന്റെ നിരപരാധിത്വം വെളിപ്പെടുത്തുന്നതെങ്ങനെ?

28. ശാകുന്തളം രണ്ടാമങ്കത്തിൽ പ്രണയസുരഭിലയായ ശകുന്തളയുടെ മനോവ്യാപാരം വർണ്ണിച്ചിരിക്കുന്നത് എപ്രകാരമാണ്?

29. "വിരഹമോ കഠോരം, കടലിതുവീതഗാധപാരം" - ഈ പരിദേവനത്തിനു പിന്നിലുള്ള മാനസികവ്യഥ അനാവരണം ചെയ്യുക.

30. 'നളചരിതം ആട്ടക്കഥയും' 'അഭിജ്ഞാനശാകുന്തളം' നാടകവും നാടകീയതയിൽ സമരസപ്പെട്ടുപോകുന്നതെങ്ങനെ?

31. ദുഷ്യന്തന്റെ രാജകൊട്ടാരത്തിൽ എത്തിയ ശാർങ്ഗരവ - ശാരദ്വതന്മാർക്ക് പട്ടണം കണ്ടപ്പോഴുണ്ടായ അനുഭവം കാളിദാസൻ എങ്ങനെ വർണ്ണിക്കുന്നു? (6×4=24)

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ട് ചോദ്യത്തിന് ഉത്തരമെഴുതുക 15 മാർക്ക് വീതം

32. "നളചരിതം അരങ്ങിലും പാഠത്തിലും വിസ്മയങ്ങൾ തീർത്തത് കാവ്യശൈലികൊണ്ടാണ്." ഈ പ്രസ്താവനയോട് ഉദാഹരണസഹിതം പ്രതികരിക്കുക.

33. 'അഭിജ്ഞാനശാകുന്തളം' കാലാതീതമായി വായിക്കപ്പെടുന്നതും അനുഭവവേദ്യമാകുന്നതും രചനാ സൗന്ദര്യം കൊണ്ടാണോ? വിശദമാക്കുക.

34. ചരാചരങ്ങളെ ഏകോദര സഹോദരങ്ങളായി കാണുന്ന കാഴ്ചപ്പാട് ശാകുന്തളം നാലാം അങ്കത്തെ ആസ്പദമാക്കി വിലയിരുത്തുക.

35. "നളചരിതത്തിലെ ഭാഷ സംസ്കൃതമാകുന്ന ചെമ്പും മലയാളമാകുന്ന വെളുത്തീയവും ചേർത്തുരുക്കിയ ഒരു വെങ്കലഭാഷയാണ്." എന്ന കേരളപാണിനിയുടെ അഭിപ്രായം പാഠഭാഗത്തെ മുൻനിർത്തി ചർച്ചചെയ്യുക. (2×15=30)

Core Course - II

19UCH341: Inorganic Chemistry- II

(Lecture-Tutorial-Lab: 3-0-2 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 56 hrs lecture and 36 hrs related lab instruction.)

No. of credits: 3 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To provide a thorough knowledge of inorganic Chemistry
CO2: To impart detailed knowledge in chemical bonding
CO3: To provide the students the fundamental knowledge of the nanomaterials
CO4: To inculcate knowledge about the various applications of nuclear chemistry
CO5: To study the compounds of non-transition elememts

Course out line

Module-1 Chemical Bonding –I ***9hrs***

Concept of resonance, formal charges. VSEPR theory and its applications – structure of molecules with bond pairs only, molecules with both bond pairs and lone pairs . –Valence bond theory-Conditions for overlapping-Types of overlapping (positive, negative and Zero overlapping), - hybridization – methane, ethylene, benzene, acetylene,allenes, sp^3d and sp^3d^2– Limitations of VBT

MO theory, LCAO, homonuclear diatomic molecules- C_2, B_2, N_2, O_2 and ions like O_2^+- heteronuclear diatomic molecules (HF, NO, and CO) – Bond order – comparison of VB and MO theories

Module II : Chemical Bonding –II ***9hrs***

Ionic bond-ionic lattice energy of ionic compounds- Bond-Lande equation, BornHaber cycle, alvation energy and solubility of ionic solids-covalent character of ionic bond, Fajan's rules

Polarity of Covalent bond- dipole moment- percentage ionic character- dipole moment and molecular structure Metallic bonding- free energy theory, VB theory and band theory (Qualitative treatment only)-Secondary forces – hydrogen bond, inter and intramolecular hydrogen bond, intermolecular interaction –-ion –dipole van der Waals forces such as dispersion forces, dipole-dipole, ion-induced dipole, dipoleinduced dipole

Module III Compounds of non-transition elements I ***(9 hrs)***

Manufacture and uses of the following Glass – different types of glasses, Silicates, Zeolites and Silicones. Borax – boron hydrides, boron nitrides, borazole and carboranes. Oxides and oxyacids of phosphorus. Refractory carbides, nitrides, salt-like carbides, borides, and silicides.

Module IV Compounds of non-transition elements II **(9 hrs)**

Oxides and oxyacids of halogens (structure only) – Inter halogen compounds and pseudo halogens – Compounds of noble gases (Xenon and Radon)– Uses of noble gases.

Inorganic polymers Phosphorus, boron and silicon based polymers – Structure and industrial applications.

Module V: Nuclear Chemistry **(9hrs)**

Natural radioactivity, modes of decay, decay constant(Derivation not expected), half life, average life, Disintegration series. Geiger –Nuttal rule, artificial transmutation and artificial radioactivity- nuclear stability, n/p ratio, packing fraction, mass defect and binding energy, Nuclear models –Shell model and liquid drop model. Nuclear fission-atom bomb and nuclear fusion-hydrogen bomb-applications of radioactivity- ^{14}C dating, rock dating neutron activation analysis and isotope as tracers. Study of reaction mechanism (ester hydrolysis)-application of radioactive isotopes in medicine – Radio diagnosis and radiotherapy. (Including numerical problems)

Module VI : Chemistry of Nanomaterials ***(9hrs)***

Evolution of Nanoscience – Historical aspects- Preparations containing nano gold in traditional medicine. Lycurgus cup- Faraday's divided metal etc. Nanosystems in nature. Preparation of nanoparticles: Top-down approaches and Bottom to top approach Sol–gel synthesis, Colloidal precipitation, Co–precipitation, Combustion technique, Sonochemistry, Hydrothermal technique, High energy ball milling etc. Carbon

nanotubes and fullerenes. Properties of nanoparticles: optical, magnetic, mechanical, thermal and catalytic properties with examples.

Reference:

1. "Basic Inorganic Chemistry" ; F. A. Cotton, G. Wilkinson and P. L. Gaus, Willey, 1994.
2. "Concise Inorganic Chemistry" : J. D. Lee, Blackwell Science Ltd, 1996.
3. "Theoretical Inorganic Chemistry" : M. C. Day and Selbin, Literary Licensing, LLC, 2012.
4. "Inorganic Chemistry- Principles and Structure and Reactivity" : J. E. Huheey, Pearson, 2010.
5. "Inorganic Chemistry" : Shriver and Atkins, Oxford University Press, 2010.
6. "Coordination Chemistry" : Basolo and Johnson, Science Reviews, 1986.
7. "Coordination Chemistry" : S. F. A. Kettle, Thomson Nelson & Sons Ltd, 1969.
8. Essentials of Nuclear Chemistry : H S Arniker, New Age International Pvt. Ltd., 2010.
9. Puri, Sharma and Kalia "Inorganic Chemistry", Vishal, 2017.
10. Madan "Modern Inorganic Chemistry" S. Chand, 1987.
11. T.F.Gieryn, Cultural boundaries of science Univ. Chicago Press 1999.
12. S. Glasstone, Source Book on Atomic Energy, 3rd Edition, East-West Press Pvt. Ltd., New Delhi, 1967.
13. The Golem : What everyone should know about science. H.Collins and T.Pinch. Cambridge Univ Press 1993

MODEL QUESTION PAPER
19UCH341: INORGANIC CHEMISTRY II

Time: Three Hours **Maximum Marks: 80**

SECTION A

(Answer **all** questions. Each question carries **1** mark)

1. What is the bond order of O_2^+.
2. What is fullerenes?
3. What are nano sensors?
4. Name the hydrogen bonding in salicylaldehyde.
5. What is inorganic benzene?
6. Write an example for inter halogen compound.
7. Example for phosphorus based polymer.
8. Name a naturally occurring radioactive element.
9. Write an example of carboranes?
10. What is zeolite.

SECTION B

(Answer any **8** questions. Each question carries **2** Marks)

11. Compare the properties of Borazole with benzene
12. Explain the method of preparation of gold nano particles
13. Applications of nano particles in medicine and electronics
14. Write a note on Fajans rule
15. Calculate the bond order of N_2, B_2, C_2 and O_2
16. What are the limitations of VBT?
17. Explain the structure of diborane
18. What is lattice energy?
19. State Geiger –Nuttal rule.
20. What are carboranes ?
21. Write a note on Born-Haber cycle
22. What is nuclear fission ?

SECTION C

(Answer any **6** questions. Each question carries **4** Marks)

23. Draw the MO diagram for NO and C_2 molecule
24. Give a comparative account of VB and MO theories using relevant examples.
25. What is meant by dipole moment? How it is helpful in explaining the structure of molecules.
26. Write a note on the preparation of nano particles using sol-gel method.
27. Explain the optical, magnetic, thermal and catalytic properties of nanoparticles with examples.
28. Write the alvationion and structures of Xenon compounds.
29. Explain artificial transmutation with example.
30. Explain mass defect.
31. Write a note on the manufacture of glasses.

SECTION D

(Answer any **2** questions. Each question carries **15** Marks)

32. (a) Explain VSEPR theory with example (5 marks)
    (b) Write a note on alvation energy and solubility of ionic solids (5 marks)
    (c) Write a note on secondary bond forces (5 marks)
33. (a) Explain the optical, magnetic, thermal and catalytic properties of nanoparticles with examples
    (b) Write a note on radio carbon dating.
34. (a) Write a note on the manufacture of glass.
    (b) Explain the preparation and bonding of noble gases.
35. (a) Write a note on carbon nanotubes and fullerenes
    (b) Explain inorganic polymers
    (c) Write a note on band theory

Complementary Course V

19UMM331.2: Linear Algebra, Probablity Theory & Numerical Methods

No. of Credits: 4 **Instructional hours per week:5**

Aim:
To enable students to acquire knowledge on basic linear algebra, probability theory and numerical methods.

Course outcome:
Students will be able to understand operations on matrices and apply diffrent methods to solve equation and grasp the various concepts related to statistical distribution.

Module 1 : Basic Linear Algebra **(24 Hours)**
Matrices and row reduction, Determinants, Cramer's rule for solving system of equations, vectors, lines and planes, linear combinations, linear functions, linear operators, linear dependence and independence, special matrices like Hermitian matrices and formulas, linear vector spaces, eigen values and eigen vectors, diagonalizing matrices.
Chapter 3 (sections 1 to 11) of text [2]
More exercises related to the topics in this module can be found in chapter 7 and 8 of reference [3], ***which is not to be included in ESE.***

Module 2 : Probability and Statistics **(36 Hours)**
Basics, Sample Space, Probability Theorems, Methods of Counting Random Variables, Continuous Distributions, Binomial Distribution, The Poisson Distribution
Chapter 15, sections 15.1 to15.7, 15.9 of text [2]
More exercises related to the topics in this module can be found in chapter 23 of reference [2], ***which is not to be included in ESE.***

Module 3 : Numerical Methods **(30 Hours)**
Algebraic and transcendental equations (Rearrangement of the equation; linear interpolation; binary chopping; Newton-Raphson method)
Simultaneous linear equations (Gaussian elimination; Gauss-Seidel iteration; tridiagonal matrices) Numerical integration (Trapezium rule; Simpsons rule; Gaussian integration; Monte Carlo methods), Differential equations (Difference equations; Taylor series solutions.
Chapter 27 (sections 27.1,27.3,27.4, 27.6 (exclude 27.6.3, 27.6.4 and 27.6.5) of text [1] .
More exercises related to the topics in this module can be found in reference [4], ***which is not to be included in ESE.***

Note: In all modules, proofs of theorems are to be omitted

Texts
Text 1 : K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press
Text 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley

References
Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons
Ref. 2 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press
Ref. 3 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India
Ref. 4 : Richard L Burden, J Douglas Faires. Numerical Analysis, 9th Edition, Cengate Learning

Fatima Mata National College Kollam,Autonomous

Semester III B.Sc. Degree Model Question Paper

First Degree Programme in Chemistry

Complementary Course in Mathematics

MM 1331.2 Linear Algebra, Probability Theory & Numerical Methods

Time:3hours **Max. Marks:80**

Section A

Answer all questions .Each question carries 1mark.

1. What are the elementary row operations?
2. What is the rank of a matrix?
3. Is square root a linear operator?
4. What is a Hermitian matrix?
5. Define sample space.
6. A coin is tossed three times. What is the probability of atleast two tails in succession?
7. State Baye's formula.
8. Give one example of a transcendental equation.
9. What is the Newton Raphson iteration formula?
10. What is a tri-diagonal matrix?

Section B

Answer any 8 questions. Each question carries 2 marks.

11. Evaluate $\begin{vmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{vmatrix}$
12. Find the equation of a plane through the three given points (0,0,0), (1,2,5) and (2,-1,0).
13. Solve the set of equations $\begin{matrix} 2x + 3y = 3 \\ x - 2y = 5 \end{matrix}$
14. Find the rank of $\begin{bmatrix} 1 & -1 & 2 & 3 \\ -2 & 2 & -1 & 0 \\ 4 & -4 & 5 & 6 \end{bmatrix}$.
15. Find the angle between the vectors $A = 3i + 6j + 9k \ \ and \ \ B = -2i + 3j + k$.
16. Find a vector perpendicular to both $i - 3j + 2k$ and $5i - j - 4k$.
17. Show that the functions *1, x, sin x* are linearly independent.
18. A three digit number is selected at random. What is the probability that all three digits are the same?
19. Find the coefficient of x^8 in the binomial expansion of $(1 + x)^{15}$.
20. There are 10 chairs in a row and 8 people to be seated . In how many ways can this be done.

21. **You have taken a test and a report given your z-score as 1.14. What percentage of your peers scored higher than u?**
22. **Use an iteration procedure to find the roots of the equation $40x = exp\ x$ to four significant figures.**

Section C

Answer any 6 questions. Each question carries 4 marks

23. **Find the rank of the matrix** $\begin{pmatrix} 1 & 1 & 2 \\ 2 & 4 & 6 \\ 3 & 2 & 5 \end{pmatrix}$.
24. **Find the distance between the lines** $r = i - 2j + (i - k)t\ , r = 2j - k + (j - i)t$.
25. **Show that** $P(A + B + C) = P(A) + P(B) + P(C) - P(AB) - P(AC) - P(BC) + P(ABC)$.
26. **A club consists of 50 members . In how many ways can a president, vice-president,secretaryand treasurer be chosen?In how many ways can a committee of 4 members be chosen?**
27. **Find the probability of exactly 52 heads in 100 tosses of a coin using the binomial distribution and using the normal approximation.**
28. **Find the number *r* such that the area under the normal distribution curve *y=f(x)* from $\mu - r\ to\ \mu + r$ is equal to $\frac{1}{2}$.**
29. **Find the root of $f(x) \equiv x^5 - 2x^2 - 3 = 0$ using Newton Raphson method.**

Section D

Answer any 2 questions. Each question carries 15 marks

30. **Use trapezium rule with h=0.5 to evaluate $I = \int_0^2 (x^2 - 3x + 4)dx$**
31. **Find the numerical solution of $\frac{dy}{dx} = 2y^{\frac{3}{2}}, y(0) = 1$ for x=0.1 to 0.5 in steps of 0.1.**
32. **a) Diagonalize the matrix $\begin{pmatrix} 2 & 3 - i \\ 3 + i & -1 \end{pmatrix}$ by a unitary similarity transformations.**

    b) find the eigen values and eigen vectors of $\begin{pmatrix} 1 & 3 \\ 2 & 2 \end{pmatrix}$
33. **a) Find $\mu, var(x), \sigma_x$ of the given data**

x	0	1	2	3
f(x)	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$

    b) Find the probability P(45,55) of between 45 and 55 heads in 100 tosses of a coin , ie $45 \leq x \leq 55$.
34. **Solve the simultaneous equations**
$$x_1 + 6x_2 - 4x_3 = 8$$
$$3x_1 - 20x_2 + x_3 = 12$$
$$-x_1 + 3x_2 + 5x_3 = 3$$
35. **Using a 3 point formula in each case, evaluate the integral $I = \int_0^1 \frac{1}{1+x^2}\ dx$**
    i)using the trapezium rule(ii) using Simpson's rule.
    (iii) using Gaussian integration.Also evaluate the integral analytically and compare the results.

Complementary Course VI

19UPH331.2: Optics, Magnetism and Electricity

No.of credits: 3 **Instructional hours per week: 5 (54 hours)**

Course Outcome

The course provides an introduction to electricity, magnetism, optics: Electric charge and electric fields, current and resistance, magnetic fields, the properties of light, optical instruments etc.

- Understand and analyze interference between waves
- Understand the phenomenon of diffraction and types of diffraction
- Understand the phenomenon of polarization of light and its changes upon reflection and transmission
- Understand the principle and operation of lasers and basics of light propagation through optical fibers
- Understand the types of magnetic materials and their properties
- Understand and analyze the emf induced in various ac circuits including inductor, capacitor, resistor, their combinations etc.

Unit I (34 hours)

Interference (11 hours)

Analytical treatment of interference-theory of interference fringes and bandwidth , . Fizeau fringes and Haidinger fringes, Interference in thin films-reflected system-colour of thin films-fringes of equal inclination and equal thickness. Newton's rings-reflected system- Theory –diameters of dark and bright rings-experiment to determine the wavelength of monochromatic light

Diffraction (11 hours)

Phenomenon of diffraction-classification- Fresnel and Fraunhofer. Fresnel's theory of approximate rectilinear propagation of light-Fraunhofer diffraction at a single slit, two slits and N slits. Plane transmission grating-determination of wavelength

Polarisation (6 hours)

plane polarized light-polarization by reflection-Brewster's law-double refraction- propagation of light in uni-axial crystals-positive and negative crystals-half wave plate plate and quarter wave plate (qualitative)

Laser and Fibre Optics (6 hours)

Principle of operation of laser-population inversion-optical pumping-ruby laser applications of lasers Light propagation in optical fibres-step index fibre-graded index fibre-applications

Unit II (20 hours)

Magnetism (10 hours)

Magnetic properties of matter-definition and relation between magnetic vectors B, H and M. Magnetic susceptibility and permeability.Magnetic properties-diamagnetism,paramagnetism-ferromagnetism-antiferromagnetism.Electron theory of magnetism-explanation of ferromagnetism- Domains, Domain theory of ferromagnetism

Electricity (10 hours)

EMF induced in a coil rotating in a magnetic field-peak, mean, rms and effective values of A.C. Ac circuits-AC through RC, LC, LR and LCR series circuits-resonance-sharpness of resonance-power factor and choke coil-transformers.

References

1. A text book of optics – Brijlal & Subramaniam
2. Electricity and Magnetism – R.Murugeshan, S.Chand & Co Ltd.
3. A text book of B.Sc subsidiary Physics – P.Vivekanandan .

MODEL QUESTION PAPER
19UPH331.2: Optics, Magnetism and Electricity

Time:3 hours **Max.Mark :80**

Part A
Answer all the questions. Each question carries one mark.(10x1=10marks)

1. Give any two examples for a diamagnetic material.
2. Write down the expression for relative permeability in terms of magnetic susceptibility.
3. When a material is suspended freely in a magnetic field, how will it align in that field if it is (a) diamagnetic material and (b) paramagnetic material?
4. If the path difference between two waves is "asinθ", find the phase difference between them.
5. What is meant by form factor of ac circuit?
6. State the principle of super position of the waves?
7. Give the acronym for laser
8. What is meant by Meta stable state?
9. Name the principle behind the optical fibers.
10. Give the expression for root mean square value of current

Part B
Answer any eight questions. Each question carries two marks (8x 2=16marks)

11. Distinguish between Fresnel's and Fraunhofer diffraction.
12. What are the difference between interference and diffraction?
13. What are domains?
14. What is meant by absent spectra in a double slit diffraction pattern?
15. Explain the colour of thin film.
16. Derive the expression for mean value of an ac circuit
17. Write a note on magnetic vectors.
18. What are positive and negative crystals?
19. Define root mean square value of current and voltage
20. Derive the expression for current in an ac circuit containing pure resistance only
21. Give a note on graded index fiber
22. Give the phase diagram of current and voltage in ac circuit containing pure inductance only

Part C
Answer any six questions. Each question carries 4 marks (6x4=24marks)

23. A slit of width "a" is illuminated by white light. For what value of "a" does the first and second minima for red light of wavelength 650nm fall at angle of diffraction θ =30˚.
24. A plane wave front of light of wavelength 500nm falls on an aperture and the diffraction pattern is observed in an eye piece at a distance of 1m from the aperture. Find the radius of the 100^{th} half period element and the area of a half period zone.
25. An iron rod 0.2m long, 10mm in diameter and relative permeability 1000 is placed inside a long solenoid wound with 300 turns/ meter. If a current of 0.5A is passed through the solenoid, find the magnetic moment of the rod.
26. The core of light pipe made by glass fibre is of refractive index 1.68.The outer covering is made of material of refractive index 1.44.What is the range of angles of incident rays with axis of the pipe for which total internal reflection inside the pipe takes places
27. In a Newton's rings arrangement the diameters of the 4^{th} and 12^{th} dark rings are 4mm and 7mm respectively .Find the diameter of the 20^{th} dark ring.
28. Explain the principle of laser.
29. Derive the expression for emf induced in the coil rotating in magnetic field only.
30. Derive the expression for the rms value of current
31. a)The peak voltage of an ac is 300 V. What is the rms voltage b) the rms value of the current in an ac circuit 10 A. What is the peak current?

Part D
Answer any two questions. Each question carries 15marks (2x 15=30marks)

32. Describe the phenomenon observed in the Fraunhofer diffraction due to a single slit with a neat diagram. Draw the graph to show the variation of intensity with distance from the central maximum. Also find the width of the central maximum.
33. Distinguish between diamagnetic, paramagnetic and ferromagnetic materials.
34. Explain the working of a step index fiber and explain the terms acceptance angle and numerical aperture.
35. Derive the expression for the voltage and current of an ac circuit with inductance and resistance in series and also give the phase diagram for this circuit

Semester - IV

Language Course VIII

19UEN411.1: READINGS IN LITERATURE II

No of Credits:4 **No of hours: 90 (5 per week)**

COURSE OUTCOME

On completion of the course, the students should be able to:

1. Understand and appreciate literary discourse.
2. Look at the best pieces of writings in English critically.
3. Analyze literature as a cultural and interactive phenomenon.
4. Learn the English language through literature
5. Understand the aesthetic, cultural and social aspects of global literature.
6. Analyze and appreciate literary texts in the global context.
7. Learn structures of the English language through the text.

Module 1: Poetry
Module 2: One-Act Play
Module 3: Prose
Module 4: Fiction

COURSE MATERIAL

Module 1: Poetry

1. William Shakespeare : ***Sonnet 30***
2. John Keats : ***Ode to a Nightingale***
3. Robert Frost : ***Mending Wall***
4. David Malouf : ***The Bicycle***
5. Maya Angelou : ***Poor Girl***
6. Gabriel Okara : ***Once Upon a Time***

Module 2: One-Act Play

1. Anton Chekhov : ***The Marriage Proposal***

Module 3: Prose

1. E. V. Lucas : ***Bores***
2. Jawaharlal Nehru : ***A Glory has Departed***
3. Bertrand Russell : ***How to Escape from Intellectual Rubbish***

Module 4: Fiction – Short stories

1. Charles Lamb and Mary Lamb : ***Tales from Shakespeare - King Lear***
2. Charles Lamb and Mary Lamb : ***Tales from Shakespeare – Merchant of Venice***
3. O. Henry : ***Retrieved Information***
4. A.J. Cronin : ***Two Gentlemen of Verona***

Core Text:

Sadasivan, Leela. *Perspectives in Literature*. Foundation Books 2015

Further Reading

1. Abrams, M.H. **A Glossary of Literary Terms** (Rev. ed.)
2. Hobsbaum, Philip. ***Metre, Rhythm and Verse Form: The New Critical Idiom***. Indian Reprint. Routledge, 2007.
3. Prasad, Birjadish. ***A Background to the Study of English Literature.*** Macmillan, 2012.
4. Wainwright, Jeffrey. ***Poetry: The Basics***. Indian Reprint. Routledge, 2009.
5. Hudson, W.H. ***An Introduction to the Study of English Literature.*** Maple Press. 2012.

MODEL QUESTION PAPER
19UUEN411.1: Readings in Literature II

Time: Three hours **Maximum Marks: 80**

Section-A

Answer **all the questions**, each in a word or a sentence. Each question carries 1 mark.

1. Who is Lancelot Gobbo?
2. Who is the illegitimate son of the Earl of Gloucester?
3. Who does Nehru refer to in "We have failed to protect"?
4. Why does Keats wish for a "draught of vintage"?
5. A foundation stone of a bore is _____.
6. What is the attitude of the poet towards the bicycle?
7. What was the reason for the tourist's interest in the two boys?
8. Why was Jimmy Valentine imprisoned?
9. What happens after Natalia accepts the marriage proposal?
10. What does the poet mean by the terms "unlearn" and "relearn"?

(10 x 1 = 10 marks)

Section-B

Answer **any eight questions**, each in a short paragraph not exceeding 50 words. Each question carries 2 marks.

11. What was the contract that Shylock made Antonio sign before giving him the loan?
12. Write a brief note on the storm scene in 'King Lear'.
13. What is the greatest asset of a Bore?
14. How did the brothers help to defeat the German army in 'Two Gentlemen of Verona'?
15. What is the "gap" that the poet refers to in 'Mending Wall'?
16. What is Ivan's outlook towards lottery and luck?
17. What is the mistake that Aristotle made according to Russell?
18. Why does the poet say that his "grievances" are foregone?
19. Do you think nostalgia is the predominant theme in the poem, "Once Upon a Time"?
20. Who is Mid-May's eldest child?
21. What is the divine quality that Gandhi possessed?
22. Why did Lomov visit his neighbour?

(8 x 2 = 16 marks)

Section-C

Answer **any six** questions in about 100 words. Each question carries 4 marks.

23. Describe the first meeting between Lomov and Natalia?
24. Comment on the role of the Fool in 'King Lear'.
25. How does the story of 'The Two Gentlemen of Verona' give promise of greater hope for human society?
26. Nehru feels Gandhi does not need any monument in bronze. Why?
27. What are the two ways of avoiding fear in 'How to Escape from Intellectual Rubbish'?
28. What are the two opposing ideas of the two neighbours?
29. Comment on the phrase 'Once Upon a Time' as the title and the opening line of the poem.
30. Do you think money exercises power and has an adverse effect on personal relationships in 'The Lottery Ticket'?
31. Trace the elements of a farce in 'The Marriage Proposal'?

(6 x4 = 24 marks)

Section-D

Answer **any two** of the following, each in about three hundred words. Each question carries 15 marks.

32. How does Maya Angelou treat the themes of love and deception in 'Poor Girl'?
33. Discuss how the theme of ingratitude is treated in the play, 'King Lear'.
34. What are the ways suggested by Russell to escape from "intellectual rubbish".
35. In 'The Proposal' by Anton Chekhov, what idea does each of the characters represent?

(15 x 2 = 30 marks)

Language course IX (Additional Language IV)

19UFR411.1: CULTURE & CIVILIZATION

No of Credits: 4 **No of hours: 5 Hrs/week**

COURSE OBJECTIVES:

1. To acquaint the students with French culture and civilization.
2. To comprehend, compare and understand better the civilization of one's native place.

COURSE OUTCOMES:

The students would be able to comprehend French culture and civilization and thereby be able to compare and grasp better the civilization of one's native place.

SYLLABUS:

NAME OF TEXT : **ECHO-A1 méthode de français**
Authors: J. Girardet & J. Pecheur
Publisher: CLE INTERNATIONALE

- Leçon- 9 : Souvenez-vous ! (Pages : 86 -93)
- Leçon – 10 : On s'appelle ? (Pages : 94 – 101)
- Leçon – 11 : Un bon conseil ! (Pages : 102 – 109)
- **The following topics on Kerala culture with special emphasis on festivals, tourist centres, cuisine and cities are to be asked as short essays and long essays.**
  - » L'Onam – la fête unique du Kerala
  - » Le Vishou,
  - » Une ville touristique favori du Kerala
  - » Le Kerala – Le Pays du Dieu
  - » L'importance touristique du Kerala
  - » Un écrivain célèbre du Kerala
  - » Un plat traditionnel du Kerala

Reference books :

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER
19UFR411.1: CULTURE & CIVILIZATION

TIME: 3HRS **MAX MARKS: 80**

PART-A

Répondez à toutes questions suivantes:

1. Qui est le fils de votre père ?
2. Vous avez un ordinateur ?
3. Qu'est-ce que vous faites pour rester en contact avec vos amis ?
4. Nommez deux parties du corps ?
5. Quel numéro fait-on pour appeler les pompiers en France ?
6. Que faites-vous si vous avez perdu votre carte bancaire en France ?
7. Nommez un film français que vous avez regardé ?
8. Pourquoi utilisez-vous l'internet ?
9. Jusqu'à quand peut-on dire « Bonjour » en France ?
10. En France, qu'est-ce que vous devez faire quand on vous fait un cadeau ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Complétez en utilisant un pronom complément direct :
    Leo : J'ai rencontré une fille sympa. Je ….. aime bien.
    Marco : Tu ……vois souvent ?
    Leo : Oui, Je ……appelle.
12. Remplacez les mots soulignés par un pronom complément direct ou indirect :
    - Tu connais la nouvelle ? Clémentine a quitté Antoine !
    - Elle a quitté Antoine quand ?
    - Il y a un mois. Elle a écrit une lettre à Antoine. Elle a dit à Antoine qu'elle allait vivre à Toulouse.
    - Et les enfants ?
    - Elle a emmené les enfants.
13. Mettez les verbes entre parenthèses a l'imparfait :
    « A Paris. J'(avoir) une chambre dans le Quartier Latin. J'(étudier) a l'Ecole de médecine. C'(être) une belle époque. Le soir, nous (danser) a la Huchette.
14. Mettez les verbes suivants à l'imparfait :
    a. Connaitre : Elle …….
    b. Lire : Je …….
    c. C. habiter : Nous ……..
    d. Regarder : Vous ……
15. Répondez :
    a. Vous jouez encore au football ?
    b. Vous lisez encore des bandes dessinées ?
16. Vous êtes en vacances en France. Que faites-vous dans les situations suivantes :
    a. Dans la rue, une voiture brule.
    b. Vous avez perdu votre carte bancaire.
17. Faites des phrases avec « *Souvent* » et « *Quelquefois* » :
18. Transformez les mots ci-dessous aux mots de la répétition :
    a. Faire
    b. Lire
    c. Prendre
    d. Dire
19. Donnez deux raisons pour lesquels vous utilisez l'ordinateur.
20. Rédigez un court message pour votre répondeur.
21. Peut-on vivre sans le téléphone portable ? Exprimez votre avis.
22. Ecrivez deux phrases pour présenter des actions que vous avez déjà faites :
    Ex : J'ai déjà mangé des escargots !

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Mettez le récit suivant au passé. Utilisez le passé composé et l'imparfait :
    « Nous allons au bord de la mer pour le week-end. Il fait chaud. Il y a beaucoup de monde. Je prends un bain. Puis, avec mon frère, nous faisons du surf. Le soir, nous sommes fatigues. »
24. Répondez en utilisant un pronom :

Ex : Vous apprenez bien le vocabulaire ? → Oui, je l'apprends.

a. Vous faites les exercices ? → Oui, Je ……..
b. Vous regardez la chaine française TV5 ? → Oui, Je ……
c. Vous regardez les films ? → Oui, Je ……
d. Vous comprenez les acteurs ? → Non, Je …….

25. Rapportez le dialogue :
    Ex : Lisa dit à Paul qu'elle a envie de sortir…
    Lisa : J'ai envie de sortir.
    Paul : Ou tu veux aller ?
    Lisa : Je voudrais aller danser. Tu veux venir ?
    Paul : Je suis fatigué.
    Lisa : Je ne veux pas sortir seule.
    Paul : Appelle Marie.
26. Dites ce qu'ils sont en train de faire, ce qu'ils viennent de faire, ce qu'ils vont faire :
    a. Paul part en vacances (arriver à la gare, monter dans le train, chercher sa place).
    b. Marie va faire une course (sortir, acheter du pain, rentrer dans cinq minutes).
27. Présentez votre voisin.
28. Rédigez en quatre phrases les souvenirs de votre premier livre.
29. Présentez un écrivain du Kerala que vous connaissez.
30. Présentez le film dernier que vous avez regardé.
31. Une amie vous a prêté un livre il y a six mois. Elle vous le demande. Vous lui renvoyez ce livre avec un petit mot. Exprimez vos excuses, vos remerciements, votre plaisir d'avoir lu ce livre.

(6x4=24)

PART-D

Répondez à **2 questions suivantes** :

32. Faites un arbre généalogique de votre famille. Alors, présentez votre famille.
33. Pourquoi le Kerala est appelé comme « Le Pays du Dieu » ?
34. Décrivez une fête unique du Kerala.
35. Vous décidez de quitter votre travail ou d'arrêter vos études. Vous avez d'autres projets. Vous rencontrez un(e) ami(e) et vous parlez de ces projets.

(2x15=30)

Language course IX (Additional Language IV)

19UHN411.1: DRAMA, TRANSLATION & COMMUNICATIVE HINDI

No of Credits: 4 **No of hours: 5 Hrs/week**

Aims of the Course / Objectives

To appreciate and analyze the dramatic elements in literature. To understand the distinct features of Hindi Drama. To understand the process of translation and the qualities of a translator. To familiarize official correspondence in Hindi. Learn Hindi for effective communication. To familiarize the technical terms used in offices.

Course Outcome

Understanding the Drama 'Nepatya Rag' written by Mira Kaanth in context of struggle for independence of women in patriarchal society. Students got scope to gain knowledge about the forms of exploitation faced by women in feudalistic system. To develop communication skills in Hindi. Get jobs for their livelihood.

Module 1

Drama

Prescribed textbook – 'Nepathya Rag' by Mira Kaanth

Published by Bharatheey Gyanpeeth, New Delhi

Module 2

Translation

Textbook – 'Anuvad evam Vyavaharik patra vyavahar'

By Prof. Vanaja K. V

Published by Govind Prakashan Mathura

(Passages 1 to 8 should be studied.)

Module 3

Communicative Hindi

Patravyavahar

Text: 'Anuvad evam Vyavaharik patra vyavahar' By Prof. Vanaja K. V

Published by – Govind Prakashan, Mathura

(Invitation letter, Leave letter, Letter to (Father, Son, Friend), Application letter for employment, Letters regarding orders, Letters of enquiry and Letters of complaint).

Technical Terminology

Prescribed Textbook – Anuvad Evam Vyavaharik Patra Vyavahar

Prof, Vanaja K V

Published by – Govind Prakashan, Mathura

Varthalap

Text: 'Bolchal ki Hindi'

By Dr Susheela Gupt

Published by Lok Bharati Prakashan

(Chapters 2 to 16 should be studied)

Books to General Reading

1. Samakaleen Hindi Natak aur Rangmanch
   Dr. Narendra Mohan
   Vani Prakashan
2. Hindi Natak - Dr. Bachan Singh
   Radhakrishna Prakashan
3. Sattothar Hindi Natak - Dr. K.V. Naryana Kurup
   Lokbharati Prakashan
4. Anuvad Sidhanth aur Prayog – Dr. G. Gopinathan
   Lokbharati Prakashan
5. Patravyavahar Nirdeshika - Bholanath Thivari
   Vani Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Fourth Semester B.A/B.Sc Degree Examination

Language Course (Additional Language IV) - HINDI

19UHN 411.1 Drama, Translation and Communicative Hindi

(2019 Admission onwards)

Time : 3 Hrs. **Max.Marks : 80**

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. मीरा कान्त का जन्म कहाँ हुआ?
2. मालवगणनायक विक्रमादित्य के नवरत्नों में आयुर्वेद के विद्वान कौन थे?
3. वराह मिहिर किस गाँव के निवासी है?
4. सुबन्धु भट्ट को खना प्यार से क्या पुकारती थी?
5. किसने 'कुमार सम्भवम्' की रचना की?
6. 'बृहत-जातक' ग्रंथ के रचयिता कौन है?
7. इतिहास की पहली महिला ज्योतिषी कौन थी?
8. 'ततः किम' किसका उपन्यास है?
9. 'Casual Leave' का हिन्दी अनुवाद क्या है?
10. 'संघ लोक सेवा आयोग' का अंग्रेज़ी अनुवाद क्या है? (10×1=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. मीरा कान्त के चार नाटकों के नाम लिखिए?
12. मेधा अपने कार्यालय में क्यों दुःखी है? उसके ऑफिस में चल रही 'पोस्ट मॉडर्न प्रॉब्लम' क्या है?
13. स्वास्थ्य के बारे में धन्वन्तरि की राय क्या है?
14. 'निर्धन पुरुष' के वेष में वराह मिहिर से मिलने कौन आया था? क्यों?
15. महादेवी ज्योतिष्मती खना से क्या जानना चाहती है?
16. महाराज भर्तृहरि ने संन्यास क्यों स्वीकार किया था?
17. विक्रमादित्य खनादेवी को क्यों सभासद बनाना चाहते हैं?
18. वररुचि के स्त्री विषयक दृष्टिकोण का परिचय दीजिए?
19. वराह मिहिर ने अनुवाद केलिए कौन-सी व्याख्या दी है?
20. नाटककार मीराकान्त का परिचय दीजिए?
21. अंग्रेज़ी पारिभाषिक शब्द लिखिए?

    1. Accountant 2. Administration

    3. Code 4. Notification

22. हिन्दी पारिभाषिक शब्द लिखिए?

    1. अवर सचिव 2. कार्यक्रम

    3. प्रमाण-पत्र 4. सचिवालय (8×2=16 marks)

III. निम्नलिखिति खंडों से किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

खण्ड 'ख' से एक प्रश्न का उत्तर अनिवार्य है।

खण्ड क

23. पत्र-लेखन के महत्व पर प्रकाश डालिए?
24. आचार्य वराह मिहिर की चरित्रगत विशेषताओं पर प्रकाश डालिए?
25. आवश्यक पुस्तकों की माँग करते हुए वाणी प्रकाशन, दिल्ली के प्रकाशक के नाम पत्र लिखिए?
26. खनादेवी को सभासद् बनाने के प्रस्ताव पर नवरत्नों की प्रतिक्रिया क्या थी?
27. रसोई घर में माँ के साथ बातचीत का नमूना लिखिए?
28. 'परन्तू... यह निर्धन पुरुष था कौन.... साम्राज्य की चिन्ता में डूबा। घुटनों से नीचे तक पहुँचते वे हाथ क्या किसी निर्धन के थे?" सप्रसंग व्याख्या कीजिए?
29. अनुवाद किसे कहते हैं? अनुवाद करते समय किन किन बातों पर ध्यान रखना चाहिए?

खण्ड 'ख'

निर्देशः हिन्दी में अनुवाद कीजिए

30. The government, however, cannot do everything by itself. So it looks to the people for help. Infact, the most wonderful thing about our plans is the way in which the people have come forward to improve their lives by working together. By far, the best example of this is the community development programme. This is the right step in the right direction. It will lead us to progress and prosperity. On it depends the future of India to a large extend.
31. I am extremely glad to note the progress of Hindi in South India. A common language for the whole of India is a necessity. There are many advantages in making Hindi the national language. There is no possibility of Hindi endangering the provincial languages. Hindi is a fine rope with which we can bind the whole of India together. Some people complain that it is difficult to learn other languages. But there is really no difficulty in that. You can find many people in Europe knowing four or five languages, besides their mother tongue.

(6×4=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. खना का चरित्र-चित्रण कीजिए?
33. केरल हिन्दी प्रचार सभा, तिरुवनन्तपुरम के हिन्दी विभाग में एक अतिथि अध्यापक का पद खाली है। उक्त पद में आपकी नियुक्ति केलिए सचिव के नाम एक पत्र लिखिए?
34. कॉलज में विभिन्न व्यक्तियों के साथ बातचीत का नमूना तैयार कीजिए।
35. 'नेपथ्य राग' नाटक के नामकरण की सार्थकता पर विचार कीजिए? (2×15=30 marks)

സെമസ്റ്റർ	**:**	**IV**
കോഴ്സ് കോഡ്	**:**	**19UML 411.1**
ലാംഗ്വേജ് കോഴ്സ്	**:**	**IX (Add lang:IV)**
സമയക്രമം	**:**	**ആഴ്ചയിൽ 5 മണിക്കൂർ (18×5= 90 മണിക്കൂർ)**
ക്രെഡിറ്റ്	**:**	**4**

ഭാഷാപ്രായോഗിക പഠനം

പഠനോദ്ദേശ്യം

1. വിദ്യാർത്ഥികളുടെ ആശയവിനിമയശേഷി വർദ്ധിപ്പിക്കുക.

2. ഔദ്യോഗിക/ഭരണകാര്യങ്ങളും ശാസ്ത്രവിഷയങ്ങളും മലയാളഭാഷയിലൂടെ അവതരിപ്പിക്കാനുള്ള കഴിവുകുക.

3. മലയാള ഭാഷ കൈകാര്യം ചെയ്യുമ്പോൾ ഉാകാവുന്ന പാകപ്പിഴകൾ സ്വയം തിരുത്താൻ പ്രാപ്തരാക്കുക.

4. പദം, വാക്യം, ചിഹ്നം എന്നിവ തെറ്റുകൂടാതെ പ്രയോഗിക്കുന്നതിലൂടെ ഭാഷാശുദ്ധി നിലനിർത്തുക.

5. മലയാള ഭാഷ അനായാസം കൈകാര്യം ചെയ്യാനുള്ള കഴിവ് നേടിക്കൊടുക്കുക.

6. വിവർത്തനത്തിൽ പ്രായോഗിക പരിശീലനം നൽകുക.

പാഠ്യപദ്ധതി :

മൊഡ്യൂൾ - ഒന്ന് (18 മണിക്കൂർ)

പദശുദ്ധി - വാക്യശുദ്ധി, വാക്യ രചനയിൽ ശ്രദ്ധിക്കേ കാര്യങ്ങൾ, ഭാഷാ പ്രയോഗത്തിലെ ശരി തെറ്റുകൾ - നല്ല മലയാള ശൈലി - ശൈലീ ഭംഗം - വാക്കുകളും വാക്യങ്ങളും തെറ്റുകൂടാതെയെഴുതുവാനുള്ള പ്രായോഗിക പരിശീലനം.

മൊഡ്യൂൾ - ര് (18 മണിക്കൂർ)

ശബ്ദ കോശജ്ഞാനം, വാക്കുകളുടെ അർത്ഥം വിപരീത ശബ്ദങ്ങൾ സമാന ശബ്ദങ്ങൾ നാനാർത്ഥങ്ങൾ, പദച്ഛേദം, ചേർത്തെഴുത്ത്, എതിർ ലിംഗം, അർത്ഥ വ്യത്യാസം. മുതലായവയിലൂടെ വിദ്യാർത്ഥികളുടെ ഭാഷാ ഗ്രഹണ ക്ഷമത വർദ്ധിപ്പിക്കുന്നു.

വിശദപഠനം:

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

1. ആശയ വിപുലനം .... പ്രകൃഷ്ട കാവ്യ മാതൃകകളിലെ ഉദ്ധരണികൾ നല്കി, ആശയം വിപുലീകരിച്ച് എഴുതുവാനുള്ള ശേഷി വർദ്ധിപ്പിക്കും വിധം അഭ്യാസ പ്രവർത്തനങ്ങൾ നടത്തുക.

2. പരാവർത്തനം: തന്നിരിക്കുന്ന പാഠ്യഭാഗം എറ്റക്കുറച്ചിലുകൾ വരാതെ ഗദ്യരൂപത്തിലാക്കുവാനുള്ള പരിശീലനം

3. മൂന്നിലൊന്നായി സംഗ്രഹിക്കൽ: ആശയ ചോരണം വരാതെ സുദീർഘങ്ങളായ മാതൃകകൾ സംഗ്രഹിക്കാനുള്ള ശേഷി.

4. ഉത്തരം കത്തെൽ: ഗദ്യ-പദ്യ മാതൃകകളിൽ നിന്ന് ഉത്തരം കത്തിയെഴുതുവാനുള്ള ശേഷി വളർത്തുന്നു.

മൊഡ്യൂൾ നാല് (36 മണിക്കൂർ)

1. ഉപന്യാസം : നിർവ്വചനം., വിവിധ ഉപന്യാസ മാതൃകകൾ, ഒരു ഉപന്യാസം തയ്യാറാക്കുമ്പോൾ ശ്രദ്ധിക്കേ കാര്യങ്ങൾ, പ്രായോഗിക ഒരു ഉപന്യാസം തയ്യാറാക്കുമ്പോൾ ശ്രദ്ധിക്കേ കാര്യങ്ങൾ, പ്രായോഗിക മാതൃകകളിലൂടെ ഏതൊരു വിഷയത്തെക്കുറിച്ചും ഉപന്യാസം തയ്യാറാക്കുവാനുള്ള പരിശീലനം.

വിശദപഠനം

1. ആ മനുഷ്യൻ നീതന്നെ : സി.ജെ. തോമസ്
2. രാവുണ്ണി : പി.എം. താജ്

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

തിരക്കഥാപഠനം

ചലച്ചിത്രനിർമ്മിതിയിൽ തിരക്കഥയ്ക്കുള്ള പ്രാധാന്യത്തെക്കുറിച്ചുള്ള ജ്ഞാനം നേടണം

വിശദപഠനം

1) ഒഴിമുറി : ജയകാന്തൻ

1. കേരള സാഹിത്യ ചരിത്രം – ഉള്ളൂർ
2. സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ – ഡോ.കെ.എം.ജോർജ്ജ്
3. കൈരളിയുടെ കഥ – എൻ.കൃഷ്ണപിള്ള
4. കുഞ്ചൻ നമ്പ്യാർ വാക്കും സമൂഹവും – കെ.എൻ.ഗണേഷ്
5. കഥയും തിരക്കഥയും – എ.ജി.രാജ്കുമാർ
6. സിനിമയുടെ ലോകം – അടൂർ ഗോപാലകൃഷ്ണൻ
7. ആധുനിക മലയാള സിനിമ – കെ.പി. രാമൻ കുട്ടി
8. സിനിമയുടെ വഴിയിൽ – ഐ.ഷൺമുഖദാസ്
9. സഞ്ചാരിയുടെ വീട് – ഐ.ഷൺമുഖദാസ്
10. കഥയും തിരക്കഥയും – എ.ജി. രാജ്കുമാർ
11. സിനിമയും മലയാളസാഹിത്യവും – മധു ഇറവങ്കര
12. മലയാള സിനിമ – സിനിക്
13. ചലച്ചിത്രത്തിന്റെ പൊരുൾ – വിജയകൃഷ്ണൻ
14. ചലച്ചിത്ര സമീക്ഷ – വിജയകൃഷ്ണൻ
15. സിനിമയുടെ രാഷ്ട്രീയം – രവീന്ദ്രൻ
16. കാഴ്ചയുടെ അശാന്തി – രവീന്ദ്രൻ
17. സിനിമയെ കത്തെൽ – എം.എഫ്.തോമസ്
18. മലയാള സിനിമ അരനൂറ്റ് – (എഡി) കെ.ജയകുമാർ
19. എം.ടി, കല, കാലം, വ്യക്തി – (എഡി) കെ.ജയകുമാർ
20. എം.ടി. കഥയും പൊരുളും – (എഡി) എം.എം. ബഷീർ
21. എം.ടി.യുടെ സർഗ്ഗപ്രപഞ്ചം – കേരളഭാഷാഇൻസ്റ്റിറ്റ്യൂട്ട്
22. എം.ടി.കല,കാലം,സ്വത്വം – ഡോ.എ.എസ്. പ്രതീഷ്

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Fourth Semester B.A Degree Examination May 2019

CBCSS

19UML 411.1: ഭാഷാപ്രായോഗിക പഠനം

Time : 3 Hrs. **Max.Marks : 80**

Section A

I. **ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്ക് വീതം**

1. 'തലപ്പാവ്' എന്ന സിനിമയുടെ സംവിധായകൻ ആര്?
2. 'റൂഥ്' ആരുടെ നാടകം ആണ്?
3. പി.എം. താജിന്റെ ഏതെങ്കിലും രണ്ട് നാടകങ്ങളുടെ പേര് എഴുതുക.
4. തുള്ളൽ വിഭാഗങ്ങൾ ഏതെല്ലാം?
5. സ്യമന്തകം ഓട്ടൻതുള്ളൽ ആരുടെ കൃതി?
6. അമ്പലപ്പുഴ ശ്രീകൃഷ്ണസ്വാമി ക്ഷേത്രം മലയാളത്തിലെ ഏത് കവിതയുമായി ബന്ധപ്പെട്ടിരിക്കുന്നു?
7. 'ഇനി വായന ഇനി വായന' ആരുടെ കൃതി?
8. 'മധുരം നിന്റെ ജീവിതം' ആരെക്കുറിച്ചുള്ള കൃതിയാണ്?
9. മലയാളത്തിലെ ഇബ്സൺ എന്നറിയപ്പെടുന്ന നാടകൃത്താര്?
10. മലയാളത്തിൽ ആദ്യമായി പ്രഹസനങ്ങൾ രചിച്ചത് ആര്? (1×10=10)

Section B

II. ഏതെങ്കിലും 8 ചോദ്യത്തിന് അരപ്പുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 2 മാർക്ക് വീതം.

11. ജോർദ്ദാൻ എങ്ങോട്ടാണ് ഒഴുകുന്നത് - സന്ദർഭം വ്യക്തമാക്കുക.
12. ഇ-വായന എന്നാൽ എന്ത്?
13. കണ്ണുള്ളത് തുറക്കാൻ മാത്രമല്ല അടയ്ക്കാൻ കൂടിയാണ് - സന്ദർഭം വ്യക്തമാക്കുക.
14. ഇതര നാടകങ്ങളിൽ നിന്നും തനത് നാടകം എങ്ങനെ വ്യത്യാസപ്പെട്ടിരിക്കുന്നു?
15. ബ്ലോഗെഴുത്തിന്റെ സവിശേഷതകൾ വ്യക്തമാക്കുക.
16. രാവണൻ കാർത്തവീര്യാർജ്ജുനന്റെ അഹങ്കാരം ശമിപ്പിച്ചതെങ്ങനെ?
17. കാർത്തവീരാർജ്ജുനം തുള്ളൽ ഏത് വിഭാഗത്തിൽപ്പെടുന്ന വിശദമാക്കുക.
18. രാവുണ്ണി എന്ന നാടകത്തിന്റെ കേന്ദ്രഭാവം എന്ത്?
19. കാർത്തവീര്യാർജ്ജുന വിജയത്തിൽ കാർത്തവീര്യന്റെ അഹങ്കാരം ശമിപ്പിക്കുന്നതെങ്ങനെ?
20. ഓട്ടൻ തുള്ളലിലെ വേഷവിധാനത്തെ കുറിച്ച് വിവരിക്കുക.

Section C

II. ഏതെങ്കിലും 6 ചോദ്യത്തിന് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 4 മാർക്ക് വീതം.

21. 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന ശീർഷകത്തിന്റെ സാങ്കത്യം പരിശോധിക്കുക.

22. തിരുവിതാകൂർ ഭാഷയിലെ മനോഹാരിത 'ഒഴിമുറിയിൽ' എങ്ങനെ ആവിഷ്കരിച്ചിരിക്കുന്നു?

23. ഒഴിമുറി ചർച്ചചെയ്യുന്ന ജീവിതസംഘർഷം വിവരിക്കുക.

24. കാർത്തവീരാർജ്ജുന വിജയം തുള്ളലിൽ പ്രകടമാകുന്ന സാമൂഹിക ആക്ഷേപഹാസ്യം വ്യക്തമാക്കുക.

25. രാവുണ്ണി എന്ന നാടകപ്രമേയ സവിശേഷത വിശദമാക്കുക.

26. 'ബത്ഗേബ' എന്ന കഥാപാത്ര നിരൂപണം ചെയ്യുക.

27. നാഥാൻ എന്ന പ്രവാചകന്റെ കടന്നുവരവ് 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന നാടകത്തെ എത്രമാത്രം സംഘർഷാത്മകമാക്കുന്നു? വ്യക്തമാക്കുക.

28. ബൈബിൾ രചനകളുടെ മേന്മയും പരിമിതിയും വ്യക്തമാക്കുക.

29. പാപബോധം ആ മനുഷ്യൻ നീ തന്നെ എന്ന നാടകത്തിൽ എങ്ങനെ കടന്നു വരുന്നു?

30. മലയാള നിരൂപണത്തിലെ വേറിട്ട മുഖമാണ് കെ.പി. അപ്പന്റേത് – വിശദമാക്കുക.

31. സി. ജെ. യുടെ ദാർശനികമായ വിചാരധാരകൾ 'ആ മനുഷ്യൻ നീ തന്നെ'യിൽ എത്രത്തോളം പ്രതിഫലിക്കുന്നു.

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ രണ്ടുചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

32. തനത് നാടകത്തിന്റെ പൊതു സവിശേഷതകൾ വിശദമാക്കുക.

33. ബൈബിൾ കഥയെ നാടകീയമായി ചിത്രീകരിക്കുന്നതിനുള്ള സി.ജെ.യുടെ കഴിവ് 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന നാടകത്തെ ആസ്പദമാക്കി ചർച്ച ചെയ്യുക.

34. കടക്കെണിയിൽ അകപ്പെട്ടുപോയ ഒരാളുടെ മാനസിക വ്യഥകളെ രാവുണ്ണി എന്ന നാടകത്തിൽ എപ്രകാരം ചിത്രീകരിച്ചിരിക്കുന്നു?

35. നമ്പ്യാരുടെ കൃതികൾ ഉത്തമമായ സാമൂഹിക പരിഹാസങ്ങൾ ആണ്. കാർത്തവീര്യാർജ്ജുന വിജയത്തെ ആധാരമാക്കി വിലയിരുത്തുക.

Core Course -III

19UCH441: Organic chemistry Paper – I

(Lecture - Tutorial – Lab: 3-0-2)

No. of credits: 3 **No. of instructional hours per week: 3**

Total : 54 hours

Course outcome

CO1: To impart a concrete idea of the classificaion, nomenclature of reactions,
CO2: To understand the behaviour of aliphatic and aromatic compounds
CO3: To study the stereochemistry of organic compounds
CO4: To impart knowledge on the mechanism of reactions of organic compounds
CO5: To study the importance of, photochemical reactions and aromaticity.

Course Outline

Module II :Introduction to organic reaction mechanism: (9 hours)

Definition of reaction mechanism.
Drawing of electron movements with arrows – curved arrow notation. Half headed and double headed arrows.
Nature of bond fissions :Homolysis and heterolysis.
Electron displacement effects: Inductive effect, electromeric effect, mesomeric effect, resonance, hyperconjugative and steric effects.
Acidity and basicity of organic compounds based on inductive and resonance with reference to acid characters of alcohols, phenols and carboxylic acids and basic character of aliphatic and aromatic amines.
Applications of hyperconjugative effect – stability of alkenes, alkylbenzenes, free radicals and carbocations.
Reaction intermediates: Carbocations, carbanions, free radicals and carbenes (definition, hybridization, structure, classification, formation, stability and important reactions) – rearrangement of carbocations – nitrenes (mention only). Benzyne intermediate(structure and formation only).
Introduction to pericyclic reactions – Electrocyclic, cycloaddition and sigmatropic reactions (Definition examples of each).

Module III : Reaction Mechanism II (9 hours)

Aliphatic nucleophilic substitutions, mechanism of S_N^1 and S_N^2 reactions – Effect of structure, substrate, solvent, nucleophile and leaving goups. Stereochemistry – Walden Inversion.
Elimination reaction: Hoffmann and Saytzeff rule – cis and trans eliminations – mechanisms of E_1 and E_2 reactions. Substitution vs Elimination.
Addition reactions – mechanism of addition of bromine and hydrogen halides to double bonds – Markownikoff's rule and peroxide effect. Cis-hydroxylation.
Methods of determination of reaction mechanism – product analysis, intermediates, isotopic effect, kinetic and stereochemical studies.

Module IV: Stereochemistry I (6 hours)

Representation of organic molecules: Fischer, Flying wedge, Sawhorse and Newman projection formulae. Conformational isomerism – conformation – Dihedral angle – Torsional strain – conformational analysis of ethane and n-butane including energy diagrams – Baeyer's strain theory – Sache-Mohr theory of strainless rings – conformation of cyclohexane (chair, boat and skew boat forms) – axial and equatorial bonds – ring flipping – conformers of mono and dialkyl substituted cyclohexanes.

Module V: Stereochemistry II (9 hours)

Optical Isomerism : Chirality and elements of symmetry – DL notation – Enantiomers – optical isomerism in glyceraldehydes, lactic acid and tartaric acid – Diastereoisomers – mesocompounds – Cahn-Ingold-Prelog rules – R-S notations for optical isomers with one and two asymmetric carbon atoms.- erythro and threo representations. Racemic mixture – resolution – methods of resolution.
Enatiomeric excess – Introduction to asymmetric synthesis
Optical activity in compounds not containing asymmetric carbon atoms – biphenyls and allenes.
Geometrical isomerism – cis-trans, syn-anti and E-Z notations – geometrical isomerism in maleic and fumaric

acids and unsymmetrical ketoximes – methods of distinguishing geometrical isomers using melting point, dipolemoment, dehydration and cyclisation.

Module VI: Organic photochemical reactions and Dyes (9 hours)

Introduction – photochemical vs thermal reactions. Photochemical processes – Jablonski diagram

Photochemical reactions of olefins: Photosensitization and photodimerisation

Photochemistry of carbonyl compounds: Norrish I, Norrish II cleavages. Photo reduction (Benzophenone to benzopinacol)

Dyes – Theory of colour and constitution – classification according to structure and method of application. Preparation and uses of methyl orange, congored, malachite green, crystal violet, phenolphthalein, fluorescein, alizarin and indigo.

Module VII :Arenes and Aromaticity (9hours)

Heat of hydrogenation and heat of combustion of benzene – structure of benzene, naphthalene and anthracene – Concept of aromaticity – Huckel's rule – Application to benzenoid and nonbenzenoid compounds.

Reactions – Mechanism of electrophilic substitution in benzene – halogenation, nitration, sulphonation and Friedel Craft's alkylation and acylation – energy profile diagram.

Ring activating and deactivating groups with examples – orientation effect in monosubstituted benzene - –OH, $-NH_2$, NO_2, $-CH_3$ and halogens.

Aromatic nucleophilic substitution – bimolecular displacement mechanism – Elimination-Addition mechanism.

Reactivity and orientation in Aromatic Nucleophilic substitution.

Reactivity of naphthalene towards alkylation, nitration and sulphonation. Carcinogenic polynucleararenes

References

1. A.Bahl and B.S.Bahl, Advanced Organic Chemistry, S.Chand& Company, New Delhi.
2. L.G.Wade Jr, Organic Chemistry, Pearson Education, New Delhi.
3. K.S.Tewari, N.K.Vishnoi and S.N.Mehrotra, A textbook of Organic Chemisty, Vikas Publishing House (Pvt) Ltd., New Delhi..
4. S.C.Sharma and M.K.Jain, Modern Organic Chemistry, Vishal Publishing Company, New Delhi.
5. P.L.Soni, Organic Chemistry, S Chand, 2012.
6. D.Nasipuri, Stereochemistry of Organic Compounds: Principles and Applications, New Age International Publizhers, New Delhi.
7. P.S.Kalsi, Organic Reactions, Stereochemistry, and Mechanism, New Age International Publishers, New Delhi.
8. R.T.Morrison, R.N.Boyd. Organic Chemistry, Pearson Education, New Delhi.
9. P.Y.Bruice, Essential Organic Chemisty, Pearson Education, New Delhi.
10. Peter Sykes, A Guide Book to Mechanism in Organic Chemistry, Pearson Education, New Delhi.
11. J.Clayden, N.Greeves and S.Warren, Organic Chemistry, Oxford University Press, New York.
12. G.M. Louden, Organic Chemistry, Oxford University Press, New York.
13. E.L.Eliel, Stereochemistry of Carbon compounds, Tata McGraw Hill Publishing House, New Delhi.
14. Jagadamba Singh and Jaya Singh, Photochemistry and Pericyclic rections, New Age International, New Delhi.
15. J.March, Advanced Organic Chemistry, John Wiley & Sons., NY.
16. S.M.Mukerji and S.P.Singh, Reaction Mechanism in Organic Chemistry, McMillan Publishers.
17. I L Finar, "Organic Chemistry" Vol – 1, 5th Edition, Pearson Education, NewDelhi

MODEL QUESTION PAPER
19UCH441: ORGANIC CHEMISTRY I

Time: 3hours **Max. Marks : 80**

SECTION – A

*(Answer **all** questions. Answer in **one** word to maximum **two** sentences. **Each** question carries **one** mark)*

1. What is the product formed when a bond undergoes homolytic fission?
2. Give one example for each (i) substitution reaction and (ii) elimination reaction.
3. Write an example for electrocyclic reaction.
4. Name two reagents used for cis-hydroxylation.
5. What the products obtained when naphthalene undergoes sulphonation at different temperatures?
6. Identify the orienting effect of the following functional groups $–CH_3$, $-NO_2$, -CHO and –OH.
7. What are chromophores?
8. What are conformers?
9. What is geometrical isomerism?
10. Explain the term chirality.

(1 X 10 =10 Marks)

SECTION - B

(*Short answer type. Answer **any 8** questions from the following. **Each** question carries **two** marks.)*

11. What are electrophiles and nucleophiles? Give examples
12. Which is more stable? Cis-2-butene or trans-2-butene? Why?
13. Phenol is acidic while ethanol is not. Why?
14. Arrange the following in the decreasing order of stability. Justify your answer.
    $(CH_3)_2CH^+$, CH_3^+, $(C_6H_5)_2CH^+$, $C_6H_5CH_2^+$
15. Give an example and state Hofmann rule.
16. What is Walden Inversion?
17. What is Kharasch effect? Illustrate with an example.
18. When toluene is nitrated the major products are ortho and para substituted products.Why?
19. Define Huckel's rule.
20. Explain photosensitization with an example.
21. What is enantiomeric excess?
22. Explain with examples the importance of dipole moment measurements in distinguishing geometrical isomerism.

(2 X 8 = 16 Marks)

SECTION - C

(*Short essay type. Answer any 6 questions from the following. Each question carries four marks*.)

23. What is inductive effect? How does it affect the acidity and basicity of organic acids and bases?
24. Explain the mechanism of E^1 and E^2 eliminations.
25. o-chloro toluene when treated with sodamide in liquid ammonia gives o-toluidine and m-toluidine. Explain this observation with relevant mechanism.
26. Explain Norrish I and Norrish II reactions.
27. Determine the R & S notations of the asymmetric carbon atoms in (+)tartaric and (-) tartaric acid
28. Explain the conformational analysis of n-butane.
29. Give a brief account on optical activity due to restricted rotation.
30. Explain any two methods of determination of reaction mechanism.
31. What are non-benzenoid aromatics compounds. Explain their aromaticity with examples

(4 X 6 =24marks)

SECTION – D

(*Answer **any2** question. Each question carries 15 marks*)

32. (a) Explain S_N^1 and S_N^2 mechanisms.
    (b) Write the influence of structure of the substrate and polarity of the solvent on nucleophilic substitution reactions.

(c) Explain Baeyer's strain theory.

33. (a) Explain the mechanism of (i) nitration (ii) halogenation of benzene.
    (b) Discuss the orientation of influence of $-NO_2$ and –OH group in aromatic electrophilic Substitution.
    (c) Discuss the classification of dyes on the basis of structure.
34. (a) What is resolution? Explain different methods of resolution.
    (b) What are carbenes? How are they generated? Comment on the structure of carbene.
    (c) Draw conformers of dimethyl cyclohexane and discuss their comparative stability.
35. (a) Write the synthesis and uses of the following dyes (i) Malachite green (ii) Methyl Orange.
    (b) Explain the geometrical isomerism of maleic and fumaric acid.
    (c) Explain the elimination-addition mechanism in halo benzenes.

(15 X 2 = 30marks)

Complementary Course VII

19UMM431.2: Differential Equations, Vector Calculus, and Abstsract Algebra

No. of Credits: 4 **Instructional hours per week:5**

Aim:
To gain knowledge of ordinary differential equations, vector integration and abstract algebra.

Course outcome:
Students will be able to demonstrate understanding of relation between abstract algebraic structures with familiar real life situation.

Module 1 : Ordinary Differential Equations (36 Hours)

First-order ordinary differential equations : General form of solution, First-degree first-order equations (Separable-variable equations; exact equations; inexact equations, inte-grating factors; linear equations; homogeneous equations; isobaric equations; Bernoullis equation; miscellaneous equations) Higher-degree first-order equations (Equations solvable for p; for x; for y; Clairaut's equation)

Higher-order ordinary differential equations : Linear equations with constant coefficients, (Finding the complementary function $y_c(x)$; finding the particular integral $y_p(x)$; constructing the general solution $y_c(x) + y_p(x)$; linear recurrence relations,Linear equations with variable coefficients (The Legendre and Euler linear equations; exact equations; partially known complementary function; variation of parameters; Green's functions; canonical form for second-order equations)

General ordinary differential equations - Dependent variable absent; independent variable absent; non-linear exact equations; isobaric or homogeneous equations; equations homogeneous in x or y alone; equations having $y = Ae^x$ as a solution

Chapter 14 and chapter 15 (exclude 15.1.5)

More exercises related to the topics in this module can be found in chapter 1, 2 and 3 of reference [3], ***which is not to be included in ESE.***

Module 2 : Vector Integration - Line, surface and volume integrals (18 hours)

Evaluating line integrals; physical examples; line integrals with respect to a scalar Connectivity of regions, Green's theorem in a plane, Conservative fields and potentials, Surface integrals, Evaluating surface integrals; vector areas of surfaces; physical examples, Vol-ume integrals, Volumes of three-dimensional regions, Integral forms for grad, div, and curl, Green's theorems; other related integral theorems; physical applications, Stokes theorem and related theorems, Related integral theorems; physical applications

Chapter 11

More exercises related to the topics in this module can be found in chapter 3 of reference [2], ***which is not to be included in ESE.***

Module 3: Abstract Algebra (36 Hours)

Definition of a group; examples of groups, Finite groups, Non-Abelian groups, Permutation groups, Mappings between groups, Subgroups, Subdividing a group (Equivalence relations and classes; congruence and cosets; conjugates and classes)

Chapter 28

More exercises related to the topics in this module can be found in reference [5], ***which is not to be included in ESE.***

Note: In all modules, proofs of theorems are to be omitted

Text

K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

References

Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons
Ref. 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley
Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press
Ref. 4 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India
Ref. 5 : David M Bishop. Group theory and Chemistry, Dover Publications

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Semester IV B.Sc. Degree Model Question Paper

First Degree Programme in Chemistry

Complementary Course in Mathematics

MM1431.2 Differential Equations,Vector Calculus and Abstract Algebra

Time:3hours **Max. Marks:80**

Section A

Answer all questions .Each question carries 1mark

1. Solve $\frac{dy}{dx} = x + xy$
2. Find the auxiliary equation of $\frac{d^2y}{dx^2}$ - $\frac{2dy}{dx^2}$ +y = e^x
3. Solve $y = px + p^2$
4. Find the integrating factor of $\frac{dy}{dx} + 2xy = 4x$
5. State Green's theorem.
6. State Divergence theorem.
7. Which are the trivial subgroups of a group?
8. Is the set of integers under addition (mod 10) is a group?
9. Define a cyclic group?
10. Give an example of a non abelian group?

Section B

Answer any 8 questions. Each question carries 2 marks

11. Solve $x\frac{dy}{dx} + 3x + y = 0$
12. Solve $\frac{dy}{dx} = (x + y + 1)^2$.
13. Solve $\frac{dy}{dx} = \frac{y}{x} + \tan\left(\frac{y}{x}\right)$.
14. Find a particular integral of $\frac{d^2y}{dx^2}$ - $2\frac{dy}{dx}$ +y = e^x.
15. Solve $1 + y\frac{d^2y}{dx^2} + (\frac{dy}{dx})^2 = 0$.
16. Evaluate the line integral

    $\oint_c xdy$, *where C is the circle in the xy plane* $x^2 + y^2 = a^2, z = 0$.
17. Show that the area of a region R enclosed by a simple closed curve C is

    $A = \frac{1}{2}\oint_c xdy - ydx$
18. Calculate $\nabla \times F$ where $F = 2xzi + 2yz^2j + (x^2 + 2y^2z - 1)k$.

19. Show that the operation $\cdot$ defined by $x.y = x + y + rxy$ where r is a non - zero real number is associate on the set of real numbers?
20. Define a group.
21. Prove the uniqueness of identity in a group.
22. Define isomorphism of two groups.

Section C

Answer any 6 questions. Each question carries 4 marks

23. Solve $\frac{d^2y}{dx^2} + 4y = x^2 sin2x.$

24. Solve $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 4y = 0.$

25. Find the value of u_{16} if the series u_n satisfies,
$u_{n+1} + 4u_n + 3u_{n-1} = n\ for\ n \geq 1$ with $u_0 = 1\ and\ u_1 = -1.$

26. Find the volume enclosed between a sphere of radius **a** centered on the origin and a circular cone of half angle $\propto$ with its vertex at the origin.

27. Find the vector area of the surface of the hemisphere,

$x^2 + y^2 + z^2 = a^2$ with $z \geq 0.$

28. Is the relation "X and Y are integers and X-Y is odd" an equivalence relation.
29. Show that the set $\{1, -1, i, -i\}$ is a group under the ordinary multiplication of complex numbers.
30. Show that two cosets of a group are either disjoint or identical.
31. Prove that the mapping $\varphi: R \to U(1)$ defined by $\varphi(x) = e^{ix}$ is a homomorphism.

Section D

Answer any 2 questions. Each question carries 15 marks

32. a) Solve $(1 - x^2)\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} - y = 1$

b) Use the variation of parameters method to solve $\frac{d^2y}{dx^2} + y = cosec\ x$ subject to the boundary conditions $y(0) = y\left(\frac{\pi}{2}\right) = 0.$

33. a) Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 4x$

b) solve $2y\frac{d^3y}{dx^3} + 6\frac{dy}{dx}\frac{d^2y}{dx^2} = x$

34. Verify Stoke's theorem for the hemispherical surface $x^2 + y^2 + z^2 = a^2, z \geq 0$ given the vector field $a = yi - xj + zk.$
35. Find a) all the proprer subgroups and b) all the conjugacy classes of the symmetric group of a regular pentagon.

Complementary Course VIII

19UPH431.2: Atomic Physics, Quantum Mechanics and Electronics

No.of credits: 3 **Instructional hours per week: 3+2 (54 hours)**

Course Outcome

- Understand basics of various atom models and quantum numbers
- Understand the phenomenon of superconductivity, superconductors, their types, properties and applications
- Understand the limitations of classical physics, foundation of quantum mechanics and the derivation of Schrodinger equations
- Understand the basics of electromagnetic spectrum , instrumentation used in spectroscopy and basics of emission and absorption spectroscopy
- Knowledge and understanding about semiconductor devices like diodes, transistors etc, their characteristics and types of biasing
- Understand the basics of various number systems , logic gates and its types

Unit I Atomic physics (12 hours)

Basic features of Bohr atom model-Bohr's correspondence principle -vector atom model-various quantum numbers-magnetic moment of orbital electrons -electron spin-Spin-Orbit coupling-Pauli's exclusion principle-periodic table

Unit II Superconductivity (8 hours)

Properties of superconductors-zero electrical resistance- Meissner effect-penetration depth-coherence length-critical fields-critical currents TypeI and Type II superconductors-isotope effect- applications of superconductors (qualitative).

Unit III Quantum mechanics (12 hours)

Inadequacies of classical physics-experimental evidences-evidences for quantum theory-Planck's hypothesis-foundation of quantum mechanics-wave function and probability density-Schrodinger equation-time dependent and time independent-particle in a potential box

Unit IV. Spectroscopic Techniques(6hours)

EM Spectrum- UV, Visible, IR,, Radio and microwave regions- Instrumentation used in spectroscopy (General concepts only- source, monochromator, cell compartment ,detector, amplifier and recorder)- Basics of absorption spectroscopy, emission spectroscopy(phenomena only). Types of emission spectra

Unit V. Electronics (12 hours)

Current-voltage characteristics of a diode -forward and reverse bias-breakdown
mechanism of p -n junction diode- zener diode and its characteristics-half wave and full wave rectifiers-bridge rectifier-ripple factor, efficiency.
Construction and operation of a bipolar junction transistor-transistor configurations CB & CE configurations with circuit diagram, current components-transistor characteristics-DC load line-Q point transistor biasing-need for biasing-bias stabilization-biasing circuitsvoltage divider bias .

Unit V. Digital Electronics (4hours)

Number systems and codes-decimal numbers-binary arithmetic -1's and 2's compliment-decimal to binary conversion-octal numbers-hexadecimal numbers-binary coded decimal-digital codes-logic gates-NOT, OR, AND, NOR and NAND gates.

References

1. Modern Physics – R.Murugeshan, S.Chand & Co. Ltd.
2. A text book of B.Sc subsidiary Physics – P.Vivekanandan.
3. Principles of Electronics – V.K.Mehta.

MODEL QUESTION PAPER

19UPH431.2: Atomic Physics, Quantum Mechanics and Electronics.

Time:3 hours **Max.Mark :80**

Part A

Answer all the questions. Each question carries one mark. (10x1=10marks)

1. State Bohr's correspondence principle.
2. What do you mean by the terms eigen value and eigen function?
3. Define the terms critical field and critical current for a superconductor.
4. Define the Quiescent point of an amplifier.
5. Explain isotope effect in superconductors.
6. Find the energy needed to release the first orbit electron from the hydrogen atom .
7. Define the peak inverse voltage of a diode.
8. What is knee voltage of a diode?
9. Define internal potential barrier.
10. Convert the binary number 110011 to its decimal equivalent.

Part B

Answer any eight questions. Each question carries two marks (8x 2=16marks)

11. Obtain the relation between the amplification factors: α, β and γ.
12. Write a note on absorption spectroscopy.
13. Give any two applications of superconductors.
14. Explain spin orbit coupling.
15. What are type I and type II superconductors?
16. Give two limitation of Bohr model
17. Explain the significance of the wave function.
18. Explain the terms: a) depletion region and b) internal potential barrier.
19. What are the differences between avalanche breakdown and Zener breakdown?
20. What is a Zener diode? Draw the symbol. What are the characteristics of a Zener diode?
21. What are the differences between a forward biased and a reverse biased pn junction diode?
22. Write a note on BCD.

Part C

Answer any six questions. Each question carries 7marks (6x4=24marks)

23. (A) Find the Q-point in an emitter feedback biasing circuit for a transistor of β (a) 50 (b) 100. Circuit details:- V_{cc}=20V; R_c=2KΩ; R_E=1KΩ;R_B=430KΩ
    (B) Find the voltage gain of a single stage amplifier. Given that β=100, R_{in}=1KΩ; R_C=6KΩ and R_L=2KΩ.
24. (A)Calculate the energy difference between the ground state and the first excited state for an electron in a one dimensional rigid box of length 1 A˚.
    (B) Find the least energy of an electron moving in one dimension in an infinitely high potential box of width 1 A˚. (m_e=9.11 x 10^{-31}Kg; h=6.63 x 10^{-34}Js)
25. Calculate the radius of third orbit of hydrogen atom according to Bohr model? Also calculate the velocity and energy of electron in this orbit? Given R_H=1.097 X $10^7 m^{-1}$.
26. (A) Find the wavelength of photon emitted when hydrogen atom goes from n=10 states to the ground state. R_H=1.097 X $10^{-3\ -1}$
    (B) The wavelength of first line of Balmer series is 6563 .Calculate the Rydberg constant.
27. (A) A 50V Zener diode is used to obtain a regulated output voltage across a load 10KΩ. The series resistor is 5KΩ. If the input voltage is 120V, find the Zener current.
    (B) Draw the circuit diagram of a full wave bridge rectifier.
28. What are biasing circuits? Draw and explain about voltage divider bias.
29. Convert the decimal number 785_{10} into equivalent octal and hexadecimal forms.
30. Find the 2's complement of (i) 1000_2 and (ii) 110011001_2.
31. Add the following binary numbers: (a) $1100_2 + 11_2 =$…….$_2$;
    (b) $11111_2 + 10101_2 =$…..$_2$

Part D

Answer any two questions. Each question carries 15marks (2x 15=15marks)

32. Derive the expression for rectifier efficiency and ripple factor for a full wave rectifier
33. State the important postulates of Bohr atom model. Derive an expression for the energy of the electron in the n^{th} orbit of hydrogen atom. Based on Bohr theory explain the hydrogen spectrum.
34. Obtain Schrodinger wave equation for a particle in a one dimensional rigid box. Solve it to obtain eigen functions and show that eigen values are discrete.
35. With necessary truth tables and symbols , explain the working of the following logic gates: (a) AND gate, (b) OR gate, (c) NOT gate, (d) NAND gate and (e) NOR gate

Semester - V

Core Course - V

19UCH541: Physical Chemistry – I

No. of credits: 3 **No. of instructional hours per week: 4**

Total hours: 54

Course outcome

CO1: To provide a firm foundation for understanding the physical principles governing chemical systems.
CO2: To get an understanding of the introduction to different states of matter
CO3: To inculcate an overview of the areas of physical chemistry which include gas and liquid properties and solve problems related problems
CO4: To impart knowledge on group theory.
CO5: To study the laws of thermodynamics form the appropriate organizational tool to understand the chemistry of bulk systems.

Course outline

Module I – Gaseous state (9 hrs)

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path and viscosity of gases, including their temperature and pressure dependence, relation between mean free path and coefficient of viscosity, calculation of σ from η; variation of viscosity with temperature and pressure.

Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy

Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor, Z, and its variation with pressure for different gases. Causes of deviation from ideal behaviour. vander Waals equation of state, virial equation of state; van der Waals equation expressed in virial form and calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.

Module II – Solid state (9 hrs)

Isotropy and anisotropy, Space lattice and unit cell, Elements of symmetry of crystals, Bravais lattices, Crystal systems, Laws of rational indices, Miller indices, Representation of lattice planes of cubic crystals, Determination of Avogadro number from crystallographic data, X-ray diffraction studies of crystals, Bragg's equation – derivation and applications, Rotating crystal and powder method, Structure of NaCl and KCl Rutile, Zinc blend, Wurtzite - Imperfections in crystals, point defects – Schottky and Frenkel defects, Non-stoichiometric defects – Line defects – edge dislocation – screw dislocation.

Module III – Liquid state and Dilute solutions (9 hrs)

Qualitative treatment of the structure of the liquid state; Vacancy theory of liquid state

Physical properties of liquids; Vapour pressure, Surface tension and Viscosity, Refractive index

Factors affecting Surface tension, Viscosity, Poisuelle's equation, Determination of viscosity by Ostwald's viscometer, Refractive index and its determination by Abbe refractometer. Surface tension and its measurement by capillary rise and stalagmometer method

Dilute solutions: Molarity, Molality, Normality and Mole fraction. Colligative properties, Thermodynamic derivation of $\Delta T_b = K_b$ x m and $\Delta T_f = K_f$ x m, Osmotic pressure, van't Hoff equation and molecular mass, Isotonic solutions, Reverse osmosis - Determination of molecular mass of solutes by Beckmann's method, Rast's method and cooling curve method. Abnormal molecular mass, van't Hoff factor, Determination of degree of dissociation and association.

Module IV – Thermodynamics I (9hrs)

Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics.

First law: Concept of heat, q, work, w, internal energy, U, and statement of first law; enthalpy, relation between heat capacities, calculations of q, w, U and H for reversible, irreversible expansion of ideal gases

under isothermal and adiabatic conditions. The Joule-Thomson effect – derivation of the expression for Joule-Thomson coefficient. Sign and magnitude of Joule-Thomson coefficient, inversion temperature.
Thermochemistry: Heats of reactions: standard states; enthalpy of combustion and its applications; enthalpy of neutralization. Integral and differential enthalpies of solution. calculation of bond energy, bond dissociation energy, Hess's law and its applications.Effect of temperature (Kirchhoff's equations) on enthalpy of reactions. Adiabatic flame temperature, explosion temperature.

Module V – Thermodynamics II (9 hrs)

Need for IInd law of thermodynamics. Different statements of IInd law, Thermodynamic scale of temperature. Carnot cycle and its efficiency, Carnot theorem. Concept of entropy- Definition and physical significance. Entropy as a function of volume and temperature, Entropy as a function of pressure and temperature. Entropy as a criterion of spontaneity and equilibrium. Gibbs and Helmholtz free energies and their significances - criteria of equilibrium and spontaneity.
Gibbs-Helmholtz equation, dependence of Gibbs free energy changes on temperature, volume and pressure. Maxwell's relations. Partial molar quantities. Chemical potential-Gibbs-Duhem equation. Clapeyron – Clausius equation. Concept of fugacity, determination of fugacity by graphical method.

Module VI – Group theory – 9 hours

Group theory: Elements of symmetry – Proper and improper axis of symmetry, plane of symmetry, centre of symmetry and identity element. Combination of symmetry elements, Determination of point groups of simple molecules like Acetylene, H_2O, NH_3, BF_3, $[Ni(CN)_4]^{2-}$ and C_6H_6. Symmetry operations. Order of a group. Combination of symmetry operations. Group theoretical rules. Construction of Group multiplication table of C_{2V}. **(5 hours)**

Liquid crystals:

Origin of liquid crystals, mesogens self-organisation, Types –smectic, nematic and cholesteric liquid crystals, characterization of liquid crystals, Swarm theory of liquid crystals, uses of liquid crystals, characterization of LCmaterials by DSC, PLM and x-ray.
Applications of liquid crystals. **(4 hours)**
(At least 100 problems are to be worked out from all units together. 30% of the questions for Examination shall contain problems.)

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MODEL QUESTION PAPER
19UCH541: Physical Chemistry –I

Time: 3 Hrs **Total marks: 80**

Section A
Answer all the questions. Each question carries 1 mark

1. Write down the van der Waal's equation for n moles of a gas.
2. In which type of liquid crystals, the colour of the material is sensitive to temperature changes?
3. What are isotonic solutions?
4. Write down the conditions at which real gases tend to approach ideal behaviour.
5. Define the term fluidity.
6. What is inversion temperature?
7. Write down the efficiency of Carnot engine.
8. The average speed of a certain gas at 27 ^{o}C is 400 $ms^{-1.}$ Calculate the temperature at which the speed will be 800 ms^{-1}.
9. What is meant by unit cell in crystallography?
10. What is the physical significance of entropy?

(1 x 10 = 10 marks)

Section B

Each question carries2 marks (Short answer). Answer any **8** questions

11. What are colligative properties?
12. Write the point group to which NH_3 belongs and mention the symmetry elements present in NH_3.
13. Explain van't Hoff factor
14. Explain first law of thermodynamics.
15. Derive the expression for Joule Thomson coefficient
16. Explain any two statements of second law of thermodynamics.
17. Maximum work is obtained from a reversible process. Substantiate.
18. What are the proper and improper axes of symmetry?
19. Draw the group multiplication table of C_{2v} point group
20. Define the terms collision frequency and collision number.
21. Explain virial equation of state.
22. Explain elements of symmetry of crystals.

(2×8 = 16)

Section C

Each question carry 4 marks (Short essay) **Answer any 6 questions**

23. Derive root most probable velocity and average velocity from Maxwell- Boltzmann equation.
24. An aqueous solution containing 0.25 g of a solute dissolved in 20 g of water froze at – 0.42 ^{o}C. Calculate the molar mass of the solute. Molar heat of fusion of ice at 0^{o}C is 6.025 kJ and R = 8.314 J K^{-1} mol^{-1}
25. Deduce the relationship between Cp and Cv by thermodynamics.
26. Explain different types of semi-conductors and their uses.
27. What is the law of corresponding states? How is it derived from van der Waals equation.
28. Explain Gibbs - Helmholtz equation and its significance
29. What is chemical potential and derive Gibbs Duhem equation?
30. Explain Hess's law and its applications
31. Derive the relation between depression of freezing point and lowering of lowering of vapour pressure.

(4 x 6 = 24 marks)

Section D

Each question carries 15 marks (essay), **Answer any two questions**

32. a) Derive Bragg's equation.(5 marks)
    b) The edge length of the unit cell of NaCl crystal lattice is 564 pm by X-ray diffraction. Compute the interionic distance between sodium and chloride ions. (5 marks)
    c)Explain point defects in a crystal. (5 marks)

33. a) What is meant by reversible process? Derive an expression for work done in the reversible isothermal expansion of an ideal gas. (5 marks)
    b) Calculate the work done in expanding one mole of an ideal gas from a volume of 2 to 20 dm^3 at 27 ^0C (5 marks)
    c) Derive the relation between Cp and Cv. (5 marks)
34. a) Calculate Tc, Pc and Vc for C_2H_2. Given a = 4.390 atm litre mol^{-2}, b=0.05136 litre mol^{-1}. (5 marks)
    b) Do all gases obey gas laws? Discuss some experimental results to explain deviation and point out the causes which accounts for this behaviour. (10 marks)
35. a) Derive thermodynamically the relation between the elevation of boiling point of a solvent and molal concentration of an electrolyte dissolved in the solvent. (5 marks)
    b) The surface tension of water at 293 K is 72.75 dyne cm^{-1}. How high will a column of water rise in a capillary tube with a radius of 0.005 cm. (5 marks)
    c) Illustrate the operation improper rotation. (5 marks)

(15x2=30)

Core Course - V

19UCH542: Inorganic Chemistry – III

(Lecture-Tutorial-Lab: 4-0-3 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 72 hrs lecture and 54 hrs related lab instruction.)

No. of credits: 4 **No. of instructional hours per week: 4**

Total hours: 72

Course outcome

CO1: To impart a concrete idea of the areas of inorganic chemistry which include coordination chemistry, transition and inner transition elements.
CO2: To get an understanding of the the important multidisciplinary areas of bioinorganic chemistry and organometallic chemistry.
CO3: To inculcate an overview of transition metal chemistry
CO4: To impart knowledge about the general principles of isolation and purification of elements, experimental techniques and instrumental methods of analysis.
CO5: To study the importance of to identify the role of organometallic compounds in organic synthesis

Course out line

Module I Transition and inner transition elements ***(18 hrs)***

Transition elements : Electronic configuration and general characteristics – oxidation state, ionization enthalpy (variation of I,II and III ionization enthalpy across 3d series), enthalpy of atomisation, melting and boiling point, density, variation of std. electrode potentials ($E^{o}_{M2+/M}$& $E^{o}_{M3+/M2+}$), stability of higher oxidation states, colour, magnetic property, catalytic property and formation of complexes.
Comparison of 3d, 4d and 5d transition series –Preparation, properties and uses of $K_2Cr_2O_7$, $KMnO_4$ and $TiCl_4$. Important application of transition metals
Lanthanides and actinides : Lanthanides - electronic configuration and general properties, reactions – Occurrence and isolation of lanthanides from monazite – Lanthanide contraction – consequences of lanthanide contraction– Magnetic properties and complexation behaviour.
Actinides – Oxidation states, ionic radii, colour, complex formation, actinide contraction, comparison with lanthanides.

Module II Coordination Chemistry ***(18 hrs)***

Nomenclature (latest version) – ligands and their classifications. EAN rule – Chelates – Stability of complexes – Factors affecting stability of complexes – Isomerism – Structural and stereoisomerism – Geometrical and optical isomerism – Bonding in complexes – V.B. Theory, CFT applied to Oh, Td and SPcomplexes. factors affecting crystal field, — Spectrochemical series – CFSE, Magnetic properties and colour of metal complexes. Effect of crystal field splitting –Jahn -Teller effect, Tetragonal distortion of an octahedral complex- - Application of coordination compounds in quantitative and qualitative analysis. Reactions of metal complexes-labile &inert complexes, ligand substitution reactions- S_N1 & S_N2 reactions-

Module III Organometallic Compounds ***(12hrs)***

Organometallic Compounds : Definition – Nomenclature and classification – sigma complex – Pi complex – those containing both sigma and Pi bonds – 18 electron rule – Metal carbonyls – mononuclear and polynuclear (give examples of carbonyls of Fe, Co, Ni) – preparation and properties of carbonyls (Fe, Ni, Mn, Cr) Vibrational frequency of CO bond in metal carbonyls – Bonding in organometallic compounds like ferrocene, dibenzene chromium, Ziese's salt (Without MOT)– Dinitrogen complexes – Application of organometallic compounds.

Module IV Bioinorganic Chemistry ***6 hrs***

Bioinorganic Chemistry: Role of metal ions in biological systems – Biochemistry of iron, haemoglobin and myoglobin (elementary idea of the structure and mechanisms of their actions). Electron transport proteins: Cytochromes, Fe- Sulphur proteins, Storage and transport of iron .Photosynthesis – Sodium-Potassium pump - Biochemistry of magnesium and calcium (brief study only).

Module V General Principles of Isolation of Elements ***9hrs***

Methods of concentration of an ore-Gravity separation, Froth floatation, Magnetic separation, Leaching, electrostatic separation, Automated ore sorting and dewatering,Preliminary processes - calcination and roasting. Methods of preparing metal from concentrated ore- Electro metallurgy- Metallurgy of Aluminium, Sodium-Pyro Metallurgy- - Metallurgy of Iron, Zinc, Aluminothermy, Auto reduction-Hydro Metallurgy-Metallurgy of Silver, Gold

Purification of crude metal- Distillaion, Liquation , Zone refining, Vapour phase refining (Mondsproess and van Arkel processes), Electro refining, Chromatography technique

Module VI: Instrumental Methods of Analysis ***9hrs***

Atomic absorption spectroscopy- flame emission spectroscopy- applications – colorimetry-spectrophotometry-laws of spectrophotometry- Beer- Lambert's law- applications of spectrophotometry-thermal methods-introduction to TG, DTA and DSC- instrumentations and applications. Tools for measuring nanostructures: XRD, Atomic Force Microscopy (AFM), Scanning Tunneling Microscopy (STM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM).

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MODEL QUESTION PAPER
19UCH542: Inorganic Chemistry III

Time: Three Hours **Maximum Marks : 80**

Section A
Answer all questions, each question carries 1 mark (answer in a word\sentence)

1. Which is more basic; $La(OH)_3$or $Lu(OH)_3$?
2. Give the general outer electronic configuration of a transition element.
3. Which is the catalyst used in the oxidation of SO_2 to SO_3 in contact process?
4. Name the element obtained by the bombardment of ^{238}U with an a – particle.
5. What is the coordination number of Ag in $[Ag(CN)_2]$?
6. Give the IUPAC name of $Na_3[Co(CO_3)_3]$ 7 What is the unit of magnetic moment?
7.
8. Give the example for a tridentate ligand.
9. Write the structure of ferrocene.
10. Give the formula of a metal carbonyl which does not obey 18-electron rule.

(1 x 10 = 10)

Section B
Answer any 8 questions, each question carries 2 marks (short answer questions)

11. Explain zone refining.
12. Name the metal ion, other than magnesium, involved in photosynthesis.
13. Give an example of phosphorus based polymer.
14. What is 'inorganic graphite?
15. What is the oxidation number of P in H_3PO_4?
16. Give the formula of a methanide.
17. Transition metals are less reactive than the alkali and alkaline earth metals - Justify.
18. Which is more stable: Cu^{2+} or Cu^{+}in aqueous solution. ? Substantiate your answer.
19. Which has got greater tendency to form complexes; lanthanides or actinides ? Give reasons.
20. Write the difference between calcinations and roasting
21. What is an ambidentateligand ? Give example.
22. Explain geometrical isomerism in metal complexes with suitable example.

(2x8=16)

Section C
Answer any 6 questions, each question carries 4 marks **(short essay type)**

23. What is Ziese'ssalt ? Give its structure.
24. State and explain 18-electron rule.
25. How haemoglobin differ from myoglobin.
26. What are carboranes ?
27. Purification of crude metals by Monds proess and van Arkel processes
28. What happens when orthophosphoric acid is heated ?
29. What is lanthanide contraction ? Explain its consequences .
30. What are the factors that affect stability of metal complexes ?
31. Give an account of the applications of coordination compounds in quantitative and qualitative analysis.

Section D
(Answer any 2 questions, Each question carries 15 marks) (essay type)

32. a.Describe the ion exchange method for the separation of lanthanides from monazite. (5 marks)
    b. Describe the splitting of d-orbitals in tetrahedral and octahedral fields according to crystal field theory.(5 marks)
    c. Comment on the magnetic properties of lanthanides. (5 marks)
33. a.Give an account of the preparation, properties, structure and bonding of noble gas compounds. (10 marks)
    b.Discuss the nature of bonding in metal carbonyls. (5marks)
34. a.How silicones are prepared ? Discuss their structure and uses.
    b.Give an account of sodium-potassium pump in biological systems.
    c.Explain the principle of TG with example.
35. a.Starting from pyrolusite, how $KMnO_4$ is prepared ?
    b.Explain the principle and working of AFM.

Core Course - VII

19UCH543: Organic Chemistry- II

(Lecture- Tutorial- Lab : 4-0-2)

No. of credits: 2 **No. of instructional hours per week: 4**

Total hours: 72

Course outcome

CO1: To impart a concrete idea of the about the preparation and properties, mechanism of reactions.
CO2: To get an understanding of organic conversions and of organic compounds
CO3: To inculcate an overview of the principles of spectroscopy
CO4: To impart knowledge about spectral applications to organic molecules.
CO5: To study organic compounds like alcohols, aldehydes, ketones, ethers, acids and their properties

Course outline

Module I-Alcohols, Phenols and Ethers (12 hours)

Alcohols: Preparation: From alkenes (Hydration, Hydroboration-oxidation, oxy-mercuration demercuration) and carbonyl compounds (reduction with Grignard reagent)
Chemical properties: Reactions involving cleavage of O-H bonds (acidity and esterification), oxidation (with PCC, Collins reagent, Jones reagent and $K_2Cr_2O_7$) and catalytic dehydrogenation – distinction between primary, secondary and tertiary alcohols – Ascent and descent in alcohol series. Biofuel – ethanol and biodiesel.
Dihydric alcohols: Oxidative cleavage – Lead tetra acetate, periodic acid – Pinacol-pinacolone rearrangement.
Phenols: Preparation from halobenzene and cumene. Chemical properties: Acidity of phenol - effect of substituents on acidity. Comparison of acidity with alcohol – bromination, nitration, sulphonation, Reimer-Tiemann reaction (mechanism expected), Kolbe reaction, Liebermann's nitroso reaction and Lederer-Mannasse reaction. Distinction between alcohols and phenols.
Ethers: Preparation by Williamson's synthesis. Reactions of ethers : Cleavage by HI,Claisen rearrangement (Mechanism expected) – Ziesel's method of estimation of methoxy group. Crown ethers: Nomenclature and importance of crown ethers.
Epoxides: Preparation from alkenes – acid and base catalysed ring opening reactions.

Module II -Aldehydes and Ketones (12 hours)

Preparation: Oxidation of primary and secondary alcohols using PCC, reduction of esters using DIBAL-H, Rosenmund reduction, Gattermann-Koch formylation and Friedel-Craft's acylation.
Chemical properties: Nucleophilic addition (HCN, $NaHSO_3$, RMgX and ROH)
Addition-elimination reaction (with ammonia and ammonia derivatives)
Reduction with Metal hydrides, MPV reduction, Clemmenson and Wolff-Kishner reduction
Oxidation: with $KMnO_4$, Tollen's reagent, Fehling solution, Br_2 water, Oppenaur oxidation, Baeyer-Villiger oxidation.
Acidity of α-hydrogen: Aldol, Claisen-Schmidt, Benzoin, Perkin and Knovenagel condensations (Mechanisms expected). Haloform reaction – Iodoform test ,Cannizaro reaction(mechanism expected) and Beckmann rearrangement(mechanism expected)

Module III-Carboxylic acids, Sulphonic acid and their Derivatives (12 hours)

Preparation: Hydrolysis of nitrile, carboxylation of Grignard reagent and oxidation of alkyl benzenes.
Chemical properties: Acidity – effect of substituents on the acidity of aliphatic and aromatic carboxylic acids – HVZ reaction – Decarboxylation – Kolbe electrolysis. Ascent and descent series in aliphatic carboxylic acids. Preparation, properties and uses of anthranilic acid, cinnamic acid, citric acid, lactic acid, oxalic acid, adipic acid and phthalic acid.
Formation of acid derivatives – acid chlorides, amides, acid anhydrides and esters – comparison of reactivity of acid derivatives. Preparation and uses of coumarin – Fries rearrangement (Mechanism expected)
Preparation and reactions of benzene sulphonic acid, toluene sulphonic acid and benzene sulphonyl chloride – Importance of tosyl group – synthesis and application of saccharin.

Module IV- Organic Nitrogen Compounds (12hours)

Nitrocompounds: Nitro-aci tautomerism – Nef's reaction – reduction of nitrobenzene in various media – nitro compounds as explosives.

Amines: Classification – Preparation: From alkyl halides, nitro compounds, nitriles, isonitriles and amides – Hoffmann's bromamide reaction, Schmidt reaction, Gabriel phthalimide synthesis.

Chemical properties: Basicity (effect of substituents on the basicity of aliphatic and aromatic amines), Carbyl amine reaction, conversiton of amines to alkene (Hoffmann elimination with mechanism), acylation and reaction with nitrous acid. Electrophilic substitution reactions of aniline: halogenation, nitration and sulphonation. Benzidine rearrangement (mechanism expected).

Separation of mixture of amines – methods to distinguish primary, secondary and tertiary amines.

Preparation and synthetic applications of diazonium chloride and diazomethane.

Module V- Organic Spectroscopy I (12 hours)

UV – Visible spectroscopy – types of electronic transitions, effect of conjugation, concept of chromophore, auxochrome, bathochromic, hypochromic shifts, hyperchromic and hypochromic effects. UV-Visible spectra of enes. Calculation of λ_{max} of dienes and α,β-unsaturated ketones.

IR spectroscopy – Molecular vibrations - Functional group and finger print region – group frequencies – effect of hydrogen bonding on –OH stretching frequency – factors influencing carbonyl stretching frequency. Comparison of carbonyl stretching frequency in compounds containing carbonyl group.

Interpretation of IR spectra of simple organic molecules such as salicylaldehyde, benzamide, acetophenone, nitro benzoic acid and phenyl acetate.

Theory of Mass spectrometry – mass spectrum, base peak and molecular ion peak, types of fragmentation, McLafferty rearrangement, isotopic effect.

Module VI- Organic Spectroscopy II (12 hours)

NMR spectroscopy – principle of proton NMR – Precession. Relaxation, shielding and deshielding effect, chemical shift, factors influencing chemical shift, spin-spin splitting, coupling constant, Delta and tau scales. Low and high resolution spectra, Interpretation of PMR spectrum of simple molecules like $CHBr_2CH_2Br$, ethylbromide, pure ethanol and impure ethanol (acidic impurities) acetaldehyde and toluene. Structural elucidation of simple organic molecules using IR and NMR spectroscopic techniques. Application of NMR in MRI.

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MODEL QUESTION PAPER
19UCH543: ORGANIC CHEMISTRY II

Time:3hours **Max.Marks : 80**

SECTION – A

*(Answer **all** questions. Answer in **one** word to maximum **two** sentences. **Each** question carries **one** mark)*

1. What is Williamson's synthesis?
2. Which reagent is used for the oxidative cleavage of 1,2-diols?
3. Give a test to distinguish aliphatic aldehydes from aromatic aldehydes.
4. Define chemical shift in NMR spectroscopy?
5. What is HVZ reaction?
6. Predict the product obtained when aniline is treated with bromine?
7. Identify the types of electronic transitions in CH_3CHO.
8. What is base peak?.
9. What is PCC?
10. Identify the reaction used to convert phenolic esters to ortho\para hydroxy ketones

(10 X 1 =10 Marks)

SECTION - B

(*Short answer type. Answer **any 8** questions from the following. **Each** question carries **two** marks.)*

11. Why phenol is more acidic than methanol?
12. How can you convert methanol to ethanol?
13. What is iodoform test?
14. What is MPV reduction?
15. How is coumarin prepared?
16. How will you convert acetic acid to propionic acid?
17. Explain Nef's reaction.
18. Write the mechanism of Benzidine rearrangement?
19. What is finger print region? Give its importance.
20. Differentiate bathochromic and hypochromic shifts.
21. What is TMS? Why it is selected as a reference compound in H-nmr spectroscopy?
22. What is DIBAL? What is its use?

(8 X 2 = 16 Marks)

SECTION - C

(*Short essay type. Answer **any 6** questions from the following. **Each** question carries **four** marks.)*

23. Explain Zeisels method of estimating methoxy group?
24. How can you distinguish primary, secondary and tertiary alcohol?
25. Discuss the mechanism and synthetic importance of Beckmann rearrangement.
26. Comment on Clemmensen and Wolff-Kishner reduction.
27. How cinnamic acid is prepared? Explain its important properties.
28. Discuss Hoffmann elimination?
29. Explain isotopic effect in mass spectroscopy.
30. (i) How can you distinguish inter and intra molecular hydrogen bonding using IR spectroscopy?
    (ii) Predict the regions where salicylaldehyde give IR absoptions.
31. Explain spin-spin coupling with an example.

(6 X 4 = 24marks)

SECTION – D

(*Answer **any 2** question. Each question carries 15 marks*)

32. (a) Write the mechanism of the following reactions:(a) Aldol condensation and (b) Benzoin Condensation.
    (b) Discuss the mechanism of (i) Reimer-Tiemann reaction and (ii) Claisen Condensation.
    (c) Comment on the following (i) Biodiesel and (ii) Crown ethers.
33. (a) Explain the synthesis and applications of saccharin.
    (b) How is diazonium chloride prepared? How is it useful to synthesize the following compounds: phenol, Iodobenze and azobenzene.

(c) How can you effect the following conversions (i) aniline to para-bromo aniline (ii) Benzamide to aniline.

34. (a) Discuss the Woodward-Fieser rules for calculating λ_{max} of dienes.
    (b) Explain the principle of NMR spectroscopy.
    (c) A compound with molecular formula C_8H_8O shows the following absorptions:
        (i) IR Spectrum: 3050, 2950, 1700, 1620, 1550, 690 cm^{-1}.
        (ii) PMR spectrum: δ 7-8 ppm (multiplet, 5H), 2.5ppm (singlet, 3H).
        Identify the structure of the compounds.
35. (a) How are primary, secondary and tertiary amines separated?
    (b) Discuss the preparation and important reactions of benzene sulphonic acid.
    (c) Discuss the different types fragmentation patterns in mass spectroscopy.

(15 X 2 = 30marks)

Open Course

19UCH551.1: Essentials of Chemistry

No. of credits: 2 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To provide an insight into the structure of atoms and an understanding of the Periodic table
CO2: To provide an idea about nuclear chemistry
CO3: To impart knowledge about industrially important polymers
CO4: To study the applications of chemistry in biology and in our daily life
CO5: To acquire knowledge about environmental pollution

Module 1-Atomic structure and Periodic Classification of Elements ***(9hrs)***

Structure of atom- Fundamental particles, atomic mass, atomic number, isotopes. Bohr theory of atom. Orbitals- Quantum numbers, aufbau principle, Hund's rule; Pauli's exclusion principle. Electronic configuration of atoms - half and completely filled orbitals. Modern periodic table: Periods, Groups, Periodicity- valency, atomic radius, electronegativity, Ionisation potential, Electron affinity.

Module 2 -Nuclear Chemistry ***(9 hrs)***

Natural radioactivity, Nature and types of radiations, Properties. Group displacement law. Radio active decay series. Decay rate. Half life period, Average life period, Unit of radioactivity. Radiation dose, artificial radioactivity, nuclear structure. Nuclear fission and Nuclear fusion. Rock dating- Radio carbon dating. (*elementary idea only*)

Module 3 -Polymer Chemistry ***(9 hrs*)**

Classification of polymer: Origin, structure, synthesis, Molecular forces.
Commercially important polymers: Application of polyethylene, polystyrene, polyhaloolefines, Nylon-6, Nylon-66, Melamine, Terylene, Bakelite
Natural and synthetic rubber, vulcanization
Importance of Biodegradable polymers, Recycling codes (*Elementary idea*).

Module 4 -Chemistry in Biological Process ***(9hrs)***

Vitamins: Vitamin-A, Vitamin-B2, Vitamin-C, Vitamin-D, Vitamin-E and Vitamin-K- Name, Source, Function and deficiency diseases. Enzymes- Classifications, characteristics, role, examples. Hormones - Sex hormones- Androgens, oestrogens, progesterone, Example, function. Cortical hormones- A few examples with function. Nucleic acid- RNA, DNA: Introduction- role in life process (*No structure or chemical reactions needed*)

Module 5 -Chemistry in action ***(9hrs)***

Dyes: classification based on constitution, application, examples, uses. Drugs: Antipyretic, analgesic, antiseptic, disinfectants, tranquilisers, antibiotics structure, name and uses only. Soaps and detergents: Hard and soft soaps, anionic, cationic and non-ionic detergents, cleansing action of soaps, Explosives: TNT, TNG, RDX, Gun cotton: name, structure and action. (*No structure or chemical reactions needed*)

Module 6 -Environmental Chemistry ***(9hrs)***

Air Pollution: Types of pollutant in air- carbon monoxide, carbon dioxide, Nitrogen oxides, Sulphur dioxides, hydrogen sulphide, Cl_2, CFC, particulate matter, metals, fly ash, asbestos, hydrocarbons- source and influence. Acid rain, Green house effect, ozone layer and its depletion. Water Pollution: Various factors affecting purity of water, sewage water, industrial waste, agricultural pollution such as pesticides, fertilizers, detergents. Hard and soft water, Removal of hardness, disadvantage of hard water. Soil pollution : Due to pesticides, herbicide, fungicide, long term use of fertilizers, plastic waste.

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5. F.A. Carey, Mc. GrawHill ,“Organic Chemistry” McGraw Hill, 2013.
6. I.L Finar,“Organic Chemistry”, Vol. 1, Pearson, Education, Nw Delhi, 2002.
7. Tewari, Mehrotra- Vikas&Vishnoi,“A Text book for Organic Chemistry, Vikas, 2006.
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MODEL QUESTION PAPER
19UCH551.1: Essentials of Chemistry

Time: 3 Hrs **Total marks: 80**

Section A.
Answer all the questions. Each question carries 1 mark

1. Who discovered radioactivity?
2. Name any unit of radioactivity.
3. What is the expansion of DNA?
4. Write an example of a sex hormone.
5. Name an enzyme.
6. State Afbau principle.
7. Draw Px orbital.
8. Give an example of inorganic polymer.
9. Name any compound which causes acid rain.
10. What is the monomer of nylon-6,6?

(1x10 = 10 marks)

Section B

(2 marks each), Short answer**Answer any 8 questions**

11. Name the pollutants in air?
12. What are the factors affecting the purity of water?
13. Explain Hund's rule of maximum multiplicity with an example.
14. Define electron affinity, explain with an example.
15. Distinguish between half life period and average life period.
16. Explain artificial radioactivity.
17. Write the structure and applications of polyhalo olefins.
18. What is vulcanization of rubber?
19. What are corticosteroidal hormones? Explain with example.
20. Distinguish between DNA and RNA.
21. How are dyes classified?
22. Explain cleansing action of soap

(2×8 = 16 marks)

Section C

(Each question carry 4 marks), (Short essay)**Answer any 6 questions**

23. Explain the source and hazards of fly ash and asbestos.
24. Explain briefly soil pollution.
25. What are periods and groups in the periodic table? What is periodicity?
26. Explain Bohr model of atom.
27. Distinguish between nuclear fission and nuclear fusion with examples.
28. What are Nylon 66, Melamine and Terylene?
29. What are the functions and deficiency diseases of Vitamin C, Vitamin D and Vitamin E.
30. Write a note on explosives.
31. Distinguish between addition and condensation polymerization.

(4×6 = 24 marks)

Section D

(15 marks each), (essay), **Answer any two question**

32. a) What are quantum numbers? Explain.
    b) State Pauli Exclusion Principle. Expalin their significance.
    c)Explain stability of half-filled and completely- filled orbitals. (5x3 = 15 marks)
33. a) Write a note on Group Displacement law and radioactive decay series.
    b) What is carbon dating? In an archaeological piece of wood ^{14}C activity is 10 % of the activity found in a fresh wood. Calculate the age of the archaeological piece (half life of ^{14}C is 5760 years.).
    c) Write a note on vitamin deficiency disease. (5x3 = 15 marks)

34. a) What are the different methods for the analysis of oils and fats?
    b) What is meant by DNA? Name the sugar unit present in DNA.
    c)Write anote on vat dyes. (5x3 = 15 marks)
35. a) Explain the cleansing action of soap.
    b) What is antibiotic? Give the names of the first antibiotic and the scientist who discovered it.
    c) Give an account of the green house effect. (5x3 = 15 marks)

Open Course

19UCH551.2 Fundamentals of Chemistry & Its Application to Everyday Life

No. of credits: 2 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To provide an insight into the evolution of Chemistry
CO2: To provide an idea about the structure of atom
CO3: To impart knowledge about the periodic properties
CO4: To study the structure and properties of selected molecules
CO5: To acquire knowledge about the importance of chemicals in our daily life

Course outline

Module 1 -Evolution of Chemistry ***9 hrs***

Evolution of Chemistry - ancient speculations on the nature of matter, early form of chemistryalchemy, Robert Boyle and the origins of modern chemistry in the latter 1600s - origin of modern chemistry - Antoine Lavoisier and the revolution in chemistry - Role of Chemistry as a central science connecting
Physics, Biology and other branches of science. Basic ideas of interdisciplinary areas involving Chemistry

Module 2- Atomic structure -Atom- model of Dalton- Thomson – Rutherford and Bohr. Nature of electron proton and neutron – atomic number – mass number- isotopes -state the relative charges and approximate relative masses of a proton, a neutron and an electron - describe, with the aid of diagrams, the structure of simple atoms as containing protons and neutrons (nucleons) in the nucleus and electrons arranged in shells (energy levels) (no knowledge of s, p, d and f orbitals);

Module 3–Periodic table ***9 hrs***

The Periodic Table - Periodic trends, Group properties - describe the relationship between group number and the ionic charge of an element- similarities among the elements in the same group - metallic to non-metallic character from left to right across a period of the Period Table- Properties of elements in Group I and XVII using the Periodic Table

Module 4- Structure and properties of materials ***9 hrs***

Elements, compounds and mixtures – elementary idea of ionic bond and covalent bond- compare the structure of simple molecular substances, e.g. methane; water, carbon dioxide, iodine, with those of giant molecular substances, e.g. poly(ethene); sand (silicon dioxide); diamond; graphite in order to deduce their properties compare the bonding structures of diamond – graphite, electrical conductivity.

Module 5- Chemicals used in everyday life. ***9 hrs***

Household materials – Major chemical ingredients (*No structural formula and preparation needed*), method of action and possible hazards/toxicity of : Match Box- Household bleach – Soap- detergent— cooking gas – tooth paste – shampoo-hair dye- nail polish- whitener-moth balls –fire crackers.

Module 6 -Chemicals in food and beverages ***9 hrs***

Important chemical ingredients/ taste makers used in packed food - soft drinks - and its health hazards. Chemicals in food production - fertilizers used in natural sources - Fertilizers urea, NPK and Super phosphates - uses and hazards. Adulterants in milk, ghee, oil, coffee powder, tea, asafoetida, chilli powder, pulses and turmeric powder - identification. artificial sweeteners - food preservatives.

MODEL QUESTION PAPER

19UCH551.2: Fundamentals of Chemistry & Its Application to Everyday Life

Time: Three Hours **Maximum Marks : 80**

Section A

(answer in a word / sentence) Answer all questions

1. What is superphosphate?
2. Who is the Father of Modern Chemistry?
3. How many atoms are present in a molecule of ozone?
4. Define isotopes.
5. What is a diamond made up of?
6. Which element has the electron configuration 2,1.
7. Name a liquid element.
8. What is the shape of water molecule?
9. How many valence electrons are there in carbon?
10. Name the main compound present in cooking gas.

Section B

Each question carries 2 marks (Short answer type).Answer any eight questions .

11. Name any two Toxic Chemicals in Cosmetics
12. Obtain the electron configuration for (a) N; (b) F.
13. Explain Hund's rule of maximum multiplicity with an example.
14. Define electron affinity, explain with an example.
15. Which of the following elements Li, Be, B, C, N, O, F and Ne are metals?
16. Explain Bohr model of atom.
17. Why is the electronegativity value of most noble gases equal to zero?
18. What are the Health Effects of Drinking Soda?
19. Which do you expect to have more metallic character, Lead (Pb) or Tin (Sn)
20. What is a Match Head of match stick made of?
21. Explain why graphite conducts electricity whereas diamond doesn't.
22. Is the reactivity of group I metals increasing or decreasing down the group? Explain why?

(2×8 = 16)

Section C

Each question carries **4 marks**(Short essay type)*Answer any six **questions***

23. Explain the colour of firecrackers.
24. What is the difference between covalent and ionic bonding?
25. What are periods and groups in the periodic table? What is periodicity?
26. What are adulterants.
27. How is Thomson's model of the atom different from Dalton's model of atom?
28. What's the difference between an oxidation number and an ionic charge?
29. Explain the health hazards associated with drinking soft drinks?
30. How can metallic character change across a period?
31. Describe clearly the link between increasing effective nuclear charge across a period and the changes in van der Waals radius.

(4×6 = 24 marks)

Section D

Each question carries 15 marks (essay type) Answer any two questions.

32. a. Explain about the pH changes of aqueous solutions of elements in the third period as the period is crossed.
    b. Explain how these changes are directly related to the changes in effective nuclear charge across the period.
    c. Describe the metallic character of elements in a period.
33. a.Explain the role of some chemicals in household items . (7.5 marks)
    b.Write a short note on food adultration. (7.5 marks)
34. a.Write a short note on the uses and hazards of fertilisers. (10 marks)
    b. Draw the structure of carbon and sodium containing nucleons.(5 marks)
35. a.Compare the structure of substances, methane, water, carbon dioxide and iodine, with ethane and silicon (10 marks)
    b.compare the bonding structures of diamond – graphite. (5 marks)

Open Course

19UCH551.3: Environmental Chemistry

No. of credits: 2 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To provide an insight into the structure and composition of atmosphere
CO2: To provide an idea about water quality standards
CO3: To impart knowledge about the sources of air pollution
CO4: To study the effects and control of soil pollution
CO5: To acquire knowledge about environmental disasters and environmental protection laws

Module -I Environmental Components: **9 hrs**

Structure and composition of the, Atmosphere, hydrosphere, biosphere and Lithosphere – composition of atmosphere

Module -II Water pollution: **9 hrs**

Sources, its effect and control; Sampling and measurement of water quality and their analysis, water quality standards, BOD and COD Hard water – soft water Eutrophication and restoration of lakes.

Module -III Air Pollution: **9 hrs**

Types and sources of air pollution, Common Air Pollutants - Effects of air pollution; Smog – ozone layer depletion – green house effect – acid rain

Module –IV Soil Pollution: **9 hrs**

Sources, types, effects and control of: Land pollution, Marine pollution, Thermal Pollution and Radioactive pollution. Waste separation, storage and disposal ; Waste Reduction, Recycling and Recovery of materials. Plastics and their misuses.

Module -V Major environmental disasters **9 hrs**

Major environmental disasters - - mercury poisoning in Minamata, Japan ,Itaiitai disease due to cadmium poisoning in Japan - Love Canal toxic waste site, Seveso disaster chemical plant explosion - Bhopal disaster - Chernobyl incident,

Module -VI Major environmental laws: **9 hrs**

Environment (Protection Act) – The Air (Prevention and control of pollution) Act – The water (Prevention and control of pollution) Act – The wild life protection Act – Forest conservation Act – The Ozone Depleting Substances (Regulation and Control) Rules – The Plastic Waste (Management and Handling) Rules - Rio declaration- Montreal protocol, Kyoto protocol Introduction to Green chemistry (elementary ideas only)

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MODEL QUESTION PAPER
19UCH551.3: Environmental Chemistry

Time: 3 hours **Maximum marks: 80**

Section A

Answerall questions (Each answer carries 1 mark)

1. What you meant by Triple R in waste management ?.
2. What type of pollution causes acid rain?
3. What are the misuses of plastics?
4. What are the three major man made sources of air pollution?
5. What kind of materials are discharged into the seas?
6. What increases the amount of carbon dioxide in the atmosphere?
7. Explain the action of zeolites on hard water.
8. What are freons?
9. Define pollution
10. What is fly ash

(10x1=10)

Section B

(short answer type) (Answer any 8 questions, Each answer carries 2 mark)

11. How is pollution related to acid rain?
12. How does ocean pollution affect sea animals?
13. What are the main concepts of Green Chemistry
14. Write short note on Radioactive pollution
15. Discuss the major composition of earth's atmosphere
16. Write about the cause and consequence of Chernobyl incident
17. What is BOD and COD?
18. What causes radioactive pollution?
19. Distinguish between Hard water and soft water.
20. What is the goal of Forest Conservation Act?
21. What is the Greenhouse effect and what is its cause?
22. What are the types of air pollutants ?

(2×8 = 16)

SectionC

(Short essay type) each question carries **4**marks. Answer **any 6**

23. Write short note on volatile organic compounds.
24. How can thermal pollution be prevented?
25. How do you control Radioactive pollution?
26. What is smog? How does smog arise?
27. What is Eutrophication
28. Write a note on Rio-Declaration.
29. Explain the various layers of the Atmosphere
30. What is Air Pollution? How can air pollution be minimized?
31. Briefly explain about the components of atmosphere.

(6×4 = 24 marks)

Section D

Answer **any 2** from the following. Each question carries 15 marks

32. (a) Explain Hardness of water and the different types. (5 marks)
    (b) Discuss about the various sources of water pollution. (5 marks)
    (c) What are the control measures for water pollution ? (5 marks)
33. (a) Write short note on causes and problems of ozone layer depletion?
    (b) Explain the various types of smog.
    (c) Discuss the Ozone Depleting Substances (Regulation and Control) Rules
34. (a) Explain thermal pollution
    (b) Discuss about plastics and their misuses
    (c) Discuss about Chernobyl disasters
35. (a) Discuss about green chemistry
    (b) Explain Montreal protocol and Kyoto protocol
    (c) The water (Prevention and control of pollution) Act

(15 × 2= 30marks)

Semester - VI

Core Course - VIII

19UCH641: Physical Chemistry – II

No. of credits: 4 **No. of instructional hours per week: 4**

Total hours: 72

Course outcome

CO1: To impart idea of the concepts of thermodynamics, quantum mechanics, and spectroscopy to chemical, physical, and biochemical systems.
CO2: To get an understanding of statistical thermodynamics
CO3: To provide a complete description of chemistry at the microscopic level,
CO4: To evaluate physical and chemical systems by non spectroscopic techniques.
CO5: To derive essential mathematical relationships in thermodynamics, quantum mechanics and spectroscopy.

Course outline

Module I – Thermodynamics III & Statistical thermodynamics 12 hrs

Nernst heat theorem, proof and its consequences. Statement of IIIrd law-Plank's statement, Lewis Randall statement. Concept of perfect crystal, evaluation of absolute entropies of solid, liquid and gas. Exception to IIIrd law with reference to examples- CO, NO, N_2O and H_2O Phase space, system, assembly and ensemble-types of ensembles and uses. Thermodynamic probability, Boltzmann distribution law (no derivation). Partition function, entropy and probability. Thermodynamic functions in terms of partition functions - internal energy, enthalpy, pressure, work function and free energy function.

Module II – Colloids and Adsorption 12 hrs

Colloidal state: Classification of colloids, Purification of colloids – ultra filtration and electrodialysis, Kinetic, optical and electrical properties of colloids. Ultra microscope, Electrical double layer and zeta potential. Coagulation of colloids, Hardy-Schulz rule, Gold number. Gels: Elastic and non-elastic gels, Imbibition and syneresis, Micelles and critical micelle concentration, sedimentation and streaming potential, Application of colloids – Cottrell precipitator, purification of water and delta formation.

Adsorption: Physical and chemical adsorption, Freundlich adsorption isotherm, Derivation of Langmuir adsorption isotherm, Statement and explanation of BET and Gibbs isotherms, determination of surface area of adsorbents by BET equation. Applications of adsorption.

Module III – Quantum mechanics - 12 hrs

Radiation phenomena- blackbody radiation, photoelectric effect, Compton effect and atomic spectra. Plank's quantum theory and explanation of the radiation phenomena. Schrodinger wave equation – significance of Ψ, well behaved functions, Concept of operators and some operators of interest (properties of operators not required), Postulates of quantum mechanics Application of quantum mechanics to simple systems - particle in 1 D box, normalization of wave function, Particle in 3 D box. Concept of degeneracy. Application to hydrogen atom (no derivation) Schrodinger wave equation in Cartesian and spherical polar co-ordinates, Quantum numbers.

Module IV – Spectroscopy – 12 hrs

Regions of electromagnetic spectrum. Different units of energy (erg, joule, calorie, cm^{-1}, Hz, Å and eV) and their inter conversions. Interaction of radiations with matter. Various types of molecular spectra. Born-Oppenheimer approximation.

Rotational spectroscopy: microwave spectra of diatomic molecules, energy expression, selection rule, rotational energy levels, determination of bond length.

Vibrational spectroscopy: Harmonic oscillator. Energy expression. Selection rules, frequency of separation, calculation of force constant, anharmonic oscillators. Morse equation. Fundamental and overtone transitions, combination bands, degree of freedom of polyatomic molecules. (calculation of force constant, frequency of vibration, bond length)

Raman spectroscopy: Stoke's and antistoke's lines and their intensity difference, rotational Raman spectrum. Selection rule. Frequency of separation, vibrational Raman spectrum, Mutual exclusion principle.

Infrared and Raman spectra as complimentary techniques

Module V – Spectroscopy – II 12 hrs

Electronic spectroscopy: Frank-Condon principle. Singlet and triplet states. Electronic spectra and diatomic molecules.

Dissociation and Predissociation, Dissociation energy, electronic spectra of polyatomic molecules (qualitative idea only).

NMR spectroscopy: **P**rinciple, Instrumentation, Chemical shift. Low resolution spectra, Delta and tau scales. Spin-spin coupling and high resolution spectra, Applications of nmr, simple problems on nmr.

Introduction to FT-nmr,

Electron spin resonance spectroscopy: principle. Types of substances with unpaired electrons, interaction of electron magnet with external magnet. Energy level spliting. Lande splitting factor, presentation of ESR spectrum. The normal and derivative spectra. Hyperfine splitting. Simple examples like methyl and benzene radicals.

Introduction to Mossbauer Spectroscopy

Module VI –Non-spectroscopic methods 12 hrs

Non-spectroscopic methods: Dipole moment, Debye equation and Clausius-Mosotti equation, measurement of dipole moment by temperature method, Dipole moment and molecular structure, Diamagnetism and paramagnetism, Magnetic susceptibility and unpaired electrons, measurement of magnetic susceptibility, Molar refraction and molecular structure, Atomic refraction, Optical exaltation, Parachor and atomic equivalent of parachor.

(At least 100 problems are to be worked out from all units together. 30% of the questions for Examination shall contain problems.)

References

1. P W Atkins, “Physical Chemistry”, Oxford University Press, 2009.
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MODEL QUESTION PAPER
19UCH641: Physical Chemistry II

Time: 3 Hrs **Total marks: 80**

Section A.
Answer all the questions. Each question carries 1 mark

1. Which of the following will give pure rotational spectrum? H_2, N_2, CO_2, HCl.
2. Write the mathematical definition of Laplacian operator.
3. Which branch of spectroscopy is used for the identification of free radicals?
4. What is the significance of polarizability of a molecule?
5. What is responsible for the stability of a lyophilic sol?
6. State The Heisenberg uncertainty principle.
7. Give the expression for Freundlich adsorption isotherm.
8. Give the expansion of STM.
9. Give the selection rule for rotational spectroscopy.
10. What is the unit of dipole moment?

Section B
(2 marks each), [Short answer]. **Answer any 8 questions**

11. What is meant by Critical Micelle Concentration (CMC)?
12. What is sedimentation?
13. What is the significance of wave function of a particle?
14. Give any two applications of ESR spectroscopy.
15. What do you mean by the term 'parachor'?
16. What is meant by normal modes of vibrations?
17. What is zeta potential ?
18. Calculate the number of fundamental modes of vibrations of CO_2 and SO_2 molecules.
19. How does stokes and anti stokes lines originate in Raman spectrum.
20. Explain chemical shift.
21. Explain blackbody radiation
22. What is hyperfine splitting in esr?

Section C
Each question carries 4 marks(Short essay), **Answer any 6 questions**

23. What is an ensemble, explain the different types of ensembles.
24. Discuss the postulates of quantum mechanics.
25. Explain the underlying principle of NMR spectroscopy.
26. What is meant by Optical Exaltation? Calculate the optical exaltation of 2,6-dimethylhepta-2,5-dien-4-one.
27. Compare physisorption and chemisorptions
28. What are the consequences of unharmonicity in vibrational spectroscopy?
29. What is Debye equation ? Explain its significance.
30. Explain mutual exclusion rule with examples.
31. The fundamental vibrational frequency of carbon monoxide molecule is 2170 cm^{-1} Calculate the force constant of the molecule.

Section D,
15 marks each (Long essay) **Answer any two question**

32. a) Derive and explain Langmuir adsorption isotherm. (5 x3 = 15 marks)
    b) What is meant by partition functions? Derive expressions for internal energy and enthalpy.
    c)The acceptable solutions to Schrodinger wave equation must have some special properties. What are these? Elaborate.
33. a) What is Hardy-Schulze rule and what are the principles involved in the mechanism of coagulation? (5 x 3 = 15 marks)
    b) Show that for a rigid diatomic rotor, the moment of inertia is given by $I = \mu r^2$

c) The pure rotational spectrum of a gaseous molecule CN consists of a series of equally spaced lines separated by 3.7978 cm^{-1}. Calculate the internuclear distance of the molecule. The molar masses are; ^{12}C=12.011 and ^{14}N=14.007 g mol^{-1}.

34. a) How can NMR spectrum distinguish between the isomers: p-xylene and ethyl benzene? (5 x3 = 15 marks)

    b) Explain the shielding and deshielding mechanism in NMR.

    c) Give the hyperfine structure of ESR spectrum of hydrogen atom.Calculate the ESR frequency of an unpaired electron in a magnetic field of 0.33T. Given $g_e = 2$ and $\mu_B = 9.273 \times 10^{-24}$ JT^{-1}.

35. a) Discuss the function of a protective colloid. (5 x3 = 15 marks)

    b) What is meant byelectrodialysis?

    c) Explain BET theory.

Core Course - IX

19UCH642: Organic Chemistry– III

(Lecture - Tutorial – Lab: 3-0-2)

No. of credits: 4 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To impart an interesting idea about the preparation and properties of a wide variety of organic compounds
CO2: To get an understanding of and polymers and their properties..
CO3: To inculcate an overview of reagents of synthetic utility
CO4: To impart knowledge on organic compounds carbohydrates, amino acids, proteins, nucleic acids, oils, fats, detergents,
CO5: To study the importance of terpenes and alkaloids

Module I: Carbohydrates **(9 hours)**

Classification and nomenclature of monosaccharides, configuration of monosaccharides. Reactions of glucose and fructose – structure of glucose and fructose – anomers and mutarotation (mechanism expected) - cyclic structure – pyranose and furanose forms – determination of ring size – Haworth projection formula – chair conformations.

Epimers and epimerization – Interconversion of aldoses and ketoses – chain lengthening and shortening of aldoses.

Disaccharides – reactions and structure of sucrose (structural elucidation not required)

Polysaccharides – Structure of starch and cellulose (structural elucidation not required) – Industrial applications of cellulose.

Module II- Heterocyclic compounds and Drugs **(9 hours)**

Heterocyclic compounds – classification – nomenclature – aromaticity.

Preparation (special reference to Paal-Knor syntheisis and Hantzsch synthesis) and properties of furan, pyrrole, thiophene and pyridine. Basicity of pyridine and pyrrole.

Synthesis and reactions of quinoline, isoquinoline and indole with special reference to Skraup, Bischler-Napieralski and Fischer-Indole synthesis. Structural elucidation of quinoline.

Structure of purine and pyrimidine bases.

Chemotherapy – Drugs – introduction – classification – Synthesis of sulphanil amide, sulphathiazole and sulphapyridine. mode of action of sulphadrugs and ampicillin. Elementary idea of the structure and application of chloroquine, paracetamol and aspirin.

Module III-Amino acids, proteins and nucleic acids **(9hours)**

Amino acids – classification, structure and stereochemistry of amino acids, essential and non essential amino acids – zwitter ion, isoelectric point.

Synthesis of amino acids – Strecker synthesis, amidomalonate synthesis, Erlenmeyer azlactone synthesis.

Peptides: Structure and synthesis (Carbobenzoxy, Sheehan and solid phase synthesis)

Proteins – classification of proteins –structure of proteins –denaturation and colour reactions.

Nucleic acids: Classification and structure of DNA and RNA. Replication of DNA. Transcription and Translation - Genetic code.

Module IV-

Natural products **(9 hours)**

Terpenes – Classification - Isoprene rule - Essential oil – Source, structure, (no structural elucidation) and uses of citral and geraniol, limonene and menthol. Structure of natural rubber – vulcanization and its advantages.

Alkaloids – Extraction and structural elucidation of conine and nicotine. Importance of quinine, morphine and codeine.

Vitamins : Classification, structure, functions and deficiency diseases (structure of vitamin A, B1 and C only - but no structural elucidation).

Lipids – biological functions – oils and fats – common fatty acids – hydrogenation – rancidity - saponification

value, iodine value, acid value.

Module V- Soaps, Detergents and Polymers **(9 hours)**

Soaps and detergents: Soap – synthetic detergents – cleaning action of soap and detergents.

Polymers: General idea of monomers, polymers and polymerisation – Degree of polymerisation – polydispersity - number and weight average molecular mass. Classification of polymers, Homopolymers and copolymers, Addition and condensation polymers, thermoplatstics and thermosets – mechanism of addition polymerization (Cationic, anionic and free radical) – Tacticity – role of ZieglerNatta catalyst in directing the tacticity in polypropylene (mechanism not required).

Addition polymerisation. Preparation and uses of (i) polyethylene (ii) PVC (iii)Teflon

Condensation polymerisation:(i) phenol-formaldehyde resin (ii) epoxy resin (iii)nylon-66

Polyethylene terephthalate. Synthetic rubbers – SBR and nitrile rubbers. Biodegradable polymers Additives to polymers – Plasticisers, stabilizers and fillers

Module VI- Organometallics, Active methylene compounds and Reagents in Organic synthesis.

(9 hours)

Organomagnesium compounds: Grignard reagent: Preparation – Reaction with compounds containing acidic hydrogen, carbonyl compounds, cyanides and CO_2.

Organo lithium compounds: Preparation – Reaction with compounds containing acidic hydrogen, alkyl halides, carbonyl compounds, cyanides and CO_2.

Organo zinc compounds: Preparation of dialkyl zinc – Reaction with active hydrogen compounds, acid halides and alkyl halides – Reformatsky reaction (mechanism expected)

Li dialkylcuprates – Preparation and reaction with aliphatic/aromatic/vinyl halides.

Active methylene compounds – examples – Preparation of ethyl acetoacetate by Claisen condensation (mechanism expected) – tautomerism – Synthetic applications of acetoacetic ester.

Reagents in organic synthesis: Study of the following reagents with respect to functional group transformations –

1. $LiAlH_4$ – reduction of =CO, -COOR and $–CONH_2$.
2. $NaBH_4$ and Diborane – reduction of =CO
3. SeO_2 - hydroxylation of allylic and benzylic positions, oxidation of CH_2 alpha to =CO to =CO
4. NBS : Allylic and benzylic bromination.

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13. S.M. Mukerji and S.P. Singh, Reaction Mechanism in Organic Chemistry, McMillan Publishers, 2007.
14. S.P. Bhutani, Chemistry of Biomolecules, Ane Book Pvt Ltd, 2009.
15. O.P. Agarwal, Chemistry of Natural Products, Krishna Prakashan, 2014.
16. T.L. Gilchrist, Heterocyclic Chemistry, Pearson Education, New Delhi, 2005.
17. V.K. Ahluwaliya, Organic Reaction Mechanisms, Narosa Publishing House, New Delhi, 2010.

MODEL QUESTION PAPER
19UCH642: ORGANIC CHEMISTRY III

Time:3hours **Max.Marks : 80**

SECTION – A

*(Answer **all** questions. Answer in **one** word to maximum **two** sentences. **Each** question carries **one** mark)*

1. Draw the structure of D-Arabinose and D-Ribose?
2. What are epimers?
3. Write the IUPAC name of (i) Furan and (ii) quinoline.
4. Write the structure of chloroquine.
5. What is isoelectric point?
6. What is natural rubber chemically?
7. Write any two biological functions of lipids.
8. What is soap?
9. Write the monomers of the following polymers (i) PTFE (ii) PP.
10. What is Frankland reagent?

(10 X 1 =10 Marks)

SECTION - B

(*Short answer type. Answer **any 8** questions from the following. **Each** question carries **two** marks.)*

11. Explain inversion of cane sugar.
12. Write any two industrial applications of cellulose.
13. Compare the aromaticity of furan and thiophene.
14. Write the structure of pyrimidine bases present in nucleic acids.
15. Define the terms (i) saponification value and (ii) iodine value.
16. What is isoprene rule?
17. What are essential and non-essential amino acids?
18. What is denaturation of protein?
19. Differentiate oils and fats.
20. Define the terms M_n and M_w.
21. What is NBS? What is its use?
22. What are active methylene compounds? Give examples.

(8 X 2 = 16 Marks)

SECTION - C

(*Short essay type. Answer **any 6** questions from the following. **Each** question carries **four** marks.)*

23. How can you interconvert glucose and fructose?
24. What is mutarotation? Explain its mechanism.
25. Explain the synthesis of amino acid by (i) Strecker and amidomalonate synthesis.
26. What are vitamins? How are they classified? Write the structure of Vitamin A and C.
27. What is tacticity? Explain it by taking poly propylene as an example.
28. What is Bakelite? How is it prepared? Give its important applications.
29. Write a short note on the structure of DNA.
30. Discuss the mechanism of Reformatsky reaction.
31. Elucidate the structure of conine.

(6 X 4 =24marks)

SECTION – D

(*Answer **any2** question. Each question carries 15 marks*)

32. (a) Discuss the cycic structure of glucose
    (b) Briefly explain the structure of starch and cellulose.
    (c) (i) Why does glucose and fructose form same osazone?
    (ii) How does fructose reacts with the following reagents? (1) Na/Hg and H_2O (2) CH_3OH and dry HCl (3) Fehling's solution.
33. (a) Explain the Fischer-Indole synthesis.
    (b) What are sulphadrugs? Give examples. Explain the mode of action of sulpha drugs.
    (c) What are terpenes? How are they classified? Write the structure of limonene and menthol.

34. Write brief note on the following : (a) Replication of DNA
(b) Merrifield synthesis
(c) Structure of protein

35. (a) Explain the synthetic applications of ethyl acetoacetate.
(b) How Grignard reagent is prepared? Explain its importance in the synthesis of primary, secondary, tertiary alcohols and carboxylic acid.
(c) Explain the mechanism of cationic and anionic polymerization.

(15 X 2 = 30marks)

Core Course - X

19UCH643: PHYSICAL CHEMISTRY- III

No. of credits: 4 **No. of instructional hours per week: 4**

Total hours: 72

Course outcome

CO1: To provide an insight into the thermodynamic and kinetic aspects of chemical reactions and phase equilibrium

CO2: To get an understanding of the various electrochemical systems.

CO3: To provide a complete description of the basics of electrochemistry and its importance to modern industry and technology

CO4: To evaluate various types of reactions and the rate of chemical changes.

CO5: To study the phase diagrams of one, two and three component systems

Module I-Chemical Kinetics &Catalysis **12 hrs**

Order of reaction, Derivation of integrated rate equation of zero, first, second and nth order reaction, Determination of order of reactions- Fractional life-method, Isolation method.

Qualitative idea of Complex reactions:- (a) opposing reactions (b) first order consecutive reactions (c) parallel reactions (d) chain reactions.

Influence of temperature on rate of reaction: Arrhenius equation, Determination of Arrhenius parameter, Energy of activation and its significance. Collision theory, Derivation of the rate equation for a second order reaction based on collision theory, unimolecular reactions- Lindemann mechanism, steady state approximation.

Types of catalyst, specificity and selectivity, mechanisms of catalyzed reactions at solid surfaces; effect of particle size and efficiency of nanoparticles as catalysts. Enzyme catalysis, Michaelis-Menten mechanism, acid-base catalysis.

Module II-Chemical and Ionic Equilibria **12 hrs**

Equilibrium constant and free energy, Thermodynamic derivation of law of mass action, relation between Kp,Kc and Kx.

Le-Chatelier's Principle – Application in Haber process and dissociation of PCl_5.

Reaction isotherm, Temperature dependence of equilibrium constant, Pressure dependence of equilibrium constant, Application of Clausius-clapeyron equation in physical equilibria.

Ionic equilibrium : Ionic product of water, Effects of solvents on ionic strength, levelling effect, Pka and Pkb values, solubility product and common ion effect and their applications.

Buffer solution, buffer action, pH of buffer solution- Henderson's equation, buffer capacity Hydrolysis of salts of all types, degree of hydrolysis and hydrolytic constant, determination of degree of hydrolysis, relation between hydrolytic constant and ionic product of water

Module III-Phase Equilibria **12 hrs**

Phase Equilibria:-Terminology, the phase rule, thermodynamic derivation of phase rule and its application to (a) water system (b) sulphur system (c) solid-liquid equilibria involving simple eutectic system such as Pb-Ag system, KI-water system, freezing mixtures, thermal analysis and desilverisation of lead (d) solid-liquid equilibria involving compound formation with congruent and incongruent melting points:- $FeCl_3$- H_2O system and Na_2SO_4-H_2O system (e) solid–gas system- decomposition of $CaCO_3$, dehydration of $CuSO_4$ $5H_2O$, deliquescence and efflorescence.

Module IV-Binary Liquid Systems **12 hrs**

Liquid-Liquid system:- Completely miscible, ideal and non-ideal mixtures, Raoult's law, vapour pressure-composition and temperature-composition curves, fractional distillation, deviation from Raoult's law, Azeotropic mixtures, partially miscible liquid system, critical solution temperature, Conjugate layers, example for upper, lower and upper cum lower CST,

Introduction to three component system, distribution law, its thermodynamic derivation, limitations of distribution law, application of distribution law to the study of association and dissociation of molecules, solvent extraction. (9hrs)

Photochemistry:Grothus-Draper, Beer- Lambert and Stark- Einstein laws, Quantum yield, Reason for very low and very high quantum yields, Rate equation for decomposition of hydrogen iodide, Role of photochemical reactions in biochemical processes, photostationary states, Fluorescence and phosphorescence, chemiluminescence and photosensitization, Explanation and examples .

(3hrs)

Module V-Electromotive Force **12 hrs**

Electrochemical cells(brief explanation) Reference electrodes-standard hydrogen electrode, calomel electrode, Types of electrodes-Metallic electrodes, anion reversible electrodes and redox electrodes, Electrode reactions and cell reactions, Derivation of Nernst equation for electrode potential and cell potential, Gibb's Helmholtz equation and EMF of a cell, calculation of ΔG, ΔH and ΔS from EMF data. Concentration cells with and without transference, electrode and electrolyte concentration cells, derivation of equation for the EMF of concentration cells with and without transference, Liquid Junction Potential. Introduction to over voltage and polarization. Applications of potential measurement:-Determination of ionic product of water, hydrolysis constant and solubility product, pH value using quinhydrone and glass electrode, potentiometric titrations of acid-base and redox reaction.

Module VI-Electrical Conductance **12 hrs**

Inter ionic attraction theory, Debye-Huckel-Onsager equation (Qualitative treatment only) activity and activity coefficient of electrolytes, Kohlrausch's law and its applications , Wein effect, Debye-Falkenhagen effect, Walden's rule. Ionic mobilities:- Transference number and its determination by Hittorff's and moving boundary methods, abnormal transference numbers, Applications of conductivity measurements:- Determination of degree of dissociation of weak electrolytes, degree of hydrolysis, solubility of sparingly soluble salts, conductometric titrations involving strong acid - strong base, strong acid-weak base, weak acid- strong base, weak acid-weak base and precipitation.

Fuel cells :- Hydrogen-Oxygen fuel cell, Hydrocarbon – Oxygen fuel cell Primary-Mercury cell, Dry cell and secondary cells –Lead acid cell, Li-ion cell Corrosion, Prevention of corrosion .

At least 100 problems are to be worked out from all units together. 30% of the questions for Examination shall contain problems.

References:

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2. Elements of Physical Chemistry ,Glasstone and Lewis,Macmillan, 1963.
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MODEL QUESTION PAPER
19UCH643: Physical Chemistry – III

Time: 3 Hrs **Total marks: 80**

Section A
Answer all the questions Each question carries 1 mark

1. Give the Arrhenius equation.
2. Write the integrated rate equation for a first order reaction.
3. Give the relation between hydrolytic constant, dissociation constant and ionic product of water of a salt of strong acid and weak base.
4. The solubility of AgCl in water at 25 ^{o}C is 0.00179 g/L. calculate its solubility product at 25 ^{o}C.
5. Write Debye- Huckel- Onsagar equation.
6. Write the reduced phase rule equation.
7. Give an example for a system having upper cum lower CST.
8. Give the Nernst equation for the potential of a copper electrode.
9. What is meant by quantum yield of a photochemical reaction?
10. Represent the electrochemical cell formed when Zn electrode is coupled with Ag electrode.

Section B

Each question carries 2 marks (Short answer) .**Answer any 8 questions**

11. Define buffer solution and buffer index .
12. Define the term activation energy. Why different reactions proceed at different rates?
13. Give one example each for a consecutive and a parallel reaction
14. What is meant by common ion effect? Explain with an example.
15. Describe with example (i) Triple point (ii) Eutectic point
16. Explain the term congruent melting point with an example
17. Write a note on conductometric titration of acetic acid against sodium hydroxide?
18. What is Debye Falkenhagen effect?
19. How will you construct a calomel electrode?
20. What is meant by liquid junction potential? How can it be almost eliminated?
21. What are azeotropes ? Explain with an example.
22. What is critical solution temperature? How does it vary by the addition of an electrolyte?

Section C

Each question carries 4 marks (Short essay). **Answer any 6 questions**

23. The rate constant of a second order reaction is 5.70 x 10^{-5} dm^3mol^{-1} S^{-1}at 25 ^{o}C and 1.64 x $10^{-4}dm^3$ mol^{-1} S^{1}at 40 ^{o}C. Calculate the activation energy and the Arrhenius preexponential factor.
24. What would be the pH of a solution obtained by mixing 5 g of acetic acid and 7.5 g of sodium acetate and making the volume equal to 500 ml? Dissociation constant of acetic acid at 25 ^{o}C is 1.75 x 10^{-5}.
25. Explain the principle of freezing mixture by taking KI – H_2O system as an example.
26. State and explain Nernst distribution law. What are the limitations of the law?
27. What are fuel cells? Describe H_2 – O_2 fuel cell and its cell reactions.
28. Derive Clausius- Clapeyron equation and mention its applications .
29. Explain the terms (i) Fluorescence (ii) Phosphorescence
30. write an note on the role of photochemical reactions in biochemical processes.
31. What are the laws of photochemistry , explain ?
32. Explain the phase diagram of Pb-Ag system.

Section D

Each question carries 15 marks (essay) **Answer any two question**

33. a) using Le Chatliers Principle, describe the effect of temp, pressure and concentration for the following systems in equilibria:

$N_2 + 3H_2 \leftrightharpoons 2NH_3$ $PCl_5 \leftrightharpoons PCl_3 + Cl_2$

(5 x 3 = 15 marks)

b) Give the applications Nernst distribution law.

c) Elaborate on azeotropic mixtures.

34. a) How will you determine the transport number of ions using Hittorf method? (10 marks)
    b) Give the construction and working of SHE. (5 marks)
35. a) Derive van't Hoff equation for temperature dependence of equilibrium constant. (10 marks)
    b) The equilibrium constant for a reaction is 1×10^5. Calculate the standard free energy change for the reaction in kilojoules at 25 ^oC (5 marks)
36. a)What is meant by CST. Explain different types of CST with examples (5 marks)
    b) Discuss various types of concentration cells. (10 marks)

Elective Course

19UCH661.4: BIOCHEMISTRY

No. of credits: 2 **No. of instructional hours per week: 3**

Total hours: 54

Course outcome

CO1: To provide an insight into the circulatory system
CO2: To provide an idea about respiratory system
CO3: To impart knowledge about kidney function
CO4: To study about food, its nutritional value and digestion
CO5: To acquire knowledge about the chemical techniques used in biology

Module I- Blood 9 Hrs

Constituents of blood cells and plasma, plasma proteins, albumin and globular - lipoproteins, functions (Details not expected), Hemoglobin – Structure & functions, Blood O_2 dissociation curve, Abnormal hemoglobin- Sickle Cell anaemia, MetHb, Thalassemia.
Blood Coagulation - Coagulation factors, Mechanism

Module II- Respiration 9 Hrs

Respiration - Need for respiration, Organization of the pulmonary system , Steps in respiration(Explanation required) Mechanism of respiration- aerobic & Anaerobic,
Respiratory diseases- Chronic Obstructive Pulmonary Disease (COPD), Brochintis, Pneumonia, Lung cancer

Module III- Kidney Function 9 Hrs

Body water balance, buffers in blood, Formation of Urine, Kidney function, Renal Threshold, Constituents of Urine, diseases associated with Kidney function

Module IV -Nutrition 9 Hrs

Defining Nutrition, role of nutrients , Importance of Balanced diet, Measurement of Energy Value of food , Calorific value, caloric requirement, Kilocalorie. Basal metabolic rate (BMR):-Significance, Condition, factors , measurement

Module V- Digestion and Absorption of Food 9 Hrs

Outline study of digestion and absorption of Carbohydrates, proteins, fats and enzymes involved , composition and functions of bile - Bile pigments, Bile acids, Bile salts.

Module VI- Biochemical Techniques 9 Hrs

Chromatographic methods - Ion exchange, adsorption paper, TLC, GLC, affinity, Applications of Chromatography, Gel filtration Electrophoresis-paper, gel, ultracentrifugation.

REFERENCES

1. AC Guyton, JE Hall “Text Book of Medical Physiology”, Elsevier, 2005.
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6. B. Srilakshmi, “Nutrition Science”, New Age International, 2006.

MODEL QUESTION PAPER
19UCH661.4: Biochemistry

Time: 3 hours **Maximum marks: 80**

Section A.

Answer all questions (maximum two sentences each question carries 1 mark)

1. What is the normal pH of arterial blood?
2. What is the cause of sickle cell anemia?
3. Give an example for plasma protein.
4. What are anticoagulants?
5. Define BMR?
6. What is the renal threshold value of glucose?
7. What is NPN?
8. What is the calorific value of fat?
9. Name the bile pigments.
10. What is GLC?

(10x1=10 marks)

Section B

Answer any eight, each question carries 2 marks

11. Define renal threshold and its significance?
12. What are the normal constituents of urine?
13. What are the different types of hemoglobin?
14. Write a short note on protein digesting enzymes.
15. Draw the structure of heme
16. What are the constituents of blood?
17. What are the functions of plasma protein?
18. What is difference between plasma and serum?
19. What is adsorption chromatograpy?
20. What is the composition of bile?
21. Write about abnormal hemoglobin.
22. Discuss about ion exchange chromatography.

(8 x 2 = 16 marks)

Section C

Answer any six each question each question carries 4 marks

23. Explain Oxygen dissociation curve and factors affecting its shift.
24. Describe gel electrophoresis.
25. Explain thin layer chromatography.
26. Explain briefly the buffers in blood.
27. Give an account of diseases affecting kidney function.
28. Discuss about ultracentrifugation.
29. Discuss the physiological events involved in the transport of oxygen and carbon dioxide.
30. Describe briefly about the various blood cells.
31. Briefly explain about lipoproteins and their functions.

(6 x 4 = 24 marks)

Section D

Answer any two (essay) Each question carries 15 marks

32. Discuss about (i) Coagulation factors (ii) Anticoagulants (iii) Mechanism of blood clotting.
33. Discuss about the principle procedure and applications of (i) SDS PAGE (ii) Affinity chromatography (iii) Gel filtration chromatography
34. Describe (i) Body water balance (ii) Functions of kidney (iii) Formation of urine.
35. Discuss about the digestion and absorption of (i) Carbohydrate (ii) Protein (iii) Fat

(15 x 2 =30 marks)

For all Lab courses scheme of ESE is decided by the board examiners in each year

First Degree B.Sc Programme in Chemistry Lab course Semester II,
PART B. LABORATORY
COMPUTER LABORATORY

[No ESA for this component]

Computer Lab based instruction on the use of computer and internet in learning. Use of educational softwares, information mining from internet and using INFLIBNET/NICNET, NPTEL and VIRTUAL LABS OF MHRD. Word processing and document preparation. Use of Spread sheets in Data handling and presentation. Introduction to chemical structure drawing, visualization of molecules using chemistry softwares.

Core Course - IV

19UCH442: Lab Course I

Three hours examination in semester IV. (Credit 2)

Course outcome

CO1: To provide an insight into the Qualitative Analysis (Micro Analysis)
CO2: To get an understanding of the Inorganic Preparations
CO3: To provide a complete description of the reactions of the radicals with a view to their identification and confirmation
CO4: To acquire the skill of systematic qualitative analysis by microscale methods of a mixture containing two acidic and two basic radicals
CO5: To acquire the skill of handling chemicals and laboratory equipments.

I. Qualitative Analysis (Micro Analysis)

a. Studies of the reactions of the following radicals with a view to their identification and confirmation: Pb^{2+}, Cu^{2+}, Bi^{2+}, Cd^{2+}, Sn^{2+}, Sb^{2+}, Fe^{2+}, Fe^{3+}, $Al^{3}+$, $Cr^{3+,}$ Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, K^{+}, NH^{4+}, CO_3^{2-}, S^{2-}, NO_2^{-}, NO_3^{-}, F^{-}, Cl^{-}, Br^{-}, I^{-}, BO_3^{-} , acetate, oxalate, CrO_4^{--}, PO_4^{-} and SO_4^{2-}.
b. Systematic qualitative analysis by microscale methods of a mixture containing two acidic and two basic radicals from the above list (not more than one interfering radical).

II. Inorganic Preparations

The following preparations are to be done:-

a. Potash alum
b. Hexamine cobalt
c. Chloride
d. Tetramine copper
e. Sulphate
f. Mohr's salt
g. Microcosmic salt
h. Sodium cobalti nitrate
i. Sodium nitro pruside
j. Manganese phthalocyanin
k. Potassium trioxalatochromate and
l. Potassium trioxalatoferrate

Core Course - VIII

19UCH544: Inorganic Volumetric Analysis (Lab Course Number II) and

Core Course - IX

19UCH545: Physical Chemistry Experiments (Lab Course Number III)

Six hours examination in semester V

No. of credits: 3+2

Course outcome

CO1: To provide an insight into Inorganic Volumetric analysis and Physical Chemistry experiments.
CO2: To get an understanding of the ***one burette titration and t***o acquire the skill of accuracy and precision in experimentation.
CO3: To experimentally verify the theoretical concepts studied.
CO4: To acquire the skill to handle burette, pipette and other volumetric equipments.
CO5: To learn the use of softwares and programmes in the physical chemistry experiments

Inorganic Volumetric analysis- one burette titration only

(a) Acidimetry and alkalimetry

Preparation of carbonate free sodium hydroxide. Use of constant boiling hydrochloric acid Titrations using (1) Strong acid – strong base (2) Strong base – weak acid (3) Strong acid – weak base, determination of Na_2CO_3 and $NaHCO_3$ in a mixture by indicator method and NH_3 in an ammonium salt by direct and indirect methods.

(b) Permanganometry

The following determinations are to be done using standard permanganate solution (1) Ferrous iron (2) Oxalic acid (3) Hydrogen peroxide (4) Calcium (5) Nitrite and (6) MnO_2 in pyrolusite.

(c) Dichrometry

Determination of Ferrous iron using internal (& external indicator) and Ferric iron after reduction with SnCl2.

(*d) Cerimetry*

Standardisation of ceric ammonium sulphate with Mohr's salt. Determination of oxalic acid using ceric ammonium sulphate.

(e) Iodometry

Standardisation of thiosulphate using KIO_3, electrolytic copper and potassium dichromate. Determination of a copper salt.

(f) Precipitation titration

Determination of chloride in neutral medium.

(g) Complexometry (using EDTA)

Standardisation of EDTA solution with $ZnSO_4$ – determination of Zn, Mg, Ni and Ca – determination of permanent and temporary hardness of water.

Physical Chemistry Practicals

The following experiments are to be done :
Determination of

1. 1.Partition coefficient of iodine between CCl_4 and H_2O or Partition coefficient of ammonia between $CHCl_3$ and H_2O
2. Transition temperature of a salt hydrate. Molar mass of a solute using transition point depression of a salt hydrate.
3. Depression in freezing point of a solid solvent by cooling curve method. Molar mass of a solute.
4. Critical solution temperature of phenol – water system.
5. Viscosity of binary mixtures and then concentration of an unknown mixture.
6. Surface tension of binary mixtures and then concentration of an unknown mixture.
7. Refractive indices of KCl solutions of different concentrations and then concentration of an unknown KCl solution.
8. Conductometric titration of NaOH vs HCl.
9. Potentiometric titration of Fe^{2+} vs $Cr_2O_7^{2-}$

10. Potentiometric titration of $KMnO_4$ vs KI
11. Determination of water equivalent of a calorimeter and heat of neutralisation of strong acid – strong base.
12. Kinetics of hydrolysis of an ester
13. Influence of KCl impurity on miscibility temperature of phenol – water system and then the determination of concentration of a given KCl solution.

2. COMPUTER SOFTWARE

Use of softwares and programmes in the physical chemistry experiments

1. Computer software like Scilab, Excel, etc to solve some of the plotting or calculation problems.
2. Determination of equivalence point of potentiometric and conductometric titrations using spreadsheet program.
3. Data analysis of kinetic experiments using spreadsheet program (determination of rate constant)
4. Plot scatter diagram.
5. Basic idea of software like Chemsketch or Chemdraw (any freely available structure drawing softwares)
6. Draw the structure of molecules using above mentioned software. (Take prints and paste in the physical chemistry record)

Core Course-XIII

19UCH644: Organic Chemistry Experiments (Lab Course IV) and

Core Course-XIV

19UCH645 Gravimetry (Lab Course V)

Six hours examination in semester VI

No. of credits: 3+2

Course outcome

CO1: To provide an insight into micro scale experiments in Organic Analysis which reduces uses of chemicals
CO2: To acquire the skill of accuracy and precision in experimentation.
CO3: To experimentally determine the physical constants of organic compounds
CO4: To learn more about chromatography and colorimetric techniques
CO5: To obtain skill in handling costly apparatus used in gravimetry

I. **Organic Chemistry Practicals (micro scale)**

1. Tests for elements : Nitrogen, halogens and sulphur
2. Determination of physical constants
3. Studies of the reactions of common functional groups using known organic compounds.
4. Qualitative analysis with a view to characterization of the functional groups. The following compounds may be given for the analysis : chlorobenzene, benzyl chloride, phenol, o – m – p – cresols, naphthols, resorcinol, benzaldehyde, acetophenone, benzophenone, benzoic, phthalic, cinnamic and salicylic acids, ethyl benzoate, methyl salicylate, benzamide, urea, aniline, o – m, p – toluidines, dimethylaniline, nitrobenzene, o – nitro toluene p – nitro toluene, m – dinitrobenzene, naphthalene, anthracene, glucose and sucrose.
   Organic preparations involving halogenation, nitration, oxidation, reduction, acetylation benzoylation, hydrolysis and diazotisation (TLC of the reactant and Product) . Isolation of an organic compound from a natural source eg. Hippuric acid from cow's urine.
5. Chromatography
   a. Paper chromatographic separation of mixture of nitroanilines, amino acids and sugars
   b. Separation of a mixture of dyes by column chromatography.
6. Organic estimation
   a. Molar mass determination of an acid and base by titration method
   b. Determination of the phenol/aniline by bromate – bromide method
   c. Determination of the equivalent mass of an ester

II Gravimetry

The following determinations are to be done using silica crucible (1) Ba as $BaSO_4$ (2) Sulphate as $BaSO_4$ (3) Iron as Fe_2O_3 (4) Calcium as $CaCO_3$ (5) Aluminium as Al_2O_3 and Magnesium as $Mg_2P_2O_7$.
The following determinations are to be done using sintered crucible
(1) Magnesium as oxinate (2) Nickel using dimethyl glyoxime (3) Copper as copper thiocyanate and (4) Silver as silver chloride

Colorimetry (Using photo electric colorimeter)

Determination of Iron using thiocyanate and ammonia using Nessler's reagent.

REFERENCE

1. A.I.Vogel, "A text book of Qualitative Analysis including semi micro methods" Pearson Education, 2012.
2. V.V.Ramanujam, "Inorganic Semi micro Qualitative Analysis", National Publishing Company, Madras, 1974.
3. E.S.Gilreath "Qualitative Analysis using semi micro method" Mc Graw Hill, 1954.
4. A.I.Vogel, "A text book of Qualitative Inorganic Analysis" Pearson education, 2012.
5. A.I.Vogel, "Elementary Practical Organic Chemistry" Pearson education, 2010.
6. Day and Raman, "Laboratory Mannual of Organic Chemistry". Viswanathan, 1996.
7. Mann and Saunders, "Practical Organic Chemistry", Pearson, 2009.
8. A. Findlay, "Practical Physical Chemistry", Longman, London, 1966.

9. R. C. Das and E. Behara, “Experimental Physical Chemistry”, McGraw Hill, US, 1984.
10. N.K.,Vishnoi, “Advanced practical organic chemistry” Vikas publishing house, New Delhi, 2009.

The practical examinations of Lab course II (volumetric analysis), Lab course III (physical chemistry experiments) are conducted at the end of V semester with a duration of 6 hours. Lab course IV (organic analysis), Lab course V (gravimetric analysis) are conducted at the end of VI semester with a duration of 6 hours.

Semester V and VI

19UCH646: Chemistry Project and Factory visit

Total ESE marks-100- (No CE marks)

Project

No. of credits: 4

Course outcome

CO1: To develop an aptitude for research in chemistry
CO2: To inculcate proficiency to identify appropriate research topic
CO3: To learn research methodology and literature search
CO4: To acquire the skill of accuracy and precision in experimentation.
CO5: To obtain skill in presentation of the topic

Specifications

Topics of chemical interest can be selected for the project. Project is to be done by a group not exceeding 5 students. Every student should submit typed (A4 paper, 12 Font, 1.5 Space, 20- 30 pages), spirally bind project report duly attested by the supervising teacher and the Head of the Department on the day of practical examination before a board of two Examiners for ESE. The viva-voce based on the project is conducted individually. Project topic once chosen shall not be repeated by any later batches of students. List of projects submitted year wise is to be maintained in a register and submitted before the examiners if requested.

The project report may contain the following sections:

1. Preliminary (Title page, declaration, certificate of the supervising teacher, content etc.)
2. Introduction with relevant literature review and objective
3. Materials and Methods
4. Results
5. Discussion
6. Conclusion / Summary 7. References.

Study tour and Factory/ research institute visit

Students are directed to visit one research institute/ chemical factory preferably with in the state of Kerala. Scientifically prepared hand written study tour report along with photographs of candidate at the places of visit must be submitted by each student for ESE on the day of the examination of project evaluation.

The board of examiners can decide the scheme of evaluation of project , study tour report and viva voce