



Fatima Mata National College (Autonomous) Kollam

Scheme & Syllabus of
First Degree Programme in Polymer Chemistry
2019 Admission Onwards

B.Sc. Degree Programme in Polymer Chemistry
Table I: Course Structure, Scheme of Instruction and Evaluation

Semester	Course Code	Study Component	Instructional Hours/ Weeks		Credits	Duration of Uty Exam	Evaluation (Marks)		Total Credits
			T	P			CE	ESE	
I	19UEN111.1	English I	5		4	3 hours	20	80	18
	111.1	Additional Language I	4		3	3 hours	20	80	
	19UEN121	Foundation Course I	4		2	3 hours	20	80	
	19UPH131.2	Complementary Course I (Physics-I)	2		2	3 hours	20	80	
		Complementary Course lab of 19UPH131.2		2					
	19UMM131.2	Complementary Course-II (Maths-I)	4		3	3 hours	20	80	
	19UPO141	Core Course I	2		4	3 hours	20	80	
		Core Course lab I of 19UPO141		2					
II	19UENS211	English -II	5		4	3 hours	20	80	18
	19UEN212.1	English -III	4		3	3 hour	20	80	
	211.1	Additional Language II	4		3	3 hours	20	80	
	19UPO221	Foundation Course II	2	2	3	3 hours	20	80	
	19UPH231.2	Complementary Course III (Physics-II)	2		2	3 hours	20	80	
		Complementary Course Lab of 19UPH231.2		2					
	19UMM231.2	Complementary Course IV (Maths-II)	4		3	3 hours	20	80	
III	19UEN311.1	English IV	5		4	3 hours	20	80	18
	311.1	Additional Language III	5		4	3 hours	20	80	
	19UPH331.2	Complementary Course V (Physics-III)	3		3	3 hours	20	80	
		Complementary Course lab of 19UPH331.2		2					
	19UMM331.2	Complementary Course-VI (Maths-III)	5		4	3 hours	20	80	
	19UPO341	Core Course II	3		3	3 hours	20	80	
		Core Course lab II of 19UPO341		2					

IV	19UEN411	English -V	5		4	3 hours	20	80	24
	411	Additional Language IV	5		4	3 hours	20	80	
	19UPH431.2	Complementary Course VII (Physics-IV)	3		3	3 hours	20	80	
	19UPH432.2	Complementary Course VIII-physics Lab of 19UPH131.2, 19UPH231.2, 19UPH331.2 & 19UPH431.2		2	4	3 hours	20	80	
	19UMM431.2	Complementary Course IX (Maths-IV)	5		4	3 hours	20	80	
	19UPO441	Core Course III	3		3	3 hours	20	80	
	19UPO442	Core Course IV - Chem Lab I & II of 19UPO141, 19UPO341 & 19UPO441		2	2	6 hours	20	80	
V	19UPO541	Core Course V	3		3	3 hours	20	80	18
	19UPO542	Core Course VI	4		4	3 hours	20	80	
	19UPO543	Core Course VII	4		4	3 hours	20	80	
	19UPO544	Core Course VIII Lab III		6	3	3 hours	20	80	
	19UPO545	Core Course IX Lab IV		3	2	3 hours	20	80	
	19UPO551	Open Course	3		2	3 hours	20	80	
		Project		2					
VI	19UPO641	Core Course X	3		3	3 hours	20	80	24
	19UPO642	Core Course XI	4		4	3 hours	20	80	
	19UPO643	Core Course XII	4		4	3 hours	20	80	
	19UPO644	Core Course XIII Lab V		2	3	3 hours	20	80	
	19UPO645	Core Course XIV Lab VI		6	4	3 hours	20	80	
	19UPO661	Elective Course	3		2	3 hours	20	80	
	19UPO646	Project and Factory Visit		3	4	Viva-voce	-	100	

A) Language Courses = 9, B) Foundation Courses = 2

C) Complimentary 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 Credit = 18+18+18+24+18+24 = 120.

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 of 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 EVALUATION 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

1.2.3. 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 quiz 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

Question No	Type of 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 = 80-80 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.

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

B. Sc Polymer chemistry programme specific outcome

1. B. Sc Polymer chemistry course is beneficial to pursue further studies such as M.Sc, M. Phil and Ph. D course.
2. Polymer chemists tend to work in manufacturing, testing and design for substances such as paint and industrial organic chemicals.
3. Candidates also have career paths in defence and aerospace industries.
4. They can also find employment opportunities in various polymer related industries.
5. Emphasize the scientific method which has helped in solving problems.
6. Make aware of those aspects of science that are environmental based and life centered.
7. Train students in the use of equipments in chemistry laboratories.

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'estchanteur. C'estchanteur du groupe U2.
 - Qui est Nicolas Sarkozy ?
 - C'estprésident de la France.
 - Comment s'appelleguide de groupe ?
 - Elle s'appelle Marie.
12. Complétez avec « à, au, en » :
 - Où habite Adriano ?.....Brésil ?Argentine ?
 - Il habiteSao 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 pyramideLouvre.
 - b. Le nom.....étudiant.
 - c. Un tableauMonet.
 - d. Un professeuruniversité 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 :
- Marie parle français.
 - Je parle italien.
 - Vous comprenez l'italien ?
 - Melissa connaît Florent.
20. Ecrivez les numéros en lettres :
- 18
 - 25
 - 30
 - 12
21. Quelle est leur nationalité ?
- Céline Dion
 - 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 :
- Vous êtes français ?
 - Vous parlez bien français ?
 - Vous comprenez le mot « Bonjour » ?
 - Vous habitez à Paris ?
24. Conjuguez les verbes :
- Ils (parler) français.
 - Nous (connaître) Marseille.
 - Je (être) secrétaire du festival.
 - Elles (comprendre) bien italien.
25. Complétez avec le masculin et le féminin :
- Un étudiant -
 - Un Brésilien -
 - Une artiste -
 - Un acteur – une
26. Accordez le group du nom :
- Les [bon] [restaurant]
 - Les [grand] [voiture]
 - Les [femme] [beau et célèbre]
 - 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'aiamis à Aix-en-Provence. Je connaisprofesseurs de français deuniversité etdirecteur 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 goûts. 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 Agarwal
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 के लिए इसे छोड़ दो। तुम्हारे पैरों पड़ती हूँ।" यह किसने किससे किस अवसर पर कहा?
13. गोपाल ने अंडा खाने के लिए 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 पड़ा?
17. कविवर टैगोर ने अंग्रेजी 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 हजार 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 दीजिए?
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 तत्त्वों 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 വിശകലനത്തിനും 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 - ഉണ്ണിയാർച്ചകുത്ത് കാണാൻ പോയ കഥ(ആറ്റുംമണ
മേലേ വേഗത്തിൽ പോകുന്നു ഉണ്ണിയാർച്ച)
3. കുമാരനാശാൻ - ചണ്ഡാലഭിക്ഷുകി - (തുമതേടും....തെല്ലിട സുന്ദരി 96 വരി)

മൊഡ്യൂൾ 2 (18 മണിക്കൂർ) കവിത്രയാനന്തര കവിത

4. ചങ്ങമ്പുഴ - മനസിനി
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 മൂലപ്പാൽ കുടിക്കരുത്
13. ശ്രീകുമാരൻതമ്പി - അമ്മയ്ക്കൊരു താരാട്ട്
14. എ. അയ്യപ്പൻ - നിനക്ക്
15. റോസ്മേരി - ചാഞ്ഞുപെയ്യുന്ന മഴ
16. റഫീക്ക് അഹമ്മദ് - മൊബൈൽഫോൺ
17. വി.എം. ഗിриജ - 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
ഉയർന്നശീരുകൾ - 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 പിതാവിവരെയുപേക്ഷിച്ചാൻ"-വിവക്ഷിതമെന്ത്?
12. "പെണ്ണായ ഞാനും വിറയ്ക്കുന്നില്ല-
ആണായ നിങ്ങൾ വിറപ്പതെന്തേ?" - ആരുടേതാണീ വാക്കുകൾ?
13. "അല്ലെല്ലെന്തു കഥയിതു കഷ്ടമേ?" - വിവക്ഷിതം വ്യക്തമാക്കുക.
14. ഒറ്റപ്പത്തിയൊടായിരമുടലുകൾ
കെട്ടുപിണഞ്ഞൊരു മണിനാഗം" - പരാമർശമെന്ത്?

PTO

15. “സങ്കടം കാൺകിലും കാണാതെ പോകയോ
മംഗലേ നീയൊരു മങ്കയല്ലേ?” - സന്ദർഭമേന്ത്?
16. “നിങ്ങൾക്കിതൊന്നും മനസ്സിലാകുന്നില്ല” - ഈ ഉപഹാസത്തിന്റെ അർത്ഥമെന്ത്?
17. ‘ഒരു തൈ നടുബോൾ’ എന്ന കവിതയുടെ പ്രമേയമെന്ത്?
18. ‘വരളുന്ന ചുണ്ടിലെ നനവാർന്ന ഓർമ്മ’യെന്നു കവി വിശേഷിപ്പിച്ചതെന്തിനെ?
19. “അന്യോന്യമുന്നു വടികളായ് നിൽക്കാം” - വിവക്ഷിതമെന്ത്?
20. ‘പുതനാമന്ത്രം പുറണ്ടതായി’ 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 മനസ്സിലാക്കിയെ ആസ്പദമാക്കി വിശദീകരിക്കുക.
26. ജനങ്ങളിൽ പുതിയ കർമ്മവീര്യം ഉണർത്തുന്നതാണ് ഇടശ്ശേരി കവിതകൾ. പുത്തൻ കലവും അതി വാളും ആസ്പദമാക്കി വിചിന്തനം ചെയ്യുക.
27. സുഗതകുമാരി കവിതകളിലെ ബിംബകല്പന കാളിയമർദ്ദനത്തെ ആസ്പദമാക്കി വിശകലനം ചെയ്യുക.
28. കുഞ്ഞേ മൂലപ്പാൽ കുടിക്കരുത് ഉണർത്തുന്ന സാമൂഹ്യമായ വെല്ലുവിളികൾ പരിശോധിക്കുക.
29. അമ്മയ്ക്കൊരു താരാട്ട് എന്ന കവിതയ്ക്ക് ഒരു ലഘു ആസ്വാദനം തയ്യാറാക്കുക.
30. റഫീക്ക് അഹമ്മദിന്റെ കവിതകളിലെ സമകാലീന ബിംബങ്ങൾ പരിശോധിക്കുക.
31. ചുഷണം 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 Chullikkad

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	: Dr Ajeesh PR and Adolescents
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
19UPO141: Inorganic Chemistry- I

Credits-4

36 hours

COURSE OBJECTIVE

The objective of this course is to teach the students the principles of modern theory of atomic structure, periodic properties of elements, occurrence and isolation of elements, chemical bonding, nuclear chemistry and analytical principles.

COURSE OUTCOME

On completion of the course the learners get through a knowledge on the basics of atomic structure, chemical bonding and periodic properties. And also enable the student to aware of various aspects of radioactivity and the various factors affecting environmental pollution.

COURSE TRANSACTION FORMAT

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

COURSE SYNOPSIS

Introduction to atomic structure, electronic configuration and periodic properties; Basic idea of occurrence and isolation of elements; Types of bonds-introduction to V.B., M.O. and VSEPR Theories, Introduction to nuclear chemistry, Environmental chemistry (air, water and soil pollution).

COURSE CONTENT

Module I (Modern theory of atomic structure)

6 hours

Introduction to wave mechanics: Dual nature of electron, Heisenberg's uncertainty principle and its significance, Wave mechanical concept of the atom, Schrodinger wave equation for a particle in one dimensional box and its solution. (no derivation), Radial and angular function, significance of orbital concept, Quantum numbers - Pauli's exclusion principle, Aufbau principle, Hund's rule, extra stability of filled and half-filled orbital, shapes of orbital, classification of elements into s, p, d and f blocks

Module II (Periodic properties, occurrence and isolation of elements)

6 hours

Size of atoms & ions, ionization energies, electron affinity, electronegativity -Pauling, Mulliken, Allred & Rochow scale, horizontal vertical and diagonal relationship in the periodic table.

Occurrence & isolation of elements (brief idea)-general principles of extraction of metals, roasting, calcination. Importance of mineral sands of Kerala, Extraction of Ti from ilmenite, and uses of Titanium.

Module III (Chemical bonding I)

6 hour

Types of bonds, transition between the main types of bonding, General properties ionically & covalently bonded compounds, lattice energy, Born — Haber cycle, Fajan's rule, partial covalent character of ionic bond. Secondary bond forces - Van der Waal's forces, ion—dipole, dipole—dipole, ion—induced dipole and dipole - induced dipole interactions, Hydrogen bonds and their consequences, dipole moment and its application.

Module IV (Chemical bonding II)

6 hours

Covalent bond - Lewis theory, Sidgwick - Powell theory, VSEPR theory, V.B. theory (qualitative idea taking hydrogen as example), Hybridisation (explanation of structures of molecules such as SF_4 , ClF_3 , IF_7 , XeF_4 & XeF_6). Sigma & pi bonds, the extent of d orbital participation in molecular bonding, M. O. Method - s-p, p-p, p-d, d-d, and non-bonding combinations of orbitals, rules of LCAO, M.O. configuration of H_2^+ , He_2^+ , Li^{2+} , C_2 , N_2 , O_2 , O_2^- , F_2 , NO and CO, bond order.

Metallic bonding - general properties, qualitative idea of theories of bonding in metals - free electron theory, V.B. theory, and band theory.

Module V (Nuclear chemistry)

6 hours

Natural radioactivity, modes of decay, decay constant (Derivation not expected), half-life period, radioactive decay series, mass defect & binding energy, forces in the nucleus, ratio of neutrons to protons, Structure of nucleus - liquid drop model, shell model, artificial radioactivity, induced nuclear reactions -nuclear fission & nuclear fusion, atomic bomb, moderators. Types of reactor (general idea) HTR, water cooled thermal reactor,

fast breeder reactors, application of radioactive isotopes-radio carbon dating, rock dating, neutron activation analysis, solubility of sparingly soluble salt.

Module VI - Environmental Chemistry (Air, Water and Soil Pollution)

6 hours

Air pollution - ozone layer depletion, ozone hole, protection of ozone umbrella –Air pollution caused by fireworks, harmful effects of fireworks, acid rain, greenhouse effect, smog –Classic and photochemical Smog, management of air pollution.

Water pollution: Causes- Heat, industrial waste, sewage water, detergents, agricultural pollutants-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:

1. J. D. Lee .*Concise inorganic chemistry* , Blackwell science limited
2. SathyaPrakash, G. D. Tuli, Basil S. K. &Madan R. D. , *Advanced Inorganic Chemistry, (Vol. I)* ,S .Chand &Com .Lid.,New Delhi.
3. F.A .Cotton,P. L .Cans& G. Wilkinson, *Basic Inorganic Chemistry*, John Wiley & Sons.
4. R. Puri, L. R. Sharma & K .C .Kalia .*Principles of Inorganic Chemistry* ,Vallabh Publications .New Delhi
5. D. F. Shriver, P. W. Atkins &C .H .Langford, *Inorganic Chemistry*, Oxford Univ. Press
6. M .C. Day &Selbin , *Theoretical Inorganic Chemistry*Publishing corporation, New York
7. R .D.Madan .*Modern Inorganic Chemistry* , S. Chand &Company Ltd .New Delhi
8. S. K. Banerji, *Environmental Chemistry. Learning Pvt. Ltd, Delhi*
9. A. K. De, *Environmental Chemistry - An introduction. International Publishers*
10. B. K. Sharma, *Air Pollution*.Krishna Prakashan Media (P) Ltd.
11. V. K. Ahluwalia, *Environmental Chemistry*.2nd edition, Ane Book (P)Ltd.
12. G.W. vanLoon and S. J. Duffy, *Environmental Chemistry: A global perspective. 3rd edition Oxford University Press.*
13. Shyam Singh, *Chemistry(Vol- II) Inorganic Chemistry, Himalaya Publishing House*

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UP0141: INORGANIC CHEMISTRY-I

Time: 3 Hours

Maximum marks: 80

Section A

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

1. The quantum numbers $n=3$, $l=1$ correspond to which orbital?
2. State Pauli's exclusion principle.
3. Which has higher electron gain enthalpy-Fluorine or Chlorine?
4. What is the hybridization of Xe in XeF_4 molecule?
5. How lattice energy is related to solubility of an ionic crystal?
6. Based on VSEPR theory, predict the shape of NH_3 molecule
7. Name a naturally occurring radioactive element.
8. Define binding energy.
9. Write the reason for eutrophication?
10. In the stratosphere, fluorine from the CFC's change to which compound.

Section B

(Answer any 8 questions. Each question carries 2 marks.)

11. Distinguish between angular probability function and radial probability function
12. What do you understand by a node? How many nodes are there for a 3S orbital?
13. Write the actual electronic configuration of copper. Give reason
14. The size of inert gas atoms is larger than the corresponding halogen atoms. Why?
15. What is Mulliken's scale of electronegativity?
16. Explain diagonal relationship with an example.
17. What is bond order? Calculate the bond order of O_2^-
18. Name the energy changes to be considered in the formation of an ionic bond
19. Sketch the atomic and molecular orbitals of NO molecule
20. What are bonding and anti-bonding orbitals?
21. Explain the structure of ClF_3 molecule
22. Write a note on greenhouse effect.

Section -C

(Answer any 6 questions. Each question carries 4 marks.)

23. State Schrodinger equation and explain the terms in it and also bring out the significance of Ψ and Ψ^2
24. Comment on the extra stability of filled and half-filled orbitals
25. Account for the fact that there is a decrease in first ionization energy from Be to B and Mg to Al
26. Explain the principle involved in the electrolytic and chemical reduction methods in the isolation of elements
27. Briefly explain the major water pollutants.
28. Define dipole moment. How is it helpful in predicting the geometry of molecules?
29. Mention the rules governing in the linear combination of atomic orbital
30. A freshly cut piece of wood gives 16100 counts of β ray emission per minute per Kg and an old wooden bowl gives 13200 counts per minute per kg. Calculate the age of wooden bowl. Half-life period of carbon is 5568 years.
31. What is smog? What are the different types of smog?

Section D

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

32. (a) Discuss the arrangement of the elements in the periodic table
(b) State and explain VSEPR Theory. What are its limitations?
33. (a) Explain H-bonding. What are its consequences?
(b) Explain resonance by taking CO_3^{2-} and O_3 as examples
34. (a) Discuss the application of radioactive isotope in neutron activation analysis and solubility of sparingly soluble salt
(b) Briefly discuss about the various air pollutants
35. (a) Explain nuclear fission and nuclear fusion
(b) Write a note on Ozone depletion

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; complex conjugate; division), Polar representation of complex numbers (Multiplication and division in polar form), de Moivre's theorem (trigonometric identities; finding the n th roots of unity; solving polynomial equations), Complex logarithms and complex powers, Applications to differentiation and integration, Hyperbolic functions (Definitions; 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 $\cosh^{-1}x = \ln(\sqrt{x^2 - 1} + x)$.
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 $\cos 4\theta = 8\cos^4\theta - 8\cos^2\theta + 1$.
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 cardioid 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 $\hat{n} \cdot r = \rho$ and the sphere of radius centered on the point with position vector c .
 (b) Identify the surfaces
 i. $|r| = k$
 ii. $r \cdot u = 1$
 iii. $r \cdot u = m|r|$ 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 inertia 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 done 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 Å given $c=3 \times 10^8 \text{ ms}^{-1}$
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 rigidly 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 spot 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 $72 \times 10^{-3} \text{ Nm}^{-1}$.

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 its diameter (ii) about its 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 = 30 marks)

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, Resource 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 Water Cycle, 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 Arundhati 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 UP, 2001.
- Bahuguna, Sunderlal. "Environment and Education". The Cultural Dimension of Ecology. Ed. Kapila Vatsyayan. New Delhi: D.K. Printworld. 1998.
- Carson, 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, Carolyn. 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 F.P. 1971. Fundamentals of Ecology. W.B Saunders Co. USA 574p
- Rao. M. N and Dutta A.K. 1987. Waste Water Treatment. Oxford and IBH Publ Co Pvt.
- Wagner K.D. 1998. Environmental Management. W.B 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 fluent way. (Convert the underlined phrase into an adverb)
 2. He is known for his honesty. (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 **any six** 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 **any two** 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 habiteun 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 sontpersonnages ?
 - b. Je connais.....acteur. c'est Depardieu.
 - c. Etchanteuse, c'est Laurie.
 - d. Regardevisiteur. C'est un personnage de cire !

20. Complétez avec « moi, toi, lui, elle, nous, vos, eux, elles » :
- Flore fait du sport avec Pierre et Antoine ?
- Oui, elle fait du tennis avec
 - Flore habite chez Marie ?
- Oui, elle habite chez
 - Elle travaille pour M. Dumont ?
- Oui, elle travaille pour
 - Elle vient en vacances avec nous ?
- Oui, elle vient avec
21. Complétez avec « pouvoir, vouloir, devoir » :
- Tufaire du ski ?
- Je voudrais bien mais je nepas skier.
 - Et toi, Flore, tu viens ?
- Désolée. Je nepas. Jetravailler 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.
1992. Entrée à l'université.
 - Juin 1995. Diplôme de professeur d'anglais.
 - 25-08-1994. Rencontre avec William
 - 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. Après, je (rentrer) chez moi. »
24. Ecrivez l'heure :
- 09 :20
 - 15 :30
 - 16 :45
 - 00 :15
25. Trouvez les questions:
-? Non, Je n'ai pas compris.
 -? Non, Je n'ai pas lu le texte.
 -? Oui, J'ai travaillé bien.
 -? 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 :
- Est-ce que Tina est française ? Non, elle.....
 - Est-ce qu'elle parle bien français ? Non, elle.....
 - Est-ce qu'elle apprend le français ? Oui, elle
 - 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'île d'Oléron est magnifique. Laurent fait du gold. Moi, du vélo. On rencontre des gens sympas. Voulez-vous venir le week-end du 24 ? On a envie de découvrir deux ou trois restos avec vous. »
29. Complétez avec les adjectifs possessifs :
« Noémie montre des photos à Lucas »
- Regarde ! Voiciappartement à Laval.
 - Ici, c'est la maison de.....parents avecjardin.

- 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 connaît 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 visité la ville de Cannes. Vous écrivez une carte postale à 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 बाढ़ 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 छोड़ 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 लोमड़ी 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। गिड़गिड़ाकर बोला जब तक मदद न करेंगे, मेरी किताब लिखी नहीं जाएगी। मुझे दया आ गई कि आदमी शरीफ है और इस के लिए 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-रिवाजों 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 അവതരിപ്പിക്കാനുള്ള കഴിവാകുക.
3. ഭാഷാപരമായ പാകപ്പിഴകൾ പരിഹരിക്കുക, ഭാഷാശുദ്ധിനിലനിർത്തുക
4. വിവർത്തനത്തിൽ പ്രായോഗിക പരിശീലനം നൽകുക:
5. മാധ്യമ മലയാളത്തിൽ വിനിമയലോകം മനിലാക്കുക.
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 രണ്ട് (27 മണിക്കൂർ)

ചെറുകഥ

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

1. എനിക്ക് ആത്മഹത്യ ചെയ്യാൻ മതിയായ കാരണമില്ലയോ? - സി.വി. കുഞ്ഞിരാമൻ
2. പൊതിച്ചോറ് - കാരൂർ
3. കടൽത്തീരത്ത് - ഒ. വി. വിജയൻ
4. പത്രം - സക്കറിയ
5. ഹിഗ്ഗിറ്റ് - 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 ഉാകുന്നതരത്തിലുള്ള ബോധനസമ്പ്രദായം സ്വീകരിക്കുക. (സന്ദർഭവും സ്വാരസ്യവും വ്യക്തമാക്കുകയെന്നതരത്തിലുള്ള ചോദ്യത്തിനു നാലുകെട്ടിന്റെ ആദ്യനാലധ്യായം മാത്രമേ ഉപയോഗിക്കാവൂ)

വിശദപഠനം:

നാലുകെട്ട്: എം.ടി വാസുദേവൻ നായർ

റഫറൻസ് ഗ്രന്ഥങ്ങൾ

1. സമ്പൂർണ്ണ മലയാള സാഹിത്യ ചരിത്രം - എഡിറ്റർ പത്മന 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.രവീകുമാർ
14. നോവൽ പഠനങ്ങൾ - ഡോ.പത്മന രാമചന്ദ്രൻ നായർ
15. ചെറുകഥാ പഠനങ്ങൾ - ഡോ.പത്മന രാമചന്ദ്രൻ നായർ
16. കഥയും ഫാൻസിയും - ഡോ.വത്സലൻ വാതുശ്ശേരി
17. കഥയിലെ ആത്മീയസഞ്ചാരങ്ങൾ - ഡോ.ഇ. രമാഭായി
18. കഥ അനുഭവവും ആഖ്യാനവും - ഡോ.കെ.പി.അപ്പൻ
19. കഥയും ഭാവുകത്വപരിണാമവും - ഡോ.കെ.എസ് രവീകുമാർ
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. പത്മന രാമചന്ദ്രൻ നായർ
25. തെറ്റുംശരിയും - പ്രൊഫ. പത്മന 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. 'കുടല്പുരിന്റെ കഥാകാരൻ' എന്നറിയപ്പെടുന്നതാര്?
6. അസൂരവിത്ത് ആരുടെ നോവലാണ്?
7. 'വീഡിയോ ചിത്രങ്ങൾ' എന്ന കഥ എഴുതിയതാര്?
8. 'കുൾഡ്രിങ്' 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 കാർശ്ശേരി കണ്ടെത്തുന്ന അഭിപ്രായങ്ങൾ എന്തെല്ലാം?
17. തെറ്റുണ്ടെങ്കിൽ തിരുത്തുക.
1. പീഡനം 2. പ്രക്രിതി 3. അർത്ഥം 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. ആഗോളവൽക്കരണത്തെക്കുറിച്ച് 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 മഹത്വം മനസ്സിലാക്കാത്ത നിരൂപകരോട് അവർക്ക് വിദ്വേഷമാണ്, പൂച്ഛവുമാണ്.
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 - I
19UPO221: METHODOLOGY & INFORMATICS

Credits-3

72 hours

COURSE OBJECTIVE

One of the objectives of this course is to teach the students the principles of science and its methods, experimentation and data handling in Science. The course also aims at teaching the evolution of chemistry as a discipline of Science, giving an overview of information technology, introducing the applications of computer in polymer chemistry, introducing cheminformatics, and introducing the students to the use of educational software.

COURSE OUTCOME

This course will be able to provide a theoretical concepts of information technology, knowledge of disaster management, documentation of experiments and introduce various well known scientists in the field of chemistry. And also familiarise the students the various analytical principles.

COURSE TRANSACTION FORMAT

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

COURSE SYNOPSIS

Overall structure of science; role of experimentation and observation; data gathering, analysis and presentation; evolution of chemistry, informatics tools, computer applications in learning of chemical sciences.

COURSE CONTENT

PART A. LECTURES

Module I *Science and its Methods*

12 hours

Hypothesis, observations and proofs. Formulation of hypothesis, its verification (proving), corroboration and falsification (disproving), Importance of models, simulations and virtual testing.

Design of an experiment, observation, data collection, interpretation and deduction, repeatability and replication. Planning of experiments, Documentation of experiments., Data interpretation, significance of statistical tools in data interpretation, errors and inaccuracies. Data presentation. Graphics, tables, histograms and pie diagrams, Accuracy and precision.

Module II *Evolution of chemistry as a discipline of science*

12 hours

Ancient speculations on the nature of matter, alchemy- early form of chemistry, Robert Boyle and the origins of modern chemistry, Antoine Lavoisier and the revolution in chemistry, Chemical atomism- John Dalton, Atom model- J.J. Thomson, Rutherford and Bohr. Major contributions of Friedrich Wohler, Dmitri Mendeleev, Michael Faraday and Marie Sklodowska- Curie. Structure of chemical science: scope of chemical science, branches of chemistry. Evolution of nanoscience and its basic aspects. Carbon nanotubes and fullerenes. Applications-in electronics, robotics, sensors, medicine. Introduction to green chemistry - basic aspects of atom economy calculations (simple reactions).

Module III *Over view of information technology*

12 hours

Personal computer and its peripherals, computer networks & internet, wireless technology, introduction to mobile phone technology, overview of operating systems & major application software.

Data, information and knowledge, knowledge management, Internet access methods, internet as a knowledge repository, academic search techniques, internet-based information mining in chemistry and chemistry related websites.

Basic concepts of IPR, copyrights and patents, plagiarism, IT in teaching and learning, educational software, academic services-INFLIBNET, NICNET, BRNET, Virtual labs.

Module IV *(Analytical principles)*

12 hours

Qualitative analysis - Principles of elimination of interfering anions, principles involved in the precipitation of compounds of cation, Volumetric analysis, acid-base, redox, precipitation & complex metric titrations, Indicators- acid -base redox & adsorption indicators, Gravimetric analysis - factors affecting the solubility of precipitates - co-precipitation & errors due to co-precipitation, Colorimetric methods - theory & application.

Module V Safety measures & Disaster management in Laboratory**12 hours.**

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)

Types, Trends, Causes, Consequences and Control of Disasters Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Technological Disasters (chemical, industrial, radiological, nuclear and biological disasters).

References

1. Coppola D P, 2007. Introduction to International Disaster Management, Elsevier Science (B/H), London.
2. Manual on natural disaster management in India, M C Gupta, NIDM, New Delhi
3. An overview on natural & man-made disasters and their reduction, R K Bhandani, CSIR, New Delhi

Module VI Introduction to Cheminformatics**12 hours**

Basics of cheminformatics, applications of cheminformatics, storage & retrieval, file formats- MOL, SDF, CML, PDB formats, SYBYL Line Notation, SMILES of simple molecules like methane, ethyl alcohol, benzene, cyclohexane etc., Molecular visualization tools, Chemical Data basis, Chemical safety, Toxicology information- material safety data sheets.

References:

1. Newton RG. The Truth of Science : New Delhi, 2nd edition
2. The Golem: What everyone should know about science. Collins and Pinch. Cambridge Univ 1993
3. Contemporary Science Teaching, Dr Soti Sivendra Chandra
4. The Story of Chemistry, N.C. Datta, University Press
5. Alexis Leon & Mathews Leon, Computers Today, Leon Vikas
6. Alexis & Mathews Leon, Fundamentals and Information Technology. Leon Vikas ISBN 08125907890.
7. Ramesh Bangia, 'Learning Computer Fundamentals, Khanna Book Publishers, ISBN 818752252b
8. Barbara Wilson, Information Technology, the Basics, Thomas Learning.
9. Teaching of information Technology, R T Mishra
10. Methods of Teaching Chemistry, Kolasani Sunil Kumar, K Ramakrishna and D.B. Rao
11. Introduction to Information Technology, Prentice Hall, V. Rajaraman
12. Introduction to Cheminformatics, Andrew. R. Leach & V.J. Gillet
13. Principles of Nano science and nanotechnology, M A Shah, Tokeer Ahmed, Narosa Publishing House
14. T. Pradeep, "NANO: The Essentials", 'McGraw-Hill Education'
15. Anastas. P.T; Warner, J.C, "Green Chemistry; Theory and Practice", Oxford University Press; Oxford, U.K., 1998.
16. Green Chemistry; An introductory text, Lancaster.M, Royal society of chemistry, Cambridge, UK, 2003.

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

PARTB. LABORATORY**COMPUTER LABORATORY**

[No ESA for this component]

ComputerLab based instruction on the use of IT in learning. Use of educational-software, information mining from internet and using INFLIBNET/NICNET. Word processing and document preparation. Data handling and presentation. Introduction to Scilab\Matlab.

MODEL QUESTION PAPER
19UPO221: M ETHODOLOGY &INFORMATICS

Time: 3 hours

Max marks: 80

Section A, Marks 1

1. A well tested scientific hypothesis is called a
2. A tentative supposition made in science to account for a phenomenon is termed as a
3. The basis of laws in science generally is
 - (a) Observation
 - (b) Experimentation
 - (c) That these can be disproved
 - (d) Observation, experimentation and disprovability.
4. In science, a physical, mathematical, or logical representation of phenomena is called a
5. The working of science consists of.....
 - (a) Deduction
 - (b) Induction
 - (c) Experimentation
 - (d) Deduction, induction and experimentation
6. Who is known as the father of modern chemistry?
7. Size of nano gold particle will be between.....to..... nm
8. The SMILES of benzene is.
9. Plagiarism is.....
10. INFLIBNET is used in.....

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. Explain empiricism in science.
12. Describe the accuracy and precision of the results of a scientific experiment.
13. What are the features of a modern personal computer?
14. Describe what DOS is and how it was later replaced.
15. Discuss the need for appropriate citation of reported literature when a scientific document is prepared.
16. Critically evaluate the data and information content of any one of the chemistry related web sites that you may have accessed to obtain chemistry related study material.
17. Comment on the role of INFLIBNET in science education and research in India.
18. Explain intellectual property right and its significance.
19. What are the major contributions of Marie Sklodowska -Curie?
20. What is standard deviation?
21. Explain plagiarism. Why is it undesirable?
22. What is the basis of molecular modelling using computers?

Section C

(Answer any six questions. Each question carries 4 marks)

23. Discuss the relation between research in basic science and the advancement of technology.
24. Explain the steps involved in the conducting scientific experiments.
25. Describe how you will gather information regarding the synthesis of polymer from internet.
26. With an example, illustrate how science advances with revision of scientific theories.
27. Explain the precautions necessary in order to safe guard a discovery so that a patent on it can be filed.
28. What is e-enabled learning?
29. Exemplify the use of a pi -diagram in presenting the results of a typical experiment.
30. Write a note on applications of nanotechnology.
31. How can atom economy be calculated?

Section D

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

32. Explain what a hypothesis is. Illustrate with an example how one such hypothesis can be formulated, verified and corroborated.
33. Explain the various components essential for preparing a research article in chemistry.
34. Explain the following in cheminformatics (i) file formats, (ii) data bases
35. Explain (i) Use of IT in teaching & learning, (ii) Revision of scientific theories and laws

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, theorems of partial differentiation, The chain rule, Change of variables, Taylor's 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 infinite series (Absolute and conditional convergence; 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 (Taylor's 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 of 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 first 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 $\mathbf{r} = xi + yj + zk$, 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 $\int_0^1 \int_0^1 xy dx dy$.
10. If $x = \cos\theta \sin\phi$ and $y = \cos\theta \cos\phi$ Find $\frac{\partial(\theta, \phi)}{\partial(x, y)}$.

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 $S = 2 + \frac{5}{2} + \frac{8}{2^2} + \frac{11}{2^3} + \dots$
15. Determine the range of values of x for which the power series $p(x) = 1 + 2x + 4x^2 + 8x^3 + \dots$ converges.
16. Expand $f(x) = \sin x$ as a Maclaurin series about $x = 0$
17. Find the Laplacian of a scalar field $\phi = xy^2z^3$.
18. Show that $\nabla \cdot (\nabla\phi \times \nabla\psi) = 0$ where ϕ and ψ are scalar fields
19. Show that $\text{curlgrad}\phi = 0$
20. By changing the order of integration, evaluate $\int_0^2 \int_{\frac{y}{2}}^1 e^{x^2} dx dy$.
21. Evaluate $\int_{-1}^2 \int_0^3 \int_0^2 12xy^2z^3 dz dy dx$.
22. Find the moment of inertia of a uniform rectangular lamina 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 $S(\theta) = 1 + \cos \theta + \frac{\cos 2\theta}{2!} + \frac{\cos 3\theta}{3!} + \dots$
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 $\nabla \times (\phi \mathbf{a}) = \nabla \phi \times \mathbf{a}$, where ϕ is a scalar field and \mathbf{a} is a vector field.
30. Evaluate $\iint_R x^2y dx dy$, where R is the triangular area bounded by the lines $x = 0, y = 0$ and $x + y = 1$
31. Evaluate the Jacobian of $x = r \sin \theta \cos \phi, y = r \sin \theta \sin \phi$ 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 $\phi = x^2y + yz$ 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. Explain 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 20000\AA . If the sun emits maximum energy at wavelength 5500\AA , what would be the temperature of the sun?
28. Calculate the surface temperature of the sun from the following data. Radius of the sun $=6.96 \times 10^8\text{m}$; mean distance of the sun and earth $=1.497 \times 10^{11}\text{m}$; solar constant $=1400\text{Jm}^{-2}\text{s}^{-1}$. Stefan's constant $=5.7 \times 10^{-8}\text{Wm}^{-2}\text{K}^{-4}$.
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°C when the outside temperature is 27°C . Specific latent heat of fusion of ice $= 3.34 \times 10^5\text{ J Kg}^{-1}\text{K}^{-1}$.
31. (a) Calculate the total change in entropy when 100 g of water at 20°C is mixed with 120 g of water at 50°C and the mixture is then heated to its boiling point. Specific heat capacity of water $= 4200\text{ J Kg}^{-1}\text{K}^{-1}$.
(b) Find the efficiency of a Carnot's engine working between 127°C and 27°C .

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. Develop an 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	: <i>The Need for Religion</i>
Nirad C. Chaudhuri	: <i>Money and the English Man</i>
Arundhati Roy	: <i>The End of Imagination</i>

Module 3: Poetry

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

Module 4: Short Stories

Rabindranath Tagore	: <i>The Homecoming</i>
Mahasweta Devi	: <i>Arjun</i>
Abburi Chaya Devi	: <i>The Woodrose</i>
Anita Desai	: <i>Circus Cat, Alley Cat</i>

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, Birjadesh. *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 worldly 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's 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

- Leçon – 6 : Bon appetit ! (Pages : 54 – 61)
- Leçon – 7 : Quelle journée ! (Pages : 62 – 69)
- Leçon – 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. Noël - | 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 préféré 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 peuxavec moi ?
 - Je ne peux pas. Jeen Grèce avec Marie. Mais l'été prochain, je voudraischez toi, dans ta maison de campagne. Tu es d'accord ?
14. Complétez avec l'article qui convient :
 - Vous voulezverre de vin ou vous prenezeau ?
 - J'ai préparé rôti de bœuf. Vous n'êtes pas végétarien ? Vous mangezbœuf ?
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 :
Après le repas
 - Tu veuxthe ?
 - Non, merci, je n'aime pas....the. Je préfèrecafé.
 - 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 août.
 - 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'estmaison de campagne. Là, ce sontenfants et ici, c'estchien.
- 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 « Noël » ?
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

Jawahar 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 Chaturvedi
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 समझाइए?
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 नहीं, नाहि 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)

ആട്ടക്കഥ, 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 പത്മന 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 (Additional 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 ഉപജ്ഞാതാവാര്യ?
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 വിശേഷിപ്പിച്ചതാര്യ?
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; ചെറുശാഖകളോടീട-
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 വെളിവാൽത്തളിയിച്ചുമില്ല;
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 തെളിമപുണ്ടിതെൻ മനം” - ആരുടെ വാക്കുകൾ? കാരണമെന്ത്?
20. “വിരഹം മേ മർമ്മദാരണം; അതിലേറെനല്ലുമാരണം” ഇങ്ങനെ ചിന്തിക്കാൻ കാരണമെന്ത്?
21. “മുറ്റമതിനായി സംഗതി വന്നു
മറ്റൊരു കാര്യവുമേതുമില്ല” - സന്ദർഭം വിശദമാക്കുക.
22. “ക്ലേശവിനാശത്തിനുമുന്നം 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. ജതുപർണ്ണൻ - കഥാപാത്ര നിരൂപണം ചെയ്യുക.
27. നളനോടു ദമയന്തി തന്റെ നിരപരാധിത്വം വെളിപ്പെടുത്തുന്നതെങ്ങനെ?
28. ശാകുന്തളം രണ്ടാമങ്കത്തിൽ പ്രണയസുരഭിലയായ ശകുന്തളയുടെ മനോവ്യാപാരം വർണ്ണിച്ചിരിക്കുന്നത് എപ്രകാരമാണ്?
29. “വിരഹമോ കഠോരം, കടലിതുവീതഗാധപാരം” - ഈ പരിഭവനത്തിനു പിന്നിലുള്ള മാനസികവ്യഥ അനാവരണം ചെയ്യുക.
30. ‘നളചരിതം ആട്ടക്കഥയും’ ‘അഭിജ്ഞാനശാകുന്തളം’ നാടകവും നാടകീയതയിൽ സമരസപ്പെട്ടുപോകുന്നതെങ്ങനെ?
31. ദുഷ്യന്തന്റെ രാജകൊട്ടാരത്തിൽ എത്തിയ ശാർങ്ഗരവ - ശാരദതന്മാർക്ക് 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)

COURSE OBJECTIVES

The objectives of the course are to provide the student with a deep understanding on the principles and application of thermodynamics, chemical kinetics, chemical and ionic equilibria and properties of binary liquid mixtures. On course completion, the student will appreciate the great significance of the laws of thermodynamics. She/he will also become familiar with the laws that govern the theories that explain the kinetics of chemical reactions, ionic equilibria and binary systems of liquids.

COURSE OUTCOME

On completing the course the learners obtain an overview of laws of thermodynamics and its applications. And also realise the concept of entropy, chemical kinetics, binary mixtures, ionic and chemical equilibrium systems etc.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3-0-2 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lecture and 36 hours lab instruction.

COURSE SYNOPSIS

Laws of thermodynamics. Statistical Thermodynamics. Chemical and ionic equilibrium. Types and characteristics of chemical reactions. Theories of chemical reactivity. Properties of liquid-liquid systems.

Module 1 Chemical Thermodynamics-I

9 hours

Terminology of thermodynamics: System, surroundings, types of systems. Extensive and intensive properties. State and path functions. Types of processes- Zeroth law of thermodynamics.

First law of thermodynamics: Definition of Internal energy and Enthalpy. Statement of first law. Heat capacities at constant volume (C_v) and at constant pressure (C_p). Thermodynamic derivation of the relation between C_p and C_v . Reversible process and maximum work. Calculation of work, heat, internal energy change and enthalpy change for the expansion of ideal gases under reversible, 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.

Thermo chemistry: Heat of reaction at constant pressure (Q_p), at constant volume (Q_v) and their relationship. Enthalpies of formation, combustion and neutralisation. Integral and differential enthalpies of solution. Hess's law and its application. Kirchhoff's equation.

Module II Chemical Thermodynamics- II

9 hours

Second law of thermodynamics: Need for II law. Different statements of second law-. The Carnot cycle and its efficiency. Carnot's theorem and its proof.

Concept of entropy: Definition and physical significance. Entropy change for reversible and irreversible processes and in phase changes. Dependence of entropy on T, P and V. Gibbs' and Helmholtz free energies and their significances. Criteria of equilibrium and spontaneity. Gibbs'-Helmholtz equation. Dependence of Gibbs' free energy change on temperature, volume and pressure. Clausius -Clapeyron equation and its applications. Maxwell's relations.

Partial molar quantities: Chemical potential. Gibbs'-Duhemequation. Concept of fugacity.

Module III Thermodynamics-III and Statistical Thermodynamics

9 hours

Nernst heat theorem, proof and its consequences. Statement of third law-Planck's statement, Lewis Randall statement. Concept of perfect crystal. Determination of absolute entropies of solid, liquid and gas. Exception to third law with reference to examples- CO, NO, N_2O and H_2O . Statistical Thermodynamics: Phase space, system, assembly and ensemble. Types of ensembles. Thermodynamic probability. Boltzmann distribution law (no derivation): Entropy and probability. Partition function and its physical significance. Partition functions and thermodynamic properties - Internal energy, enthalpy, heat capacity, pressure, work function, Gibbs' free energy and chemical potential.

Module IV Chemical and Ionic Equilibria

9 hours

Thermodynamic derivation of law of mass action. Relation between K_p , K_c and K_x . Vant Hoff reaction isotherm. Variation of equilibrium constant (K_p & K_c) with temperature - The Vant Hoff equation.

Ionic equilibrium: Ionic product of water. Effect of solvents on ionic strength. Levelling effect, ionization of weak acids and bases. pK_a and pK_b values. Solubility product and common ion effect and their applications, pH and its determination by indicator methods. Buffers and calculation of their pH - Henderson's equation. Hydrolysis of salts of all types. Degree of hydrolysis and hydrolysis constant. Relation between hydrolysis constant and ionic product of water.

Module V Chemical kinetics

9 hours

Order and molecularity of reaction. Derivation of integrated rate equation of zero, first, second, third and n^{th} order reactions and examples. Determination of order of reactions- Graphical and analytical methods using integrated rate equations. Fractional life method. Differential rate equation method. Isolation method.

Influence of temperature on the rate of reactions. Arrhenius equation. Determination of Arrhenius parameter. Energy of activation and its significance. Collision theory. Derivation of rate equation for a second order reaction based on collision theory. Collision theory of unimolecular reactions. Lindeman mechanism. Steady state approximation. Theory of absolute reaction rate.

Module VI Binary Liquid Systems

9 hours

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 systems: Critical solution temperature. Conjugate layers. Examples for upper, lower and upper cum lower CST. Immiscible liquid pairs. Theory of steam distillation. Distribution law - Its thermodynamic derivation. Limitations of distribution law. Applications of distribution law to the study of association and dissociation of molecules. Solvent extraction. Equilibrium constant of $KI + I_2 \leftrightarrow KI_3$.

About 150 problems to be worked out.

References:

1. Glasstone & Lewis, "Elementary Physical Chemistry", Longman.
2. Kundu & Jain, "Physical Chemistry", Chand.
3. Kapoor, "Elements of Physical Chemistry", Macmillan
4. Barrow, "Physical Chemistry". 6th edn. The McGraw-Hill.
5. Alberty & Silbey, "Physical Chemistry", John Wiley & Sons.
6. Castellan, "Physical chemistry", Narosa Publishing House. New Delhi
7. Atkins, "Physical Chemistry", Longman.
8. Glasstone, "Thermodynamics for Chemists".
9. Rastogi & Misra, "An Introduction to Chemical thermodynamics", Vikas.
10. Puri, Sharma & Pathania, "Principles of Physical Chemistry", Vishal.
11. Gurdeep Raj, "Advanced Physical Chemistry", Goel.

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO341: PHYSICAL CHEMISTRY - I

Time: 3 hours

Maximum marks: 80

Section A (Answer all questions. Each question carries 1 mark)

1. Write the mathematical statement of first law of thermodynamics
2. Define entropy
3. What is meant by Raoult's law
4. Give the expression for work done in an isothermal reversible expansion of an ideal gas
5. The equation connecting K_p and K_c is given by _____
6. What is the principle of purification of common salt
7. Half-life of a first order reaction is equal to _____
8. The relation between entropy and thermodynamic probability is _____
9. Saponification of ester follows _____ order kinetics
10. Give examples for system with upper and lower CST

(10x1 = 10 marks)

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. State and explain Zeroth law of Thermodynamics.
12. Define integral and differential heat of solution
13. Why is the heat of neutralization of all strong acid by strong base is the same in aqueous solution
14. A first order reaction has a rate constant of $2.18 \times 10^{-3} \text{ sec}^{-1}$. Calculate the half-life of the reaction
15. What are azeotropic mixtures? Explain with an example
16. What are consecutive and parallel reactions?
17. What is meant by order and molecularity of a reaction?
18. State and explain Nernst heat theorem.
19. Write a note on physical significance of entropy
20. What is meant by common ion effect?
21. Give example Distinguish between degree of hydrolysis and dissociation constant
22. What is meant by levelling effect?

(8x2 =16 marks)

Section C

(Answer any 6 questions. Each question carries 4 marks)

23. Explain Hess's law and its application
24. Derive Gibbs Helmholtz equation
25. Give an account of the different types of ensembles
26. discuss solvent extraction technique
27. Write a note on hydrolysis of salts. Explain any two of its categories
28. Explain any two methods used for the determination of order of a reaction'.
29. Derive Van't Hoff equation for temperature dependence of equilibrium constant.
30. State and explain Nernst distribution law. What are the limitations of the law?
31. The rate constant of a second order reaction is $5.70 \times 10^{-5} \text{ dm}^3 \text{ mol}^{-1} \text{ S}^{-1}$ at 25°C and $1.64 \times 10^{-4} \text{ dm}^3 \text{ mol}^{-1} \text{ S}^{-1}$ at 40°C . Calculate the activation energy and the Arrhenius - pre exponential factor

(6x4 =24 marks)

Section D

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

32. a) Derive the expression for Joule Thomson coefficient and discuss
b) Describe Carnot's cycle for establishing the maximum convertibility of heat to work
33. a) Explain third law of thermodynamics and how is it useful in determining the absolute entropy of a solid at required temperature?
b) Obtain expressions for enthalpy, entropy and Gibbs free energy in terms of partition function
34. a) Write a brief note on the theory of absolute reaction rate
b) Derive equation for rate constant of a bimolecular reaction from collision theory
35. a) Explain the buffer action of a solution of weak base and its salt. Derive the relationship between pH of solution and the relative amount of base and salt present in it.
b) Define solubility product. Explain its any two applications in qualitative analysis.

(2x15 =30 marks)

Note: At least 25% of the questions should contain numerical problems.

Complementary Course V

19UMM331.2: Linear Algebra, Probability 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 different 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 to 15.7, 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, Cengage 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: 3 hours

Max. Marks: 80

Section A

Answer all questions. Each question carries 1 mark.

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 at least two tails in succession?
7. State Bayes'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
$$\begin{aligned} 2x + 3y &= 3 \\ x - 2y &= 5 \end{aligned}$$
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, secretary and 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 μ , $var(x)$, σ_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
- $$\begin{aligned} x_1 + 6x_2 - 4x_3 &= 8 \\ 3x_1 - 20x_2 + x_3 &= 12 \\ -x_1 + 3x_2 + 5x_3 &= 3 \end{aligned}$$
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 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.Murugesan, 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 " $a \sin \theta$ ", 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 $\theta = 30^\circ$.
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 100th 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 4th and 12th dark rings are 4mm and 7mm respectively .Find the diameter of the 20th 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
19UEN411.1: 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 x 4 = 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)

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, Jeappelle.
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 à l'imparfait :
« A Paris. J'(avoir) une chambre dans le Quartier Latin. J'(étudier) à l'Ecole de médecine. C'(être) une belle époque. Le soir, nous (danser) à 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 brûle.
 - 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 répondant.
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 fatigués. »
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 chaîne 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

Patravvyavahar

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. Patravvyavahar 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. निम्नलिखित 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'

निर्देश: 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 के लिए 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 കഴി വ്യാപ്തമാക്കുക.
3. മലയാള ഭാഷ കൈകാര്യം ചെയ്യുമ്പോൾ ഉപയോഗിക്കുന്ന പാഠകപിഴകൾ സ്വയം തിരുത്താൻ പ്രാപ്തമാക്കുക.
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 മലയാളം ശൈലി - ശൈലീ ഭംഗം - വാക്കുകളും വാക്യങ്ങളും തെറ്റുകൂടാതെയെഴുതാവാനുള്ള പ്രായോഗിക പരിശീലനം.

മൊഡ്യൂൾ - രണ്ട് (18 മണിക്കൂർ)

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

വിശദപഠനം:

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

1. ആശയ വിപുലനം പ്രകൃഷ്ട കാവ്യ മാതൃകകളിലെ ഉദ്ധരണികൾ നൽകി, ആശയം വിപുലീകരിച്ച് എഴുതാവാനുള്ള ശേഷി വർദ്ധിപ്പിക്കും വിധം അഭ്യാസ പ്രവർത്തനങ്ങൾ നടത്തുക.
2. പരാവർത്തനം: തന്നിരിക്കുന്ന പാഠ്യഭാഗം എറ്റക്കുറച്ചിലുകൾ വരാതെ ഗദ്യരൂപത്തിലാക്കുവാനുള്ള പരിശീലനം
3. മുന്നിലൊന്നായി സംഗ്രഹിക്കൽ: ആശയ ചോരണം വരാതെ സുദീർഘങ്ങളായ മാതൃകകൾ സംഗ്രഹിക്കാനുള്ള ശേഷി.
4. ഉത്തരം കത്തെൽ: ഗദ്യ-പദ്യ മാതൃകകളിൽ നിന്ന് ഉത്തരം കത്തിയെഴുതാവാനുള്ള ശേഷി വളർത്തുന്നു.

മൊഡ്യൂൾ നാല് (36 മണിക്കൂർ)

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

വിശദീകരണം

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

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

തിരക്കഥാപഠനം

ചലച്ചിത്രനിർമ്മിതിയിൽ തിരക്കഥയ്ക്കുള്ള പ്രാധാന്യത്തെക്കുറിച്ചുള്ള ജ്ഞാനം നേടണം

വിശദീകരണം

- | | | |
|--------------------------------------|---|----------------------------|
| 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 കണ്ടെത്തൽ | - | എം.എഫ്.തോമസ് |
| 18. മലയാള സിനിമ അരങ്ങുറ്റ് | - | (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 നാടക്യത്താര്?
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 സാങ്കല്പം 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. കടക്കണിയിൽ അകപ്പെട്ടുപോയ ഒരാളുടെ മാനസിക വ്യഥകളെ രാവുണ്ണി എന്ന നാടകത്തിൽ എപ്രകാരം ചിത്രീകരിച്ചിരിക്കുന്നു?
35. നമ്പ്യാരുടെ കൃതികൾ ഉത്തമമായ സാമൂഹിക പരിഹാസങ്ങൾ ആണ്. കാർത്തവീരാർജ്ജുന വിജയത്തെ ആധാരമാക്കി വിലയിരുത്തുക.

Core Course - III
19UPO441: ORGANIC CHEMISTRY-I

Credits: 3

54 hours

COURSE OBJECTIVES

1. To introduce the concepts of reaction mechanism, conformational analysis and stereochemistry of simple organic compounds.
2. To impart knowledge about the preparation, reactivity and properties of hydrocarbons and halogen and oxygen containing organic molecules.

COURSE OUTCOME

The course will enable the student to assimilate the chemistry of carbon based molecules, their structural aspects, reactivity and the related aspects of conformational analysis and stereochemistry of organic compounds. S/he will appreciate the vastness of the area of the chemistry of carbon compounds, the intricacies of their structure and the details of their reactivity.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3-0-2 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lecture and 36 hours lab instruction.

COURSE SYNOPSIS

Electronic effects in organic chemistry. Chemistry of alkanes, cycloalkanes and conformational analysis. Organic stereochemistry and mechanism of organic reactions. Structure, preparation and reactivity of halogen and oxygen containing organic compounds such as halocarbons, alcohols, ethers, phenols, aldehydes, ketones and carboxylic acid derivatives.

COURSE CONTENT

Module I Introduction to Reaction Mechanisms and Aromaticity:

9 hours

Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Ortho-para directive influence of substituent such as $-\text{OH}$, $-\text{NH}_2$, $-\text{NO}_2$, Alkyl groups and halogens. Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles.

Reactive Intermediates: Carbocations, Carbanions, free radicals, carbenes, nitrene and benzyne.

Aromaticity: Benzenoids and Hückel's rule, Non-benzenoid aromatic compounds.

Module II Stereochemistry of organic compounds:

9 hours

Elements of symmetry, Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds. resolution, inversion and racemization. Absolute and relative configuration, D-L, R-S systems of nomenclature (upto 2 chiral carbon atoms), Priority and sequence rules. Asymmetric synthesis.

Geometrical isomerism: E-Z systems of nomenclature (upto two C=C systems). Geometric isomerism of maleic and fumaric acid and butadiene.

Module III Organic Reaction Mechanisms

9 hours

Types of organic reaction – Substitution reactions. a) in aliphatic compounds SN^1 , SN^2 and SN^i mechanisms (nucleophilic). Factors affecting substitutions. b) in aromatic compounds via benzyne intermediate (nucleophilic) and electrophilic substitutions like nitration, sulphonation, halogenation, Friedel Craft's alkylation and alkylation.

Addition reactions (electrophilic and nucleophilic) Mechanism of addition of hydrogen, hydrogenhalide to alkenes and alkynes - free radical addition, Markownikoff's rule and Kharasch effect.

Elimination reactions - E1 & E2 mechanisms. Saytzeff's and Hofmann's rules.

Module IV Cycloalkanes and Conformations:

9 hours

Cycloalkanes: Nomenclature, methods of formation (from halides, Simmons-Smith reaction) Baeyer's strain theory and its limitations, ring strain in cyclopropane and cyclobutane. Theory of strainless rings, banana bonds in cyclopropane. Ring, angular and torsional strain.

Conformations: Conformational analysis of ethane, n-butane, ethylene glycol and cyclohexane. Fisher,

Newman, saw-horse and wedge projections.

Introduction to polycyclic alkanes: decalin, cubane and prismane

Module V Halogen Compounds, Alcohols, Phenols and Ethers:

9 hours

Halogen compounds: methods of preparation (from alcohol and alkene), synthetic uses of vinylchloride, chloroprene, Freon-12, DDT, BHC.

Alcohols: *Preparation:* Preparation of 1°, 2° and 3° alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters.

Reactions: With sodium, HX (Lucas test), esterification, oxidation (with alk. KMnO_4 , acidic dichromate, conc. HNO_3). Industrial applications of ethylene glycol and glycerol. Pinacol-pinacolone rearrangement (mechanism).

Phenols: (Phenol case) Preparation from diazonium salts, hydroboration & hydration of alkene

Reactions: (Mechanism not required) - Reimer-Tiemann reaction, Kolbe reaction. Fries and Claisen rearrangements

Ethers (aliphatic and aromatic): Cleavage of ethers with HI, Ziesel's method of estimation of alkoxy group.

Module VI Aldehydes, Ketones and Carboxylic Acids:

9 hours

Aldehydes and ketones (aliphatic and aromatic): (Formaldehyde, acetaldehyde, acetone and benzaldehyde)

Preparation: from acid chlorides and nitriles.

Reactions (Mechanism not required)— Reaction with HCN, ROH, NaHSO_3 , ammonia and its derivatives like hydrazine, hydroxyl amine, phenyl hydrazine, Borsche's reagent etc. Iodoform test. Mechanisms of Aldol Condensation, Cannizzaro's reaction and, Benzoin condensation. Wittig reaction, Clemmensen reduction and Wolff Kishner reduction and reduction with alkali metal hydride. (mechanisms not required.)

Carboxylic acids and their derivatives: - Preparation: Acidic and Alkaline hydrolysis of esters, properties of aliphatic and aromatic carboxylic acids, pK_a values, factors affecting the strength of carboxylic acids.

Reactions (Mechanism not required): Hell – Vohlard - Zelinsky Reaction, Reformatsky Reaction, Perkin condensation.

References:

1. K. S. Tewari, S.N. Mehrotra and N.K. Vishnoi, "A Text Book of Organic Chemistry", Vikas
2. I. L. Finar, "Organic Chemistry" Vol 1 & 2, Longman.
3. R. T. Morrison and R. T. Boyd, "Organic Chemistry", Prentice-Hall.
4. F. Carey, "Organic Chemistry". McGraw Hill
5. P. Y. Bruice "Organic Chemistry"
6. P. Sykes, "Guide Book to Mechanism in Organic Chemistry", Orient Longman.
7. S. M. Mukherji and S. P. Singh, "Reaction Mechanisms of Organic Chemistry", Macmillan.
8. M. K. Jain, "A Text Book of Organic Chemistry".
9. Bahl and Bahl, "Advanced Organic Chemistry".
10. P. S. Kalsi, "Stereochemistry and Mechanism through Solved Problems", New Age.
11. P. S. Kalsi, "Organic Reactions and Their Mechanisms", New Age.
12. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry, McMillan

Weightage of marks

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO441: ORGANIC CHEMISTRY-I

Time: 3 hours

Maximum marks:80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. The reaction of a conjugated diene with an alkene to form a cyclic product is called —
2. Which is aromatic - tropyllium anion or cyclopentadienyl anion?
3. CH_3 is — stable than $(\text{CH}_3)_3\text{C}$
4. Pyrole is —basic than pyridine
5. The Hybridisation of carbon atom in Benzyne is — and —
6. Haloalkanes react with aqueous alkali to form—
7. Schiff's bases are obtained by reaction of ketones with —
8. The reducing agent in Clemmensen reduction is —
9. Picric acid is —
10. Lucas reagent is

[10x1=10]

SECTION B

(Answer any 8 questions. Each question carries 2 marks)

11. What are the conformations of cyclohexanes? Diagrammatically show and label the C-H bonds in these.
12. Depict the structure of muscone and civetone
13. What is the directive effect of a methyl group in aromatic electrophilic substitution?
14. How is diethyl ether prepared? Why is it more volatile than ethanol?
15. The peroxide effect is observed only in the addition of HBr and not HCl or HI. Why?
16. What is nitrene? Illustrate its formation in a reaction
17. State and explain Huckel's rule
18. Arrange in the increasing order of acid strength: propionic acid, formic acid, acetic acid. Give reason.
19. Tertiary alcohols are more reactive than primary and secondary alcohols towards Lucas reagent. Why?
20. What is aldol condensation?
21. How will you distinguish acetaldehyde and acetone?
22. Starting from phenol how 2-hydroxy benzaldehyde is prepared?

[8x2=16]

SECTION C

(Answer any six questions. Each question carries 4 marks)

23. State and explain Baeyer's strain theory
24. How are 1-naphthol, 2-naphthol and BHC prepared?
25. How will you synthesise glycerol from propene?
26. Give an account of resolution
27. Give an account of non-benzenoid aromatics
28. Illustrate asymmetric synthesis
29. Discuss the reduction of carbonyl compounds with LiAlH_4 and NaBH_4
30. What is the mechanism of $\text{S}_\text{N}1$ reaction? Illustrate with an example
31. Write a note on the directive influence of OH and NO_2 groups

[6x4=24]

SECTION D

(Answer any 2 questions, Each question carries 15 marks)

32. a) Illustrate the conformations of n-butane using projections
b) Write the mechanism of Claisen rearrangement
33. a) Describe the E-Z nomenclature used to specify the configuration of Alkenes.
b) Describe the structure of carbenes. Mention a reaction in which carbene is formed.
34. a) Discuss Cannizzaro reaction and Beckmann rearrangement
b) Write briefly on (i) Reimer-Tsima reaction and (ii) Simmons-Smith reaction
35. a) Discuss the mechanism of Saytzeff's and Hoffmann's elimination
b) Write briefly on (i) hyper conjugation and (ii) Kharasch effect

[2x15=30]

Core course - IV

(Lab Course I & II of 19UPO141, 19UPO341, 19UPO441)

Six hours examination in semester IV

19UPO442: Inorganic Qualitative and Volumetric Analysis

Credits - 2

Total 36+36+36 hrs.of lab instructional Semester I, III &IV

This laboratory based course reinforces the qualitative and quantitative chemical analysis that the student has learned in the I, III and IV semesters.

COURSE OBJECTIVES

To equip the students with skill in qualitative and quantitative chemical analysis of inorganic materials. After the course completion, the student will have the necessary training required for laboratory based on wetchemical analysis.

I. INORGANIC QUALITATIVE ANALYSIS

COURSE CONTENT

Hands-on, wet chemistry study of the reactions of the following cationic and anionic radicals for identification and confirmation of identity. Cations: Ag, Hg, Pb, Cu, Bi, Cd, As, Sn, Sb, Fe, Al, Cr, Zn, Mn, Co, Ni, Ca, Sr, Ba, Mg, Na, K and NH_4 .

Anions: SO_4 , NO_3 , F, Cl, Br, I, BO_3 , Acetate, Oxalate, Tartarate, AsO_3 , AsO_4 , CrO_4 and PO_4 .

Systematic qualitative analysis by semi micro methods of a mixture containing two acidic and two basic radicals from the above list. (Not more than one interfering radical).

II. INORGANIC VOLUMETRIC ANALYSIS

Inorganic analysis based on quantitative volumetry.

COURSE CONTENT

Module 1. Acidimetry and Alkalimetry

a. Strong acid - Strong base; b. Strong base - Weak acid; c. Strong acid - Weak base; d. Determination of NaCO_3 and NaHCO_3 in a mixture; e. Estimation of NH_3 in an ammonium salt by direct and indirect methods.

Module 2. Dichrometry

Determination of ferrous iron using internal indicator; b. Determination of ferric iron via reduction with SnCl_2 . The above exercise using external indicator.

Module 3. Permanganometry

Determination of ferrous iron, Sodium oxalate, Hydrogen peroxide, calcium nitrite and MnO_2 in pyrolusite.

Module 4. Iodometry

Standardisation of thiosulphate using KIO_3 , electrolytic copper and potassium dichromate. Determination of As_2O_3 , arsenite, hypochlorite, bleaching powder and Cu in a salt.

Module 5. Precipitation methods

Determination of Chloride in neutral medium (Mohr's method)

Module 6. Complexometry

Standardization of EDTA solution using ZnSO_4 . b. Determination of Zn and Mg using EDTA.

Reference:

1. A. I. Vogel, "A text book of Qualitative Analysis including semi micro methods" Longmans.
2. V. V. Ramanujam, "Semi micro Qualitative Analysis"
3. E. S. Gilreath "Qualitative Analysis using semi micro method" McGraw Hill
4. A. I. Vogel, "A text book of Qualitative Inorganic Analysis" Longmann
5. A. I. Vogel, "A Text Book of Quantitative Inorganic Analysis".

B.Sc. Degree Programme in Polymer Chemistry
LAB COURSE - I & II (PRACTICAL)
19UPO442: Inorganic qualitative and volumetric analysis
SCHEME OF VALUATION

Time: 6 hours

Maximum marks: 80

Table 1.

No.	Main components in general	Marks
1	Lab record	10
2	Anions (identification, confirmation, and chemistry)	8
3	Cations (identification, confirmation, and chemistry)	8
4	Systematic recording	6
5	Viva	5
6	Performance	2
7	Neatness	1
Total		40

Table 2.

Main components for ESE for lab course – Inorganic volumetric analysis		
No.	Main components in general	Marks
1	Lab record	10
2	Procedure with principle and equation	4
3	Accuracy (up to 1% - 15mark, error > 3% - grace mark -4)	15
4	Two step calculation	2
5	Neat tabulation and recording	2
6	Viva	5
7	Performance	2
Total		40

Complementary Course VII

19UMM431.2: Differential Equations, Vector Calculus, and Abstract 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, integrating factors; linear equations; homogeneous equations; isobaric equations; Bernoulli's 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, Volume 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

Fatima Mata National College Kollam, Autonomous

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: 3 hours

Max. Marks: 80

Section A

Answer all questions. Each question carries 1 mark

1. Solve $\frac{dy}{dx} = x + xy$
2. Find the auxiliary equation of $\frac{d^2 y}{dx^2} - \frac{2dy}{dx} + y = e^x$
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 $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + y = e^x$.
15. Solve $1 + y \frac{d^2 y}{dx^2} + \left(\frac{dy}{dx}\right)^2 = 0$.
16. Evaluate the line integral $\oint_C x dy$, 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 $A = \frac{1}{2} \oint_C x dy - y dx$
18. Calculate $\nabla \times F$ where $F = 2xzi + 2yz^2j + (x^2 + 2y^2z - 1)k$.

19. Show that the operation \cdot defined by $x \cdot y = x + y + rxy$ where r is a non-zero real number is associative 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 $\frac{d^2y}{dx^2} + 4y = x^2 \sin 2x$.
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 α 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 $\varphi: R \rightarrow U(1)$ 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 $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ 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 proper 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 Type I 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.Murugesan, 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:- $V_{cc}=20V$; $R_c=2K\Omega$; $R_E=1K\Omega$; $R_B=430K\Omega$
(B) Find the voltage gain of a single stage amplifier. Given that $\beta=100$, $R_{in}=1K\Omega$; $R_c=6K\Omega$ and $R_L=2K\Omega$.
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 \AA .
(B) Find the least energy of an electron moving in one dimension in an infinitely high potential box of width 1 \AA . ($m_e=9.11 \times 10^{-31} \text{ Kg}$; $h=6.63 \times 10^{-34} \text{ Js}$)
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 $R_H=1.097 \times 10^7 \text{ m}^{-1}$.
26. (A) Find the wavelength of photon emitted when hydrogen atom goes from $n=10$ states to the ground state. $R_H=1.097 \times 10^3 \text{ }^{-1}$
(B) The wavelength of first line of Balmer series is 6563 \AA . Calculate the Rydberg constant.
27. (A) A 50V Zener diode is used to obtain a regulated output voltage across a load $10K\Omega$. The series resistor is $5K\Omega$. 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) $1100_2 + 11_2 = \dots\dots\dots_2$;
(b) $1111_2 + 10101_2 = \dots\dots_2$

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
19UPO541: ORGANIC CHEMISTRY II

Credits: 3

54 hours.

COURSE OBJECTIVES

The objective of the course is to introduce the chemistry of acyclic and cyclic organic compounds containing hetero atoms, organometallic compounds, phytochemicals and secondary metabolites, dyes and drugs. The course will enable the student to further appreciate the rich chemistry of carbon based molecules, especially of natural origin.

COURSE OUTCOME

This course will be able to provide the significance of many utility materials like carbohydrates, proteins, steroids, drugs, vitamins, terpenes etc to learners. And also get through a knowledge of organometallic and nitrogen and sulphur containing compounds.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3-0-0 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lectures.

COURSE SYNOPSIS

Chemistry of amino, mercapto and sulfur-oxygen compounds, Heterocyclic chemistry, Organometallic compounds, Chemistry of carbohydrates, alkaloids, terpenes, steroids and vitamins. Chemistry of dyes and drugs, Bioorganic chemistry of amino acids, peptides, nucleic acids and lipids.

COURSE CONTENT

Module I. Nitrogen and Sulphur Compounds

9 hours

Amines (Aliphatic and Aromatic) *Preparation*: from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction. Reactions: Hofmann elimination, Carbylamine test, Hinsberg test, with HNO_2 , Schotten – Baumann Reaction. bromination, sulphonation. Diazonium salts: *Preparation*: from aromatic amines. *Reactions*: conversion to benzene, phenol, dyes. Benzidine rearrangement and its mechanism. Preparation, structure and properties of urea. Methods of preparation of mercaptans, sulfoxides, sulphones, sulphonic acid, sulphanilic acid and sulphanilamide.

Module II. Carbohydrates

9 hours

Classification and nomenclature of monosaccharides, configuration of monosaccharides, Epimerization, mutarotation and anomers. Elucidation of structures of glucose and fructose. Chair conformation of D-glucopyranose. Occurrence and chemical properties of disaccharides. Elucidation of structure of sucrose. Starch and cellulose (brief study). Industrial application of cellulose.

Module III. Heterocyclic and Organometallic Compounds

9 hours

Heterocyclic compounds: Introduction, classification and nomenclature. General methods of preparation and properties of furan, thiophene, pyrrole, indole, pyridine, quinoline and isoquinoline. Importance of heterocyclic compounds.

Organometallic compounds:

Preparation (from alkyl halide), reactions and synthetic uses of Grignard reagent (preparation of alcohol, aldehyde and ketone and monocarboxylic acid), organo zinc (preparation from alkyl halide) Reformatsky reaction Simmons–Smith reaction.

Organo lithium - Gilman reagent and its reaction with organic halides

Active methylene compounds:

Preparation: Claisen ester condensation. Keto-enol tautomerism.

Reactions: Synthetic uses of ethylacetoacetate (preparation of non-heteromolecules having up to 6 carbon).

Module IV Alkaloids, Terpenes, Dyes:

9 hours

Alkaloids: Introduction, extraction and general properties. Elucidation of structures of coniine and nicotine. Importance of alkaloids.

Terpenoids: Introduction - Isoprene and special isoprene rules. Isolation of terpenoids. Structure of citral and geraniol (structure elucidation not required). Importance of menthol, alpha-pinene and camphor.

Dyes: Classification. Witt's theory. Synthesis of the following dyes: Methyl orange, Congo red, Bismarck brown, malachite green, rosaniline, indigotin and alizarin.

Module V Steroids, Vitamins and Drugs:

9 hours

Steroids: Introduction. Diel's hydrocarbon. General nature of steroids. General idea of structure of cholesterol (elucidation not required).

Sex hormones - examples and functions (Structure not expected). Importance of androgen, estrogen and cortisone.

Vitamins: Introduction, classification and general features. Physiological functions and deficiency symptoms of vitamin A, thiamin, riboflavin, nicotinic acid, vitamin B12, C, D, E and K.

Drugs: Classification of various types of drugs with examples. Sulphonamides, antimalarials and chemotherapy.

Module VI Bioorganic Chemistry -Amino acids, Proteins, Nucleic Acid and Lipids

9 hours

Amino acids: - Classification, structure and stereochemistry of amino acids - two methods of preparation, reactions of α amino acids - essential and non-essential amino acids, zwitter ion, isoelectric point. Peptides: structure and synthesis (Carbobenzoxy method, Sheehan method only). Proteins: Structure of proteins, denaturation and colour reactions. Enzymes: General nature and classification, specificity of enzymes.

Nucleic acids: Nucleosides and nucleotides (brief idea only), polynucleotide, Structure of DNA (Watson-Crick model), RNA (types of RNA), Replication of DNA, Genetic Codes.

Oils and fats: Common fatty acids present in oils and fats, Omega fatty acids (Elementary idea of the sources and benefits in human health), Hydrogenation, Trans fats (definition and sources only), Soap (preparation only), Saponification value, Iodine number.

References:

1. K. S. Tewari, S.N. Mehrotra and N.K. Vishnoi, "A Text Book of Organic Chemistry", Vikas
2. I. L. Finar, "Organic Chemistry" Vol 1 & 2, Longman.
3. R. T Morrison and R.T. Boyd, "Organic Chemistry", Prentice-Hall.
4. T. W. Graham Solomons, "Organic Chemistry". John Wiley & Sons.
5. S. H. Pine, "Organic Chemistry", Prentice Hall.
6. M. K. Jain, "A Text Book of Organic Chemistry". Vishal Publishing.
7. Bahl and Bahl, "Advanced Organic Chemistry". S. Chand.

Weightage of marks

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO541: ORGANIC CHEMISTRY - II

Time: 3 hours

Maximum marks:80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. — is an example of an essential amino acid.
2. The fundamental unit of terpene is —
3. Sulpha drugs are used as —
4. Diazotisation is done at low temperature because —
5. An example for a mordant dye
6. The base present in RNA but not in DNA
7. The protein present in human hair is —
8. The main components of starch are —
9. Structure of D-glucose is —
10. Benzene diazonium chloride is converted to benzene by

[10x1=10]

SECTION B

(Answer any 8 questions. Each question carries 2 marks)

11. Give the difference between chromophore and auxochrome with one example each
12. Give the structure of pyrole and indole
13. What is meant by reducing and non-reducing disaccharide?
14. How does glucose react with phenyl hydrazine?
15. In what respects vitamins differ from hormones?
16. List the difference between RNA and DNA
17. How is methyl orange prepared?
18. Pyridine is more basic than pyrole. Why?
19. What is Grignard reagent? Mention its use
20. How is isoquinoline prepared?
21. How a primary amine is chemically distinguished from a tertiary amine?
22. What are zwitter ions? Write an example

[8x2=16]

SECTION C

(Answer any six questions. Each question carries 4 marks)

23. Name four fat soluble vitamins. Write the chemical name, source and a deficiency disease.
24. What is mutarotation? Why does glucose undergo mutarotation?
25. What are the industrial applications of cellulose?
26. What are Frankland reagents? How are they prepared?
27. Write a note on peptide synthesis
28. Write a note on (i) synthetic uses of ethyl acetoacetate and (ii) Witts theory
29. How is glucose converted into fructose?
30. Discuss the aromaticity of thiophene and pyrrole
31. Give the significance of isoelectric point.

[6x4=24]

SECTION D

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

32. a) How will you separate a mixture of primary, secondary and tertiary amines (5 marks)
b) Write brief notes on iodine value and saponification value (6 marks)
c) Draw the structure of any four dyes (4 marks)
33. a) Explain the structure elucidation of glucose (7.5 marks)
b) Write short note on Benzidine rearrangement and Reformatsky reaction (7.5 marks)
34. a) Explain the Hofmann exhaustive methylation and its application (5 marks)
b) Write a note on synthetic detergents (5 marks)
c) Give any two methods for the preparation of urea. Also write down any three reactions of it (5 marks)
35. a) Discuss briefly the structure of proteins (7.5 marks)
b) Discuss the chemical steps in the determination of the structure of nicotine (7.5 marks)

[2x15=30]

COURSE OBJECTIVES

The objectives of the course are:

1. To master the laws that governs the physical and chemical behaviour of chemical substances in the gaseous, liquid, solution and solid states.
2. To understand how the different phases of matter exist in equilibrium
3. To enable the student to understand and appreciate the theories and practice of electrochemistry.

COURSE OUTCOME

On course completion, the student will understand the equilibria between phases, the laws that govern the various states of matter and the theories of electrochemistry.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 4-0-0 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 72 hours lecture.

COURSE SYNOPSIS

Properties of materials in the gaseous, liquid, solution and solid state. Introduction to equilibria between phases, and electrochemistry

COURSE CONTENT**Module 1. Gaseous State****12 hours**

Types of molecular velocities and their inter relations.-Maxwell Boltzmann distribution. Statement and explanation (No derivation). Effect of temperature. Derivation of R.M.S, average and most probable velocities from M B equation. Collision frequency, collision number, collision diameter and mean free path. Ideal gas equation. Behaviour of real gases. Deviation of real gases from ideal behaviour. Compressibility factor, Boyle temperature- Van der Waals' equation of state- derivation and importance. Virial equation of state. Determination of molar mass by limiting density method.

Critical phenomena-Isotherms of CO_2 . Continuity of state. Critical constants and their experimental determination. Relation between critical constants and Van der Waals constants. Reduced equation of state. Liquefaction of gases-Linde's and Claude's process.

Module II Liquid state and Dilute solutions**12 hours**

Properties of liquids: Surface tension- measurement by capillary rise method and stalagmometer method, factors affecting surface tension. Viscosity-Poiseuille equation, Determination of viscosity by Ostwald's viscometer. Refractive index and its determination by Abbe's refractometer.

Dilute solutions: Molality, molarity, normality and mole fraction. Colligative properties. Thermodynamic derivation of $\Delta T_b = K_b \times m$ and $\Delta T_f = K_f \times m$. Osmotic pressure: Laws of osmotic pressure.-Van't Hoff equation. Determination of molecular mass of solute by Beckmann 'method, Rast method and cooling curve method. Abnormal molecular mass-Van't Hoff factor. Determination of degree of dissociation and association.

Module III Solid state**12 hours**

Isotropy and anisotropy, space lattice and Unit cell. Elements of symmetry of crystal. Crystal systems, Bravais lattices. Laws of crystallography, Miller indices, Representation of lattice planes of cubic crystals. Diffraction of X-rays by crystals: Bragg's equation-derivation and application, identification of type of cubic crystal. Rotating crystal and powder method. Structure of NaCl, KCl and CsCl. Defects in crystals - Schottky and Frenkel defects. Liquid crystals: Types of liquid crystals- smectic, nematic and cholesteric. Molecular arrangements in various states of liquid crystals, uses of liquid crystals.

Module IV Phase Equilibria**12 hours**

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, Thermal analysis and desilverisation of lead. KI-water system and Freezing mixtures. (d) Solid-liquid equilibria involving compound formation with congruent and incongruent melting point- $\text{FeCl}_3\text{-H}_2\text{O}$ system

and $\text{Na}_2\text{SO}_4\text{-H}_2\text{O}$ system. (e) Solid - Gas system - decomposition of CaCO_3 and dehydration of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. Efflorescence and Deliquescence.

Module V Electrical Conductance

12 hours

Conductance: Arrhenius theory. Variation of conductance with dilution of strong and weak electrolyte. Debye-Huckel theory of inter ionic attraction. Debye-Huckel-Onsager equation (only qualitative treatment). Activity and activity coefficient of electrolytes. Kohlrausch's law and its application. Wien effect. Debye-Falkenhagen effect. Walden's rule.

Ionic mobilities: Transference number and its determination by Hittorff's and moving boundary methods. Abnormal transference number. 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.

Module VI Electromotive Force

12 hours

Electrochemical cells (brief explanation). Types of electrodes - Metallic electrodes, gas electrodes, anion reversible electrodes and redox electrodes. Reference electrodes- standard hydrogen and calomel electrodes. Electrode reactions and cell reactions. Derivation of Nernst equation for electrode potential and cell potential. Gibbs-Helmholtz equation and EMF of a cell. Calculation of ΔG , ΔH , ΔS and equilibrium constant from EMF data. Concentration cells with and without transference: Electrode and electrolyte concentration cell. Derivation of equation for the EMF of concentration cell with and without transference. Liquid junction potential. Fuel cells: Principle, $\text{H}_2\text{-O}_2$ and hydrocarbon- O_2 fuel cells. Over voltage. Applications of potential measurements: Determination of ionic product of water, hydrolysis constant and solubility product. pH value using quinhydrone and glass electrodes. Potentiometric titrations of acid - base and redox reactions.

About 150 problems to be worked out.

References:

1. S. Glasstone & Lewis, "Elementary Physical Chemistry", Longman.
2. N. Kundu and S. K. Jain, "Physical Chemistry", S Chand.
3. K. L. Kapoor, "Elements of Physical Chemistry", Macmillan
4. G. M. Barrow, "Physical Chemistry", 6th edn, McGraw-Hill.
5. R. A. Alberty & R. J. Silbey, "Physical Chemistry", John Wiley.
6. G. W. Castellan, "Physical chemistry", Narosa.
7. P. W. Atkins, "Physical Chemistry", Longman.
8. Puri, Sharma & Pathania, "Principles of Physical Chemistry"
9. Glasstone, Physical Chemistry, Macmillan

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO542: PHYSICAL CHEMISTRY-II

Time: 3 hours

Maximum marks:80

Section A

(Answer all questions. Each question carries 1 mark)

1. Write van der Waals' equation for n moles of a gas
2. The average speed of a certain gas at 27°C is 200 ms^{-1} . Calculate the temperature at which the speed will be 600 ms^{-1}
3. What is meant by molarity of a solution
4. How is inversion temperature related to Vander Waal's constant
5. The total number of Bravais lattices in a crystal is _____
6. Write Debye Huckel Onsagar equation
7. The Van't Hoff equation for osmotic pressure of a solution is _____
8. Give an example for a system with congruent melting point
9. Write the reduced phase rule equation
10. Give the Nernst equation for the potential of a hydrogen electrode

(10x1 = 10 marks)

Section B

(Answer any eight questions. Each question carries 2 marks)

11. State and explain the law of rationality of indices.
12. Distinguish between collision frequency and collision number
13. What is meant by surface tension of a liquid and write Poiseuille's equation
14. Explain the terms unit cell and space lattice
15. Explain the effect of temperature on the distribution of molecular velocity
16. Briefly explain Van't Hoff factor
17. What is meant by liquid junction potential? How can it be eliminated?
18. How will you construct a calomel electrode?
19. What is Debye Falkenhagen Effect?
20. Write a note on conductometric titration of sodium hydroxide against HCl
21. Describe with example triple point and eutectic point
22. Explain the term incongruent melting point with an example

(8x2 =16 marks)

Section C

(Answer any 6 questions. Each question carries 4 marks)

23. Derive most probable velocity and root mean square velocity from Maxwell- Boltzmann Equation.
24. How will you experimentally determine the critical constants of a gas?
25. Give an account of the Rotating crystal method for the determination of crystal structure.
26. Discuss the moving boundary method for the determination of the transference number of an Ion.
27. Write a note on Rast's method and cooling curve method of determining molar mass
28. Explain the terms Efflorescence and Deliquescence
29. How will you determine pH of a solution using quinhydrone and glass electrode?
30. Explain the principle of freezing mixture by taking KI- H_2O system as example
31. An aqueous solution containing 0.25g of a solute dissolved in 20g of water froze at -0.42°C . Calculate the molar mass of solute. Molar heat of fusion of ice at 0°C is 6.025 KJ and $R = 8.314\text{ JK}^{-1}\text{mol}^{-1}$.

(6x4 =24 marks)

Section D

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

32. a) Derive van der Waal's equation of gas
b) Describe Linde's method of liquefaction of gas
33. a) Explain Schottky and Frenkel defect
b) Write a brief note on different types of liquid crystals and their molecular arrangement.
34. a) Explain any three applications of liquid crystals. Discuss Pattinson's process for the desilverisation of lead
b) Explain the application of phase rule to the study of dissociation of hydrates of copper sulphate
35. a) Explain Debye Huckel theory of strong electrolytes
b) What are concentration cells? Derive an equation for the E.M.F of a concentration cell with transference

(2x15 =30 marks)

Core Course - VII
19UPO543: POLYMER CHEMISTRY-I

Credits: 4

72 hours

COURSE OBJECTIVES

The objectives of the course are:

1. To understand the history and evolution of polymer science.
2. To introduce eminent personalities in the field of polymer science.
3. To introduce the specialized subject of the chemistry of polymers.
4. To familiarize the students with the types of polymers, the significance and determination of their molecular mass .
5. To understand in detail the mechanisms of the reactions that lead to the formation of polymers.

COURSE OUTCOME

The learners will be able to explain evolution of polymer science and the basic concepts involved in polymer science. Realise the concepts of polymerisation mechanisms, molecular weight and degree of polymerisation.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 4 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 72 hours lecture.

COURSE SYNOPSIS

History of polymer science, important events in polymer history, eminent personalities in this field. Basic principles of polymer chemistry, inorganic polymers, molecular mass & size, mechanism & kinetics of free radical, ionic, condensation polymerization and copolymerization.

COURSE CONTENT

Module 1-Basic principles of polymer chemistry

12 hours

Historical development of polymer chemistry, important events in polymer chemistry. Monomers, polymers, repeating units, functionality, degree of polymerization. Nomenclature of polymers. Classification of polymers. Conformation and configuration in macromolecules, tacticity. Some important plastics used in daily life; LDPE, LLDPE, HDPE, PP, PVC, PS, PMMA, PTFE, PET (structure and applications) Inorganic polymers-importance, advantages and applications- structure, preparation and properties of silicones and polyphosphazenes. Comparison with organic polymers.

Module II- Free radical addition polymerization

12 hours

Chain growth polymerization. Mechanism of chain growth polymerization. Initiation, propagation and termination. Types of free radical initiators (peroxy, azo and redox initiators). Initiator efficiency. Inhibitors and retarders - functions and examples. Chain transfer reactions. Kinetics of chain growth polymerization. Kinetic chain length. Auto acceleration, thermal & electrochemical polymerization.

Module III Ionic & stereoregular polymerization

12 hours

Ionic polymerization - anionic and cationic catalysts, Solvent and temperature effects in ionic polymerizations. Mechanism and kinetics of anionic and cationic polymerizations, counter ions and termination modes. Initiation by metal amides, metal alkyls and electron transfer in anionic mechanisms. Living polymers. Coordination polymerization: stereo regularity, Ziegler-Natta catalysts. Metallocene catalysts. Bimetallic and monometallic mechanisms.

Module IV - Condensation or step growth polymerization

12 hours

Step growth polymerization, carbonyl addition-elimination mechanism, direct reaction, interchange reaction. Examples like polyamides, polyesters, polyethers, polybenzimidazoles etc. Average functionality, basic characteristics, extent of reaction, degree of polymerization, Carother's equation and gel point. Mechanism and kinetics of self-catalysed and non-catalysed esterification. Ring-opening polymerisation of cyclic ethers & cyclic amides. Interfacial polymerization. Melt & solution polymerization. Rearrangement polymerization.

Module V - Copolymerisation

12 hours

Copolymerization: random, alternate, block and graft. Copolymerization involving two monomers (free radical

mechanism). Derivation of copolymerisation equation, types of copolymerization behavior, reactivity ratio & its determination. Q-e scheme. Synthesis of copolymers. Range of applicability of copolymerization equation. Polymerisation techniques (bulk, solution, suspension and emulsion).

Module VI - Molecular mass & its determination

12 hours

Molecular mass, threshold value. Number & weight molecular mass & their calculation. Z average & viscosity average molecular mass (equations only). Polydispersity index, molecular mass distribution curve.

Absolute and relative methods of molecular mass determination. Determination of No. average molecular mass - end group analysis, cryoscopy & vapour phase osmometry, Weight average molecular mass-ultracentrifugation (principle only), Light scattering method, zimm plot (No experimental details expected), viscosity average molecular mass, Gel permeation chromatography. Determination of number average and weight average molecular weight from gel permeation chromatograms.

References:

1. Malcom P. Steves, *Polymer chemistry-An introduction*, 3rd edition, Oxford University Press.
2. F. W. Billmeyer, *Text book of Polymer Science*, 3rd edition, John Wiley & Sons.
3. V.R. Gowariker, N. V. Viswanathan & J. Sreedhar, *Polymer Science*, New Age International Publishers.
4. P. Bahadur & N. V. Sastry, *Principles of Polymer Science*, Narrora Publishing House, 2nd Edition, New Delhi.
5. Premamoy Ghosh, *Polymer Science & Technology*, 3^r edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
6. G. Odian, *Principles of polymerization*, 3rd edition, John Wiley & Sons.
7. G. S. Misra, *Introductory Polymer Chemistry* New age International Publishers & Distributors, New Delhi.
8. V. K. Ahluwalia & A. Misra, *Polymer Science- A Text Book*, Ane Books, India, **New Delhi**.
9. J. R. Fried, *Polymer Science & Technology*. Prentice Hall of India Pvt. Ltd, New Delhi. **freightage of marks:**

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO543: POLYMER CHEMISTRY-I

Time: 3 hours

Maximum marks: 80

Section A

(Answer all questions. Each carries 1 mark) \.

1. Write the repeating units in (a) Nylon 6 (b) Nylon 6, 6
2. What is the functionality of phenol in polymerization reactions?
3. Write the IUPAC name of (a) polymethyl methacrylate (b) poly vinyl acetate.
4. Show the influence of solvent on cationic polymerization mechanism.
5. What is meant by end group analysis of a polymer?
6. What are the minimum requirements for a molecule to undergo condensation polymerization?
7. What is autoacceleration?
8. If the degree of polymerization of polyethylene is 100. What is its molecular mass?
9. Write the expression for Z- average molecular mass
10. What is Dacron?

(10x1=10)

Section B

(Answer any 8 questions. Each question carries 2 mark

11. Write the structures showing the isotactic & syndiotactic arrangements in polypropylene
12. Name two commonly used packing materials in Gel Permeation Chromatography
13. What is meant chain transfer reactions? Give an example of a chain transfer agent
14. Why is molecular mass of a polymer quoted as an average?
15. Comment on the specificity in coordination polymerization
16. What is ring opening polymerization?
17. Define kinetic chain length. How is it related to degree of polymerisation?
18. Explain ester interchange reactions.
19. Compare the properties of inorganic & organic polymers
20. Mention the important applications of PTFE.
21. What is the practical significance of polymer molecular weight?
22. What is telomerisation? Give an example

(8x2=16)

Section -C

(Answer any 6 questions. Each question carries 4 marks)

23. Name four important events in the history of polymer chemistry.
24. The threshold molecular weight of polyethylene is higher than nylon -6. Why?
25. Make a comparative study of addition & condensation polymerization.
26. Explain electron transfer mechanism in polymerization.
27. Write a short note on gel permeation chromatography.
28. Give the mechanism of free radical polymerization of polystyrene.
29. How block and graft copolymers synthesized?
30. Explain different types of free radical initiators.
31. How copolymerization behavior is predicted on the basis of reactivity ratios?

(6x4=24)

Section D

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

32. a) Derive copolymerization equation.
b) Write the preparation, properties & applications of polyphosphazenes
33. Explain the determination of molecular weight of a polymer by
a) Osmometry
b) Light scattering method
34. a) Write the bimetallic mechanism of Ziegler-Natta polymerization
b) Explain melt & interfacial polymerization techniques
35. a) Describe solution & suspension polymerization techniques and make a comparative study.
b) Explain the non-catalysed and catalysed esterification.

(2x15=30)

Core Course - VIII

19UPO544: Organic Chemistry Experiments (Chemistry Lab Course No-III)

Three hours examination in semester V

Credits: 3

108 hours

COURSE OBJECTIVES

The objective of this course is to train the students in qualitative and quantitative chemical analysis of organic materials. On completion, the student will have the necessary expertise in laboratory based organic analysis

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 0-0-6 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 108 hours lab instruction.

COURSE SYNOPSIS

Laboratory based qualitative and quantitative analysis of organic materials.

COURSE CONTENT

Module 1. Elemental tests for Nitrogen, Halogens and Sulphur.

Module 2. Determination of physical constants.

Module 3. Study of the reactions of common functional groups using known organic compounds.

Module 4: Qualitative analysis with a view to characterization of functional groups and identification of the following compounds:- Naphthalene, Anthracene, Chlorobenzene, Benzyl chloride, p-Dichlorobenzene, Benzyl alcohol, Phenol, o-, m- and p-Cresols, 1- and 2-Naphthols, Resorcinol, Benzaldehyde, Acetophenone, Benzophenone, Benzoic, Phthalic, Cinnamic and Salicylic acids, Ethyl benzoate, Methyl salicylate, benzamide, Urea, Aniline, o-, m- and p- Toluidines, Dimethyl aniline, Nitrobenzene, o- and p-Nitrotoluenes, m-Dinitrobenzene, and Glucose.

Module 5: Organic preparations involving Halogenation, Nitration, Oxidation, Reduction, Acetylation, Benzoylation, Hydrolysis and Diazotisation.

Module 6: Chromatography. Thin layer chromatographic separation of mixture of Nitro anilines, and Dyes by Column Chromatography.

Module 7: Organic Estimations. Molecular mass determination of an acid by titration method..Determination of the equivalent of an Ester. Determination of Phenol or Aniline by bromate- bromide method.

1. A.I. Vogel, "A Text Book of Quantitative Organic Analysis".
2. V. K. Ahluwalia and R. Aggarwal, "Comprehensive Practical Organic Chemistry" Vol 1 & 2, University Press.

CHEMISTRY LAB COURSE- III (PRACTICAL)
19UPO544: ORGANIC CHEMISTRY EXPERIMENTS
SCHEME OF VALUATION

Time : 3 hours

Maximum marks: 80

Components for End semester valuation of organic Chemistry experiments

SI No	Components	Marks
I	Organic Preparation(14marks) a) Equation and procedure for preparation of compound b) Quantity of the compound c) Quality of the compound d) Recrystallised sample	6 2 2 4
II	Qualitative Analysis(46) a) Preliminary examination b) Elemental analysis c) Aromatic or aliphatic d) Saturated or unsaturated e) Identification and confirmation of functional group f) Systematic recording g) Suggestion and preparation of derivative h) Display of organic derivative i) Viva voce	4 4 4 6 8 4 4 2 10
III	Lab record	20

Core course - IX

19UPO545: Polymer Chemistry Experiments. (Chemistry Lab Course No-IV)

Three hours examination in semester V

Credits: 2

COURSE OBJECTIVES

The objective of this course is to equip the students with skill in polymer related laboratory work

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 0-0-3 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lab instruction.

COURSE SYNOPSIS

1. Laboratory based qualitative and quantitative analysis of polymeric materials.
2. Preparation of polymers

COURSE CONTENT

Module 1

Determination of: 1. ammonia content 2. total solid content 3. dry rubber content 4. KOH number. 5. acid value 6. iodine value 7. estimation of hydroxyl groups 8. estimation of nitrogen in polymeric and related samples.

Module II

Determination of: 1. ash content; 2. volatile matter and 3. Metal (Cu, Fe and Th) content of dry rubber.

Module III

Qualitative analysis of plastics and rubbers

Module IV

Synthesis of different polymers involving various polymerization processes and techniques.

References

Handbook for analysis of synthetic polymer and plastics, J. Urbanski, W. Czerwinski, K. Janicka et al., Ellis Harwood Ltd.

CHEMISTRY LAB COURSE-1V (PRACTICAL)
19UPO545: POLYMER CHEMISTRY EXPERIMENTS
SCHEME OF VALUATION

Time: 3hours

Maximum marks: 80

Components for end semester valuation of Polymer Chemistry experiments

SI No	Components	Marks
1	Quantitative analysis of polymer(30 marks) a)Principle, equation and procedure for polymer estimation b)Per- formance c)Neat tabulation d)correct calculation e)Quality and thickness f) Accuracy up to 2% 8marks, 2.1 to2.4 % 6marks,2.5 to2.9% 4 marks, 3 to 3.4% 2 marks and above 3.5% 1 mark	5 5 5 5 2 8
2	Qualitative analysis of polymer (20 marks) a) Preliminary experiments b) Elemental analysis c) Group identification d) Identification and confirmation of sample e) Systematic recording f) Viva voce	4 4 2 4 2 4
3	Polymer preparation(10 marks) a)Equation and procedure for polymer preparation b)quantity of sample c)quality of sample d) Display	5 2 2 1
4	Record	20

Open Course

19UPO551: CHEMISTRY IN EVERY DAY LIFE

Credits: 2

54 hours

COURSE OBJECTIVES

The objective of this course is to make the students aware of the contributions of chemistry in making our life pleasant and comfortable. Harmful effects of chemicals and the recent developments too are discussed.

COURSE OUTCOME

In our everyday life we come across with many utility materials which are all contributions of chemistry whether it is food, clothes, drugs or cosmetics. This interdisciplinary paper is designed to make the students aware of the significance of chemistry in every day life.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3-0-0 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lecture.

COURSE SYNOPSIS

Basic concept of chemistry, fundamentals of biochemistry, idea about drugs, dyes, soaps & detergents, polymers, silicates, environmental chemistry, nano technology & green chemistry.

COURSE CONTENT

Module 1 (Basic concept of chemistry)

9 hours

Importance of chemistry, subatomic particles-proton, electron, neutron, Bohr model of Atom, Dual behaviour, Heisenberg's uncertainty principle, orbital concept, Aufbau principle, Hund's rule, Pauli's exclusion principle, electronic configuration, Modern periodic table, types of elements, chemical bonding – energetic of bond formation, ionic & covalent bond, H-bond, effect of H-bonding on physical properties.

Module 2(Fundamentals of Biochemistry)

9 hours

Biochemistry, elements in living organism, Carbohydrates - definition, classification based on taste, functions. Proteins - amino acids, simple examples, structure, classification, essential & non-essential amino acids, peptide bond, proteins - classification on the basis of molecular structure, difference between fibrous & globular proteins, biological functions of proteins, denaturation of protein.

Enzymes - Definition, function, characteristics, coenzymes (papain)

Nucleic acids - Definition, biological functions of DNA & RNA, genetic code. Vitamins - Definition, classification, physiological functions, important vitamins, their sources & deficiency diseases. (vitamin A, B₁, C, D, E, K, & H)

Module 3 Chemistry in action

9 hours

Drugs, classification, chemotherapy, analgesics, antipyretics, antiseptics, disinfectants, tranquilisers, antimicrobial, antibiotic, antacids (function & examples only) sulpha drugs – General structure, synthesis & uses.

Dyes- definition, chromophore-auxochrome theory, examples (no structure). Soaps, preparation, hard & soft soaps, cleansing action of soap.

Detergents, classification. superiority of detergents over soaps. Hardness of water, temporary & permanent hardness.

Food preservatives- examples. Natural and artificial sweeteners (Saccharin, sorbitol, aspartame, alitame).

Module 4 Basic concept of Polymer chemistry

9 hours

Monomers, polymers, degree of polymerization, functionality, homopolymer, heteropolymer, copolymers; block, graft, alternate & random. Classification based on origin, structure, synthesis & molecular force. Inorganic polymer, examples only. Some important plastics used in daily life; LDPE, HDPE, PP, PS, PVC, PMMA & Bakelite (structure & applications). Advanced materials- carbon fibres- CFRP & CFRC, advantages & application. Biodegradable polymer, recycling, recycling codes.

Module 5 -Environmental Chemistry

9 hours

Pollution- types of pollution, air pollution, air pollutants, acid rain, photochemical smog, particulates, ozone

layer depletion, air pollution control. Water pollution - Types of pollutants, characterization of waste water, methods used in wastewater treatment, characteristics of potable water, treatment of water for municipal purposes, fluoride problem in drinking water. Soil pollution - sources of soil pollution, effects of soil pollutants, control. Nuclear hazards- sources of radioactive pollution damages to biological systems, hazards & control

Module 6 -Frontiers in chemistry

9 hours

Introduction to Nano science and Nano technology, evolution of nano science-Historical aspects, nanostructures in traditional medicine, Lyncurus cup, Faraday's divided metal. Nanosystems in nature, classification 0D, 1D, 2D, & 3D. Nano particles, nano wires, Fullerenes, CNT, quantum dots, applications (brief idea only).

Green chemistry -Role of chemical industries in polluting the environment, waste management in our city, introduction to the principles of green chemistry, basic aspects of atom economy calculations.

References:

1. J. D. Lee, Concise Inorganic Chemistry, Black Well Science
2. John McMurry Fay & Robert C. Fay, Chemistry 4th edition, Pearson.
3. ArunBahl & B.S. Bahl, A Text book of Organic Chemistry, S. Chand
4. PremamoyGhosh, Polymer Science & Technology, Tata McGraw
5. S. P. Bhutani, Chemistry of biomolecules, Ane Books.
6. S. Shanmugham, Nanotechnology, www.rm'p Publishers
7. Dominic W. S.Wong Mechanism & Theory in food chemistry, CBS Publishers
8. Dr.S. S. Dara, Dr.D. D. Misra, A Text book of environmental Chemistry& Pollution control.
9. Anastas,P.T., Warner, J.C.,Green Chemistry-Theory & Practice, Oxford Univ. Press.
10. Alex v.Ramani, Food Chemistry,www.mjpublishers.com
11. Bhupinder Mehta & Manju Mehta,Organic Chemistry.
12. De Man,Third edition,Principles of Food Chemistry,Springer,2007.
13. Srivastava R.P & Kumar S. 2006. Preservation of Fruits & Vegetables,ICAR,New Delhi.

Distribution of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO551: CHEMISTRY IN EVERY DAY LIFE

Time: 3 hours

Maximum marks: 80

Section A

(Answer all questions. Each question carries 1 mark)

1. State Pauli's exclusion principle.
2. Write the actual electronic configuration of Cu.
3. Recycling code of PVC is -----.
4. What is temporary hardness?
5. Name any two antibiotics
6. Distinguish between enzyme and coenzyme.
7. What is the size of gold in nanometer
8. Name a water soluble vitamin.
9. What is BOD?
10. What is biodegradable polymer?

(10x1=10)

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. What are antipyretics? Give two examples.
12. Differentiate between electron affinity & electronegativity.
13. What are antacids? Give two examples
14. What are the magnetic properties of nanoparticles?
15. Write short note on genetic code
16. Give one method to remove permanent hardness of water
17. What is atom economy?
18. Write short note on fluoride problems in drinking water
19. List four air pollution control methods
20. Name two block copolymers.
21. Describe the role of chemical industries in polluting the environment
22. State and explain Heisenberg's uncertainty principle

(8x2=16)

Section C

(Answer any 6 questions. Each question carries 4 marks)

23. Explain the cleansing action of soap
24. Differentiate between antiseptic & disinfectant.
25. Discuss on fluoride treatment of water.
26. Describe the following ,
 - a) Recycling
 - b) Inorganic polymers
27. How polymers are classified based on molecular force?
28. Explain the theory of enzyme action.
29. Describe the following with two examples
 - a) Food preservatives.
 - b) Artificial sweetners.
30. Write short note on the nuclear hazards and its damages to biological systems.
31. Narrate the applications of nanotechnology.

(6x4=24)

Section D

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

32. Explain water pollution? How is water purified?
33. Discuss on
 - a) The functions of proteins
 - b) Classification of carbohydrates

34. Write notes on

- a) Basic principles of green chemistry
- b) The sources, function and deficiency disease of vitamin A,B,C,D and K

35. Write short note on

- a) Faraday's divided metal
- b) Soaps & cleansing action
- c) Addition & condensation polymers

(2x15=30)

Semester VI
Core Course - X
19UPO641: Inorganic Chemistry II

Credits: 3

54 hours.

COURSE OBJECTIVES

1. To understand the electronic configuration and general properties of transition metals, lanthanides and actinides
2. To enable the students to learn about the bonding in co-ordination and organometallic compounds.
3. To grasp the concepts of symmetry and its applications in inorganic structural chemistry
4. To learn about the compounds of non-transition elements, non-aqueous solvents and bioinorganic chemistry

COURSE OUTCOME

Upon successful completion of this course the students will be able to explain the importance of transition metals, lanthanides and actinides.

Explain the significance of co-ordination and organometallic compounds and point out the role of metals in biological functions.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3-0-0 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lecture.

COURSE SYNOPSIS

Transition metals, Lanthanides & Actinides, Coordination chemistry, Introduction to Group theory, Chemistry & applications of organo metallic compounds, structure & properties of compounds of non-transition elements, non-aqueous solvents, structure, properties & applications of metal ions in biological systems, metallo enzymes & photosynthesis.

COURSE CONTENT

Module I -Transition & Inner Transition elements

9 hours

Transition elements -Electronic configuration & general characteristics, abundance, difference between the 1st row and the other two rows.

Lanthanides - Electronic configuration, general properties, occurrence, separation– chemical & ion exchange methods, lanthanide contraction & its consequences, magnetic properties & complex formation behaviour.

Actinides - Electronic configuration position in periodic table oxidation state, occurrence, Trans actinides - Names & symbol.

Module II -Coordination Chemistry - I

9 hours

Double salts & coordination compounds, nomenclature, Werner's theory, EAN rule, shapes of d orbitals, chelates, bonding in transition metal complexes, V. B. Theory, Crystal field theory - explanation of magnetic properties, geometry, colour, electronic spectra of d¹ & d⁹ systems, spectrochemical series, effects of crystal field splitting, Jahn-Teller distortion, M. O. theory, applications of coordination complexes.

Module III -Coordination chemistry II& Group theory

9 hours

Isomerism & stability of complexes, factors affecting stability, geometry of different coordination numbers, application of complexes in qualitative & quantitative analysis. Group theory - elements of symmetry, proper & improper axis of symmetry, plane of symmetry, centre of symmetry & identity element. Combination of symmetry elements, point groups (C_{2v} & C_{3v}). Schoenflies symbol of simple molecules like H₂O, NH₃ & BF₃

Module IV -Organometallic Compounds

9 hours

Definition, nomenclature & classification, 18 electron rule, metal carbonyls (mono nuclear & poly nuclear - examples of carbonyls of Fe, Co, & Ni), preparation & properties of carbonyls of Fe & Ni, structure & nature of metal-carbonyl bonding in mononuclear Ni carbonyls, bonding in ferrocene, structure & application of Ziese's salt, Wilkinson's catalyst. Application of organo metallic compounds.

Module V - Compounds of non-transition elements & non-aqueous solvents

9 hours

Preparation properties & structural aspects of following: boron nitrides, borazole, boron hydrides.

Preparation & properties of hypohalous acids, per halic acid & pseudo halogens, chemistry of cement, glass, ceramics & Xenon compounds.

Non - aqueous solvents - Classification of solvents, characteristics of common solvents, protic & aprotic solvents, liquid ammonia solutions of alkali metals, reactions in liquid SO_2 & liquid HF.

Module VI Bioinorganic chemistry

9 hours

Role of alkali & alkaline earth metal ions in biological systems, biological functions, excess & deficiency diseases of Cr, Mn, Cu, Fe, Ni & Co. Toxicity of metal ions (Pd, As, Cd, Mg), oxygen carriers, haemoglobin & myoglobin - structure & mechanism of action, cooperative effect in Hb, biochemistry of iron, biological role of Mg & Ca ions, elementary idea of cytochromes, ferretin & ferredoxins, Metallo enzymes - carbonic anhydrase & peroxidase, photosynthesis, principle & mechanism.

References:

1. J. D. Lee, Concise inorganic chemistry, Blackwell science limited
2. SathyaPrakash, G. D. Tuli, S. K. Basu & R. D. Madan, Advanced Inorganic Chemistry, (Vol. 1), S. Chand & Co. Ltd., New Delhi.
3. F. A. Cotton, L. Gaus & G. Wilkinson, Basic Inorganic Chemistry, John Wiley & Sons.
4. B. R. Puri, L. R. Sharma & K. C. Kalia, Principles of Inorganic Chemistry, Vallabh Publications, New Delhi
5. D. F. Shriver, P. W. Atkins & C. H. Langford, Inorganic Chemistry, Oxford Univ. Press
6. M. C. Day & J. Selbin, Theoretical Inorganic Chemistry, East west press pvt. Ltd.
7. R. D. Madan, Modern Inorganic Chemistry, S. Chand & Company Ltd. New Delhi
8. SathyaPrakash, G. D. Tuli, Basu S. K. & Madan R. D, Advanced Inorganic Chemistry, (Vol. 11), S. Chand & Co. Ltd, New Delhi
9. W. U. Malik, G. D. Tuli & R. D. Madan, Selected Topics in inorganic chemistry, S. Chand & Co. Ltd, New Delhi.
10. M. N. Hughes, The Inorganic chemistry of biological processes, John Wiley.

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UP01641: INORGANIC CHEMISTRY-II

Time: 3 Hrs

Maximum marks:80

Section A

(Answer all questions. Each question carries 1 mark)

1. Give the general electronic configuration of transition elements
2. What is the theoretical magnetic moment of Ti^{+3}
3. Write the IUPAC Name of $[CuCl_2 (CH_3NH_2)_2]$
4. What is spectrochemical series?
5. What are chelates?
6. Write the Shoenflies symbol
7. What is improper axis of symmetry?
8. Give the formula of a metal carbonyl which do not obey 18 electron rule
9. Write the structure of Ziese's salt
10. Give the structure of borazole

(10x1=10)

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. Differentiate between double salts and coordination compounds
12. State and explain EAN rule
13. Solutions of the hydrated Ti^{+3} ions are reddish violet colored. Give reason
14. State and explain Jahn -Teller distortion
15. Write any one method for the preparation of polynuclear carbonyl of Cobalt
16. Comment on the nomenclature of organo metallic compounds
17. What are pseudohalogens? Give an example
18. What are protic and aprotic solvents?
19. List the role of alkaline earth metal ions in biological systems
20. Write excess and deficiency diseases of Cu and Mn
21. Describe the biological role of Mg
22. What are metalloenzymes? Give an example

(8x2=16)

Section -C

(Answer any 6 questions. Each question carries 4 marks)

23. Describe the variable oxidation state shown by transition metals
24. Discuss the drawback of V.B.Theory of complexes
25. Explain the stereoisomerism shown by the complex $[Co (NH_3)_4Cl_2]$
26. Discuss the nature of metal carbonyl bonding in mononuclear carbonyl of Ni
27. Mention the application of organometallic compounds in medicine
28. Narrate the reactions of alkali metals in liquid HF
29. Give an account of the preparation and properties of hypochlorous acid
30. Explain the principle and mechanism of photosynthesis
31. Narrate the toxic effect of cadmium and mercury

(6x4=24)

Section D

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

32. a) Make a comparative study of 3d, 4d and 5d transition series
b) What is Lanthanide contraction? Explain its causes and consequences.
33. a) Explain the electronic spectra of dI and dg systems
b) Comment on the factors that affect the stability of coordination complexes
34. a) Narrate the application of complexes in qualitative analysis
b) Describe the bonding in ferrocene
35. a) Give an account on the structure of Xenon compounds
b) Describe the biochemistry of iron

(2x15=30)

Core Course - XI
19UPO642: Physical Chemistry III

Credits: 4

72 hours.

COURSE OBJECTIVES

1. To introduce the concepts of quantum mechanics.
2. To familiarise the students with the theory, instrumentation and application, at an introductory level, of the various spectroscopic methods in chemistry.
3. To learn the chemical behaviour of substance in the colloidal state, the physicochemical aspects of photochemical, catalytic and adsorption phenomena. Upon finishing the course, the student is expected to gain introductory level knowledge of QM and Spectroscopy with relevance to chemical systems, and will understand colloidal state of chemical substance, the theories of photochemistry, catalysis and adsorption

COURSE OUTCOME

Upon finishing the course, the student is expected to gain introductory level knowledge of QM and Spectroscopy with relevance to chemical systems, and will understand colloidal state of chemical substance, the theories of photochemistry, catalysis and adsorption.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 4-0-0 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 72 hours lecture.

COURSE SYNOPSIS

Preliminary quantum mechanics. Theory and applications of rotational, vibrational, electronic and Raman spectroscopy. Introductory NMR, ESR and EIMS spectroscopy. Colloidal state of chemical substance, theories of adsorption, photochemistry and catalysis

COURSE CONTENT

LECTURES

Module I Development of Quantum Mechanics

12 hours

Radiation phenomena: Black body radiation. Planck's quantum theory, Photoelectric effect, Compton effect and atomic spectra. Concept of operators: Linear, Laplacian, Hamiltonian and Hermitian operators. Postulates of quantum mechanics. Derivation of Schrodinger wave equation and its significance. Eigen functions and eigen values.

Application of quantum mechanics to simple systems: Particle in 3D box and its complete solution. Concept of degeneracy. Schrodinger equation for H atom - Separation into three equations (without derivation). Simple harmonic oscillator: Classical treatment - Derivation of total energy of the oscillator. Quantum mechanical treatment - Schrodinger equation of the particle executing simple harmonic motion and energy expression (No derivation)

Module II Rotational and Vibrational Spectroscopy

12 hours

Regions of electromagnetic spectrum. Different units of energy (erg, Joule, calorie, cm^{-1} , Hz, A° and eV) and their interconversions. Interaction of radiations with matter. Various types of molecular spectra. Born-Oppenheimer approximation.

Rotational spectroscopy: Microwave spectra of rigid diatomic molecules. Moment of inertia. Derivation of energy expression and rotational energy levels. Selection rule. Determination of bond length. Effect of isotopic substitution. Vibrational spectroscopy: Harmonic oscillator. IR spectra of diatomic molecules. Energy expression. Selection rules. Frequency of separation. Calculation of force constant. Anharmonic oscillators.

Morse equation. Fundamental and overtone transitions. Combination bands and hot bands. Degree of freedom of polyatomic molecules. Group frequencies and application of IR spectra.

Module III Raman, UV-VIS and NMR Spectroscopy

12 hours

Raman spectroscopy: Stokes and antistoke's lines. Quantum theory of Raman effect. Rotational Raman spectrum. Selection rule. Frequency of separation. Vibrational Raman spectrum. Mutual exclusion principle. Advantages of Raman Spectroscopy.

Electronic spectroscopy: Electronic spectra of diatomic molecules. Franck-Condon principle. Singlet and triplet states. Dissociation and predissociation. Dissociation energy. Selection rules. Electronic spectra of polyatomic molecules (qualitative idea only).

NMR spectroscopy: Principle of NMR, Nuclear spin. Interaction of nuclear magnet with external magnet.

Precession. Relaxation. Shielding and deshielding effect. Chemical shift. Delta and tau scales. Spin - spin coupling. Low and high resolution spectra. Interpretation of PMR spectra of simple molecules such as ethyl bromide, ethanol, acetaldehyde, ethyl acetate, toluene and acetone.

Module IV ESR, EIMS and Non Spectral methods

12 hours

Electron spin resonance spectroscopy: Principle. Types of substances with unpaired electrons. Interaction of electron magnet with external magnet. Energy level splitting. Lande splitting factor. Presentation of ESR spectrum. The normal and derivative spectra. Hyperfine splitting. Simple examples like hydrogen atom, methyl and benzene radicals.

Mass spectrometry: Theory of mass spectrum. Production of ions. Base peak and molecular ion peak. Common types of dissociation. Mass spectra of simple molecules. Application of mass spectrometer in the determination of molar mass.

Non-spectral 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 refractions. Optical exaltation. Parachor and atomic equivalent of parachor.

Module V Photochemistry and Catalysis

12 hours

Beer-Lambert Law, Grotthuss-Draper law and Stark-Einstein Law of Photochemical Equivalence. Quantum Yield, Reason for very low and very high quantum yields. Kinetics of decomposition of HI. Qualitative treatment of H_2-Cl_2 reaction. Fluorescence and phosphorescence. Photosensitisation and chemiluminescence. Explanation and examples.

Catalysis: Theories of catalysis, Intermediate formation theory, steady state method, Enzyme Catalysis-mechanism. Effect of temperature on enzyme catalysis. Michaelis-Menten equation.

Module VI Colloids and Adsorption

12 hours

Colloidal state: Purification of colloidal solutions -dialysis and ultra-filtration. Kinetic, electrical and optical properties of colloidal systems-Ultra microscope, Electrical double layer and zeta potential.

Coagulation of colloids, Hardy-Schulz rule and gold number. Gels- elastic and non-elastic gels, imbibition, synergesis. Surfactants -micelles, critical micelle concentration, sedimentation and streaming potential. Application of colloids-Cottrell precipitator-sewage disposal-formation of deltas. 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 Langmuir equation. Applications of adsorption.

About 150 problems to be worked out.

References:

1. S. Glasstone & Lewis, "Elementary Physical Chemistry", Longman.
2. Kundu and S. K. Jain, "Physical Chemistry", S Chand.
3. K. L. Kapoor, "Elements of Physical Chemistry", Macmillan
4. G. M. Barrow, "Physical Chemistry", 6th edn, McGraw-Hill.
5. R. A. Alberty & R. J. Silbey, "Physical Chemistry", John Wiley.
6. G. W. Castellan, "Physical chemistry", Nafosa.
7. P. W. Atkins, "Physical Chemistry", Longman.
8. M. Chanda, "Atomic Structure & Chemical Bond Including Molecular Spectroscopy", Tata McGraw Hill.
9. C. N. Banwell, "Fundamentals of Molecular Spectroscopy", Tata McGraw Hill.
10. M. C. Gupta, "Atomic and Molecular Spectroscopy", New Age.
11. P. S. Sindhu, "Fundamentals of Molecular Spectroscopy", New Age International.
12. R. K. Prasad, "Quantum Chemistry", New Age International.
13. Puri, Sharma & Pathania, "Principles of Physical Chemistry", Vishal.

Weightage of marks:

Module	I	II	III	IV	V	VI
Marks	21	21	22	22	22	22

MODEL QUESTION PAPER
19UPO642: PHYSICAL CHEMISTRY - III

Time : 3 Hrs

Maximum marks:80

Section A

(Answer all questions. Each question carries 1 mark)

1. Define Laplacian operator
2. Which of the following will show rotational spectrum? H_2 , N_2 , H_2O , CO_2 and HCl
3. What is meant by threshold frequency?
4. Which valence state of copper will show e.s.r spectra
5. Predict the number of lines in the e.s.r spectrum of methyl radical
6. Sketch the high resolution N.M.R spectrum of ethyl alcohol
7. How many fundamental vibrational frequencies are expected for H_2O and CO_2 molecules
8. Give the expression for Gibbs adsorption isotherm
9. Define quantum yield of a photochemical reaction
10. Give an example for chemiluminescence

(10x1 = 10 marks)

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. State and explain zeta potential
12. Distinguish between sedimentation potential and streaming potential
13. Discuss black body radiation
14. What is meant by photoelectric effect
15. Explain chemical shift in nmr spectroscopy
16. How does stokes and anti-stokes lines originate in Raman spectrum
17. How is magnetic susceptibility measured?
18. How does hyperfine splitting arise in e.s.r?
19. Distinguish between chemical and physical adsorption
20. What is phosphorescence?
21. What are fundamental bands and overtones?
22. Explain the terms singlet and triplet states

(8x2 =16 marks)

Section C

(Answer any 6 questions. Each question carries 4 marks)

23. What are the methods by which ions are produced in mass spectrometer?
24. Explain mutual exclusion principle and how is it useful in structure elucidation
25. What is Debye equation? Explain its significance
26. Discuss harmonic and anharmonic oscillator
27. Explain Franck- Condon principle
28. Explain the terms fluorescence and phosphorescence
29. What are the postulates of quantum mechanics? Explain
30. Explain spin -spin coupling and high resolution spectra in nmr with an example
31. The fundamental vibrational frequency of carbon monoxide molecule is 2170 cm^{-1} . Calculate the force constant of the molecule.

(6x4 =24 marks)

Section D

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

32. a) Derive Langmuir adsorption isotherm
b) Explain the determination of surface area of a solid by Langmuir adsorption isotherm
33. Derive
a) The expression for the kinetics of decomposition of HI
b) Michaelis - Menten equation
34. a) Give a brief account of the application of IR spectroscopy in the structure determination of organic molecules
b) Derive an equation to determine the moment of inertia and energy of a rigid diatomic molecule in Rotational spectroscopy
35. a) Explain the application of mass spectra in the determination of molar mass
b) Derive the expression for total energy of a particle in a three dimensional box

(2x 15 =30 marks)

Core Course - XII
19UPO643: Polymer Chemistry II

Credits: 4

72hours

COURSE OBJECTIVES

1. To introduce the concept of polymer structure and the critical importance of T_g and T_m .
2. To provide an overview of polymer reactions and reactivity of polymers.
3. To understand factors that influences the degradation of polymers.
4. To give an idea of management of plastics in environment.
5. To enable them to understand the process of recycling, incineration, land filling and biodegradation.
6. To learn about the behaviour of polymers in solution and to introduce biopolymers.

COURSE OUTCOME

Upon successful completion of the course the learners are able to emphasise the importance of various types of polymer reactions, management of plastics in environment like incineration, land filling, recycling and biodegradation and get an overview of polymer solutions.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 4 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 72 hours lecture.

COURSE SYNOPSIS

Molecular forces & bonding in polymers, crystalline state, T_g , polymer reactions, polymer solution nature, size & shape of macro molecules, polymer degradation, biopolymers, biodegradable polymers. Management of plastics in environment – Recycling, Incineration, landfilling and biodegradation. Codes of recycled items.

COURSE CONTENT

LECTURES

Module I - Molecular forces and bonding in polymers

12 hours

Primary structure - polarity of monomers. Secondary structure - conformation and configuration. Tertiary structure - crystalline and amorphous polymers. Polar and non-polar interactions. Segmental mobility and total mobility of polymer chains. Solid, liquid, glassy and rubbery states. Amorphous and crystalline behaviours. T_g and T_m . Viscoelastic deformation. Determination of T_g . Factors influencing T_g (molecular geometry, molecular mass, plasticisers, copolymerization) relationship between T_g and T_m . Importance of T_g . Factors influencing crystalline state, polymer single crystals, spherulites.

Module II — Polymer reactions-I

12 hours

Reactions involving hydroxyl, aldehydic, ketonic, carboxylic and amino groups. Hydrolysis, acidolysis, oxidation, hydrogenation, addition and substitution reactions. Prepolymers and curatives. Illustrations of curing of unsaturated polyesters with styrene, thiols with PbO_2 or epoxide or diamine. Cyclisation of natural rubber in acid medium, cross linking- photo chemical, through labile intermediate, vulcanization using peroxide, sulphur, sulphur compounds, mechanism of sulphur vulcanization.

Module III— Polymer reactions-II

12 hours

Preparation of block and graft copolymers. Cyclisation reactions of PVA and PAN, ladder and spiro polymers. Derivatives of cellulose as useful products; synthesis and applications of cellulose acetate, cellulose nitrate, and carboxy methyl cellulose. Preparation, properties and applications of ion exchange resins. Polymer drugs. Polymer supported reactions, advantages, polymers as chemical reagent. Merrifield's solid phase peptide synthesis.

Module IV - Polymer solution

12 hours

Difference of polymer solution from that of low molecular mass solutes. Swelling and formation of ellipsoid. Absolute, relative, reduced and intrinsic viscosity. Viscosity changes. Gel-sol systems. Good and poor solvents. Fractionation of polymers: fractional precipitations, gradient illusion and gel permeation chromatography. Cohesive dispersion forces. Cohesive energy density (CED). Solubility parameter, determination of solubility parameter. Entropy of mixing from Quasi crystalline lattice model concept. Ideal and non ideal solutions. Athermal solutions, excluded volume effect. Thermodynamics of polymer dissolution. Nature, size and

shape of macromolecules in solution. End to end distance and radius of gyration. Perturbed and unperturbed dimensions. Theta solvent and theta temperature.

Module V — Polymer degradation

12 hours

Process of degradation. Random and chain end degradation. Methods of degradation: thermal degradation - factors affecting thermal stability; mechanical degradation - milling and mastication; photodegradation - photostabilisers; oxidative degradation - oxidants and antioxidants; hydrolytic degradation; degradation by high energy radiation, chemical degradation. Management of plastics in environment; Recycling, incineration, land filling and biodegradation. Codes of recycled items.

Module VI- Biopolymers and biodegradable polymers

12 hours

DNA and RNA - structure and functions. Structure of proteins, Preparation, properties and applications of regenerated cellulose. Structure and applications of starch, shellac, chitiri and chitosan. Commercial applications of natural polymers-lignin, kerogen, amber, asphaltene. Biodegradable polymers, examples, polylactic acid, Biomedical applications of polymers.

References:

1. Malcom P. Sieves, *Polymer chemistry-An introduction*, 3^d edition, Oxford University Press.
2. F. W. Billmeyer, *Text book of Polymer Science*, 3rd edition, John Wiley & Sons
3. V. R. Gowariker, N. V. Viswanathan & J. Sreedhar, *Polymer Science*, New Age International Publishers.
4. P. Bahadur & N. V. Sastry. *Principles of Polymer Science*, Narrora Publishing House, 2 Edition, New Delhi.
5. Premamoy Ghosh, *Polymer Science & Technology*, 3rd edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi
6. G. Odian, *Principles of polymerization*, 3rd edition, John Wiley & Sons.
7. G. S. Misra, *Introductory- Polymer Chemistry* New age International Publishers & Distributors, New Delhi
8. V. K. Ahluwalia & A. Misra, *Polymer Science-/. Text Book*, AneBooks, India, New Delhi.
9. 7. R. Fried, *Polymer Science & Technology*, Prentice Hall of India Pvt. Ltd, New Delhi

MODEL QUESTION PAPER
19UP0643: POLYMER CHEMISTRY- II

Time: 3 hours

Maximum marks: 80

Section A

(Answer all questions. Each question carries 1 mark)

1. Tg of PVC is higher than HDPE. Why?
2. What is acidolysis reaction?
3. Give an example of a biodegradable polymer.
4. Why do rubbers retain flexibility even after cross linking while thermosets donot?
5. What is meant by leathery state of a polymer?
6. What are cure reactions?
7. Differentiate between reduced and relative viscosity.
8. Define radius of gyration.
9. What is cohesive energy density?
10. Define the term mastication.

(10x1=10)

Section B

(Answer any 8 questions. Each question carries 2 marks)

11. How is melting point of polymers differing from that of other materials?
12. Natural rubber needs vulcanization. Why?
13. What are good & poor solvents?
14. Write any two chemical reactions of polyacrolein.
15. What is carbon fibre? Mention its use.
16. What are photo stabilizers? Give two examples.
17. What is controlled drug release?
18. Explain the formation of single crystals from polymer melt.
19. Mention the commercial applications of cellulose acetate.
20. What is excluded volume effect?
21. Give the structure & applications of chitosan.
22. Write the cyclisation reactions of rubber in acid medium.

(8x2=16)

Section -C

(Answer any 6 questions: Each question carries 4 marks)

23. Describe the factors influencing crystallinity of polymers
24. Narrate the nature & size of macromolecules in solution
25. Describe the curing reaction of unsaturated polyesters.
26. Distinguish chain scission & non-chain scission degradation.
27. What is regenerated cellulose? Explain.
28. Describe any one method of determination of Tg of a polymer sample.
29. Discuss on management of plastics in environment.
30. Write short note on genetic engineering.
31. How GPC is useful in fractionating polymers?

(6x4=24)

Section D

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

32. a) Describe dissolution process of polymers in solvents. Discuss thermodynamics of polymer dissolution.
b) Management of plastics in environment.
33. Explain polymer supported reactions. Explain the structure & applications of ion exchange resins.
34. Write short note on the factors affecting thermal stability of polymers. Explain oxidative degradation & the methods to prevent it.
35. Narrate the structure & functions of DNA. Write short note on the biomedical applications of polymers.

(2x15=30)

Core Course - XIII
Chemistry Lab Course No -V
19UPO644: Gravimetry

Three hours examination in semester VI

Credits: 3

36 hours

COURSE OBJECTIVES

To equip the students with skill in the gravimetric analysis .

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab.' 0-0-2 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 36 hours lab instruction.

COURSE CONTENT

The following determinations are to be done using silica crucible Gravimetric estimation of

1. Barium as BaSO_4
2. Sulphate as BaSO_4
3. Iron as Fe_2O_3
4. Calcium as CaCO_3

The following determinations are to be done using sintered crucible

1. Magnesium as oxinate,
2. Nickel as dimethyl glyoxime complex,
3. Copper as CuCNS and
4. Silver as AgCl .

Reference:

1. A.I. Vogel, "A Text Book of Quantitative Inorganic Analysis".

B.Sc Degree Programme in Poluymer Chemistry
19UPO644: LAB Course V (PRACTICAL)
GRAVIMETRY

Time: 3Hous

Maximum Marks : 80

Main components for ESE for lab course – Inorganic gravimetric analysis		
No	Main Components in general	Marks
1.	Lab record	20
2.	Procedure with principle and equation	10
3.	Accuracy (up to 1% - 25 marks , error > 3% grace mark 8)	25
4.	Calculation	5
5	Neat tabulation and recording	5
6.	Viva	10
7.	Performance	5
	Total	80

Core Course - XIV
Chemistry Lab Course No –VI
19UPO645: Physical Chemistry Experiments

Three hours examination in semester VI

Credit-4

COURSE OBJECTIVES

To impart better understanding of the theoretical principles of physical chemistry experiments.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 0-0-6 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 108 hours lab instruction.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 0-0-6 hours per week; eighteen 5 day weeks per semester. Contact hours per semester: 108 hours lab instruction

COURSE SYNOPSIS

Laboratory experiments with emphasis on physical chemistry'.

COURSE CONTENT

Module 1. Phase Rule

Distribution law. Partition coefficient of iodine between water and carbon tetrachloride. Partition coefficient of benzoic acid between toluene and water.

Module 2, Dilute Solution

Transition temperature of a solvate. molar mass of a solute using transition point depression in freezing point. Molar mass of a solute using depression in freezing point of a solid solvent by cooling curve method

Module 3. Partially miscible liquid.

Critical Solution temperature of phenol-water system, influence of impurities (KCl or NaCl) on miscibility temperature of phenol-water system, influence of succinic acid on the miscibility temperature of phenol-water system.

Module 4, Physical properties Viscosity of simple liquids. Significance of refractive index of simple liquids and detection. And determination of parachor value.

Module 5- Thermochemistry and Kinetics

Determination of water equivalent of a calorimeter. Heat of neutralization of a strong acid by a strong base. Kinetics of hydrolysis of an ester. Determination of rate constant

Module 6 Electrochemistry

Conductometric titration of NaOH vs HCl, NaOH vs CH₃COOH Potentiometric titration of Fe²⁺ vs Cr₂O₇²⁻ KMnO₄ vs KI

References

1. Findlay & Kitchener, "Practical Physical Chemistry" Longman.
2. Yadav Practical Physical Chemistry

Examinations for 19UPO544 (lab course III) and 19UPO545 (lab course IV) may be conducted on the same day for 6 hours at a stretch,

Examinations for 19UPO644 (lab course V) and 19UPO64S (lab course VI) may be conducted on the same day for 6 hours at a stretch,

B.Sc. Degree Programme in Polymer Chemistry
LAB COURSE-VI (PRACTICAL)
19UPO645: PHYSICAL CHEMISTRY EXPERIMENTS
SCHEME OF VALUATION

Time: 3hours

Maximum marks: 80

Table 1.Components for end semester evaluation of Physical Chemistry experiments

Sl. No	Components	Marks
I.	Lab report: 1) 8 experiments& above 2) Data and sufficient experimental details 3) correctness of the result 4) Neatness of presentation	20
II.	Procedure- 1) principle of the expt 2) Relevant equation/graph 3) materials and apparatus 4) experiment	8
III.	Neat tabulation& systematic recording 1) Correct representation of data 2) Graphical representation 3) satisfactory skill in experimentation 4) Neatness of data and result presentation	8
IV.	Viva	10
V.	Performance of experiment, calculation and accuracy of the result (accuracy may depend upon the experiment)	34(details of marks distribution given separately)

1. Determination of partition coefficient

Performance, calculation and accuracy (34marks)

a)	Titration of aqueous and organic layer	6 titre values	12 marks
b)	Calculation(correct equation, substitution, final value and units		4 marks
c)	Accuracy	up to 6% error	a) 18marks

2. Determination of critical solution temperature

Performance, calculation and accuracy (34 marks)

Sl No	components	marks
1	Determination of miscibility temperature 6 values and above	12marks
2	Graph with 4 points	4 marks
3	Accuracy -up to 6% error	18 marks

3. Determination of concentration of KCl

Performance, calculation and accuracy (34 marks)

Sl No	components	marks
1	Determination of miscibility temperature 6 values and above	12marks
2	Graph with 4 points	4 marks
3	Accuracy -up to 6% error	18 marks

4. Determination of concentration of HCl

Performance, calculation and accuracy (34 marks)

Sl No	Components	Marks
a	Measurement of conductance 10 values	10 marks
b	calculation(correct equation, substitution, final value and unit)	4 marks
c	two graphs with minimum 4 points	4 marks

5. Determination of molal transition point depression constant & Determination of molecular mass by transition point method

Performance, calculation and accuracy (34 marks)

Sl. No.	Components	Marks
a	Transition point determination- 3 transition temperature	9
b	Calculation of Kf or molecular mass	4 marks
c	Graph - 3 cooling curve	6 marks
d	Accuracy -up to 6% error	15 arks

6. Determination of concentration of Fe²⁺ /KI potentiometrically

Performance, calculation and accuracy (34marks)

Sl. No.	Components	Marks
a	Measurement of emf 10 values -	10 marks
b	calculation	4 marks
c	graph with six points	6marks
d	Accuracy up to 6% error	14marks

Elective Course

19UPO661: Advanced Polymer Chemistry

Credits: 2

54hours

COURSE OBJECTIVES

1. To introduce different industrially important polymers.
2. To understand the concept of the theory behind smart polymers.
3. To provide an overview of characterization of polymers.
4. To familiarize various moulding techniques.
5. To learn about the properties & applications of natural & synthetic rubbers.
6. To provide an idea of manufacturing dipped goods like balloon, gloves etc.

COURSE OUTCOME

This course intends to take the students through various processing techniques and introduce some industrially important polymers and smart polymers. And also provide an overview of different characterisation techniques.

COURSE TRANSACTION FORMAT

Lecture-Tutorial-Lab: 3 hours per week; eighteen 5-day weeks per semester. Contact hours per semester: 54 hours lecture.

COURSE SYNOPSIS

Characterization of polymers: physical & chemical methods, preparation, structure & properties of plastics, engineering plastics, elastomers & fibers. Smart polymers. Wet compounding, recipe for some dipped goods. Polymer processing- additives, technology of polymer processing, and various moulding processes.

COURSE CONTENT LECTURES

Module I - Characterisation of polymers – I

9 hours

Preliminary analysis: solubility, flame test, Lassaigne's test, heating test and melting point test (LDPE and HDPE). Analysis of polystyrene (dye test). Molecular weight (Calculation of number & weight average molecular weight from Gel Permeation Chromatography). Physical properties: stress-strain behavior in tension, fatigue, impact strength, tear resistance, optical properties - transmittance, reflectance; electrical properties - dielectric strength (no experimental details and method of determination).

Module II - Characterisation of polymers - II

9 hours

Applications of IR, NMR (proton and C-13) and X-ray diffraction in characterisation. Thermal analysis; differential thermal analysis, thermogravimetric analysis and differential scanning calorimetry.

Module III - Engineering & specialty plastics

9 hours

Engineering plastics ; ABS, polycarbonates, polysulphones, polyesters, polyaryl ether ketones, PF resins & ionomers. Specialty plastics ; dendritic polymers, liquid crystal polymers, conductive polymers, telechelic polymers, polyimides etc. polymer composites, polymer blends, high performance fibres – FRP & CFRP. Smart polymers (brief idea only)

Module IV - Elastomers and fibres

9 hours

Natural rubber, composition, preservation & coagulation of latex, wet compounding, formulation of some latex products like glove, rubber band, balloon etc. Structure, properties and preparation of synthetic rubbers (PB, SBR, NBR, polychloroprene, polyisobutylene, IIR, EPDM, buna-N, thiokol). Reclaimed rubbers. Thermoplastic elastomers- advantages, polyurethanes. Fibres: natural (structure and properties); synthetic (structure and properties of nylon, polyester and acrylics)

MODULE V- Polymer processing

9 hours

Structure-property relationship in elastomers, plastics & fibres. Compounding: additives, functions & examples: Vulcanizers, accelerators, activators, extenders, fillers, antioxidants, antiozonants, UV stabilizers, lubricants, plasticizers, flame retardants, colourants & extenders. Blending methods: milling and internal mixing.

MODULE VI- Technology of polymer processing

9 hours

Moulding processes: Compression moulding- transfer moulding, injection moulding, blow moulding. Forming

techniques- extrusion, spinning, calendaring, and casting. Other techniques-Lamination & reinforcement, foaming, coating, finishing, microencapsulation.

References:

1. Malcon P. Sieves, *Polymer chemistry-An introduction*, 3rd edition, Oxford University Press.
2. F. W. Bilimayer, *Text book of Polymer Science*, 3rd edition, John Wiley & Sons
3. V. R. Gowariker, N. V. Viswanathan & J. Sreedhar, *Polymer Science*, New Age International Publishers.
4. Premamoy Ghosh, *Polymer Science & Technology*, 3rd edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi
5. Siddaramaiah, *Practicals in Polymer Science*, CBS Publishers & Distributors, New Delhi
6. P. Bahadur & N. V. Sastry, *Principles of Polymer Science*, Narrora Publishing House, 2nd Edition, New Delhi.
7. G. Odian, *Principles of polymerization*, 3rd edition, John Wiley & Sons.
8. G. S. Misra, *Introductory Polymer Chemistry* New age International Publishers & Distributors, New Delhi
9. V. K. Ahluwalia & A. Misra, *Polymer Science-A Text Book*, Ane Books, India, New Delhi.
10. R. Fried, *Polymer Science & Technology*, Prentice Hall of India Pvt. Ltd., New Delhi
11. P. J. George and C. Kuruvilla Jacob (Editors), *Natural Rubber Agromanagement and Crop Processing*, Rubber Research Institute of India, Rubber Board, Kottayam, 2000.
12. C. Falconer Flint, *The Chemistry and Technology of Rubber Latex*, Chapman and Hall Ltd., London, 1938.
13. K.O. Calvert, *Polymer Latices and Their Applications*, Applied Science Publishers, London, 1982.
14. D.C. Blackley, *Polymer Latices Science and Technology* (Volume 3: Applications of latices), Second Edition, Chapman and Hall, London, 1997.

MODEL QUESTION PAPER
19UP0661: ADVANCEDPOLYMER CHEMISTRY

Time: 3 hours

Maximum marks:80

Section A

(Answer all questions. Each question carries 1 mark)

1. Define fatigue.
2. Write any one test to distinguish LDPE & HDPE.
3. What are telechelic polymers?
4. What is ebonite?
5. Give two examples of inorganic fillers.
6. Define the term impact strength.
7. What are extenders? Give an example.
8. Cotton is used as filler. Give reason.
9. Mention any two compounding methods.
10. Natural rubber needs vulcanization. Why?

(10x1=10)

Section-B

(Answer any 8 questions. Each question carries 2 marks)

11. How is the rate of degradation calculated from TGA curve?
12. Write the composition of natural rubber latex
13. Name two UV stabilizers.
14. What is plasticization? Why is it needed in polymer processing?
15. Define yield point & tensile strength.
16. How is transfer moulding superior to compression molding?
17. Write a note on dendritic polymers.
18. Ionomers are superior to LDPE. Why?
19. What is wet compounding?
20. What is FTIR?
21. Give the structure of two synthetic rubbers.
22. Write any four advantages of polysulphones.

(8x2=16)

Section -C

(Answer any 6 questions. Each question carries 4 marks)

23. Discuss the role of X-ray diffraction studies in polymer characterization
24. Explain the use of differential thermal analysis in polymer analysis
25. Write a note on blending methods in polymer processing
26. How a polymer composite differ polymer blends?
27. What is tear resistance? How is it measured?
28. Discuss on liquid crystalline polymers.
29. Write short note on electrical properties of polymers.
30. Discuss the structure & use of phenol formaldehyde resins.
31. What is microencapsulation?

(6x4=24)

Section D

(Answer any 2 questions, Each question carries 15 Marks)

32. Explain the peculiarities in structure & properties of
 - a) Fibre
 - b) plastic
 - c) elastomer
33. Explain the following.
 - a) Compression moulding
 - b) Calendering
 - c) Lamination technique.

34. Discuss the structure & properties of

- a) Thiokol
- b) Polyether ketones
- c) ABS.

35. Discuss the application of IR, ^1H nmr & ^{13}C nmr in polymer characterization.

(2x15=30)

Project

19UPO646: PROJECT AND FACTORY VISIT

Credits: 4

The course attempts to introduce the student to the preliminaries of conceptualizing a project proposal based on a valid problem in chemistry and related areas, to train in the methodology of collecting background information necessary to solve the problem, to enable designing of experiments to provide an answer to the question posed, to familiarize how to collect and interpret data and to encourage arriving at a conclusion or in an answer to the question posed.

COURSE OBJECTIVES

The course serves to kindle the research aptitude, provide research skills and inculcate a spirit of enquiry among the students.

COURSE TRANSACTIONS FORMAT

Lecture-Tutorial-Lab: 0-0-2 hours per week in semester V and 0-0-3 in semester VI; eighteen 5-day weeks per semester. Contact hours per semester: 36 hours in semester V and 54 hours in semester VI at lab and library. The number of students attached to one supervisor and other modalities of doing the research project will be in accordance with the regulations.

COURSE CONTENT.

The course involves carrying out a small research project that has originality and sound scientific justification and is not meant to do repetitive projects that are mere extensions or copy of those already done. A topic may be chosen in any areas of chemistry that involves theoretical, computational or experimental work. Proper objectives must be identified and on completion, some if not all of these specific objectives must be achieved. Writing a review paper alone does not come under the ambit of a project. The topics shall either be allotted by the supervising teacher or be selected by the students in consultation with the supervising teacher.