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| Hall Ticket Number : | | | | | | | | | | |
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| R-20 |
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Code: 20AC25T

I B.Tech. II Semester Regular Examinations October 2021

Communicative English

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two mark**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

- | | | | |
|---|------------------------|-----------|---------------------|
| 1. Answer ALL the following short answer questions | (5 X 2 = 10M) | CO | Blooms Level |
| a) What does William Hazlitt ask his son to do instead of reading all the time and why? | | CO1 | L2 |
| b) What is the mood of the poem, "The Brook"? | | CO1 | L2 |
| c) Why do Girintza, Shultz and Vontieff want to kill the prince? | | CO1 | L2 |
| d) What was the innovative approach of Mohammad Yunus to traditional approach? | | CO1 | L2 |
| e) What do you learn from the life story of Mrinalini Sarabhai? | | CO1 | L2 |

PART-B

Answer any five full questions by choosing one question from each unit (5 x 12 = 60 Marks)

| | | |
|--------------|-----------|---------------------|
| Marks | CO | Blooms Level |
|--------------|-----------|---------------------|

UNIT-I

- | | | | | |
|----|--|-----|-----|----|
| 2. | The author stresses the importance of not judging people or places the first time you encounter them. Why does he say this? What was your reaction to some of your fellow students when you first met them? Have you become more tolerant of people after coming to college? Give reasons for your answer. | 12M | CO1 | L2 |
|----|--|-----|-----|----|

OR

- | | | | | |
|-------|---|----|-----|----|
| 3. a) | Change the following statements into questions. | 6M | CO3 | L4 |
| | i. We are playing games. | | | |
| | ii. We are late. | | | |
| | iii. Kate has been swimming today. | | | |
| | iv. I was washing the car when they came. | | | |
| | v. Ali is learning to play the guitar. | | | |
| | vi. This book is full of beautiful pictures. | | | |
| b) | Identify the parts of speech of the underlined words in the following sentences. | 6M | CO3 | L4 |
| | i. We go to my grandma's house <u>sometimes</u> . | | | |
| | ii. The bus driver <u>drove</u> the bus. | | | |
| | iii. The actor <u>calmly</u> read his lines. | | | |

UNIT-II

- | | | | | |
|----|---|-----|-----|----|
| 4. | Explain what you think is meant by the lines 'For men may come and men may go, /But I go on for ever'. What does it say about Nature? | 12M | CO1 | L2 |
|----|---|-----|-----|----|

OR

- | | | | | |
|----|---|----|-----|----|
| 5. | Develop the following hints into a readable passage and give a suitable title. | | | |
| a) | A rich farmer - lot of land - cattle and servants - two sons - happy life - After some years younger son unhappy - asked for his share of the property - wouldn't listen to father's advice - got his share - sold them all - went away to another country - fell into bad ways - soon all money gone - poor - no one to help him - understood his mistake. | 6M | CO4 | L3 |

- b) Dick – actor – brilliant - strange character - insists on realism - headache to the manager - a new drama - first drinking scene - water provided in a cup as usual - Dick insists on liquor - manager has to buy a bottle of liquor - second scene – fight - insists on real swords - refuses to handle wooden swords - steel swords brought - third scene - hero drinks poison - manager has real poison - actor in a fix - promises to be sensible in future 6M CO4 L3

UNIT-III

6. How does the doctor stop the conspirators from killing the prince? What is the irony behind the trick? How does the play end? 12M CO1 L3

OR

7. a) **Rearrange each group of jumbled sentences below so as to have well-written paragraphs.** 7M CO4 L4

- i. It also gives you the pronunciation of the words.
- ii. The dictionary can be referred to for the various grammatical forms of words as well.
- iii. You do possess one, perhaps, but I doubt whether you are aware of the different kinds of information it contains.
- iv. Every college dictionary should provide at least these four kinds of information about words, namely pronunciation, grammatical patterns and usage.
- v. One of the most important reference books that you must possess is a dictionary.
- vi. Finally, a good dictionary contains illustrative sentences or phrases. Showing how phrases are actually used.
- vii. It contains, of course, the meanings of difficult words.

- b) **Fill in blanks in the sentences below using appropriate form of the verb in brackets.** 5M CO4 L4

- i. The Britishers _____ (rule) India for more than two hundred years.
- ii. By next July we _____ (complete) five years working in the company.
- iii. By the end of this week we _____ (work) on the project for a month.
- iv. They _____ (not/refuse) to make you happy.
- v. She _____ (finish) her exams by then, so we can go out for dinner.

UNIT-IV

8. Describe and discuss Mohammad Yunus's contribution for the uplift of the economic status of the poor people. 12M CO2 L4

OR

9. **Prepare an expository essay on the topic, "Books and the digital age."** 12M CO4 L4

UNIT-V

10. **Correct the following sentences and rewrite them.** 12M CO3 L3

- i. The oven is *located in the immediate vicinity of the stove*.
- ii. *An analysis of the process was performed by Renu.*
- iii. *In the light of the fact that the product is not of a satisfactory nature, the consensus of opinion is that it is incumbent upon us to postpone the launch until later.*
- iv. Please put the books back in the table.
- v. The burglar got in by the window besides the door.
- vi. Don't be afraid. You're between friends here.
- vii. They have really bad roads here.
- viii. I don't like driving in a heavy traffic.
- ix. We had a breakfast in the hotel restaurant.
- x. Ann is doctor.
- xi. I bought three jeans for just 700 rupees.
- xii. His lawyer produced an important new evidence.

OR

11. Narrate the inspiring story of Mrinalini Sarabhai and describe the legacy left by her for future generation. 12M CO4 L4

*** End ***

Hall Ticket Number :

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R-20

Code: 20AC21T

I B.Tech. II Semester Regular Examinations October 2021

Differential Equations and Vector Calculus

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two mark**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

- | 1. Answer ALL the following short answer questions (5 X 2 = 10M) | CO | Blooms Level |
|---|-----|--------------|
| a) Evaluate $\frac{1}{D^2 - 4D + 4} x e^{2x}$. | CO1 | L2 |
| b) Solve the Euler's equation $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = 0$. | CO2 | L3 |
| c) Find the general solution of $p + q = pq$ | CO3 | L2 |
| d) Prove that $\nabla \cdot \vec{r} = 3$ | CO4 | L3 |
| e) State Green's theorem. | CO5 | L3 |

PART-B

Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | Blooms Level |
|--|-------|-----|--------------|
| UNIT-I | | | |
| 2. Solve $(D^2 - 4D)y = e^x + \sin 3x \cos 2x$. | 12M | CO1 | |
| OR | | | |
| 3. Solve the following equation by the method of variation of parameters $(D^2 + 3D + 2)y = e^x + x^2$ | 12M | CO1 | |
| UNIT-II | | | |
| 4. Solve $(1 + 2x)^2 \frac{d^2 y}{dx^2} - 6(1 + 2x) \frac{dy}{dx} + 16y = 8(1 + 2x)^2$ | 12M | CO2 | |
| OR | | | |
| 5. In an L-C-R circuit, the charge q on a plate of a condenser is given by $L \frac{d^2 q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = E \sin pt$. The circuit is tuned to resonance so that $p^2 = \frac{1}{LC}$. If initially the current i and the charge q be zero, show that, for small values of R/L , the current in the circuit at time t is given by $\frac{Et}{2L} \sin pt$ | 12M | CO2 | |

| |
|-----------------|
| UNIT-III |
|-----------------|

6. a) Solve $p(1+q) = qz$ 6M CO3

b) Solve $x(z^2 - y^2)p + y(x^2 - z^2)q = z(y^2 - x^2)$ 6M CO3

OR

7. Solve by the method of separation of variables

$u_x = 2u_t + u$ where $u(x,0) = 6e^{-3x}$ 12M CO3

| |
|----------------|
| UNIT-IV |
|----------------|

8. a) Find the directional derivative of $w(x, y, z) = xy + yz + zx$ in the direction of $-2\vec{i} + \vec{j} + 2\vec{k}$ at the point $(1, 2, 0)$. 6M CO4

b) Find the angle between the surfaces $x^2 + y^2 + z^2 = 12$ and $x^2 + y^2 - z = 12$ at $(2, 2, 2)$. 6M CO4

OR

9. a) Find the constant a , b and c such that the vector field defined by $\vec{F} = (4xy + az^3)\vec{i} + (bx^2 + 3z)\vec{j} + (6xz^2 + cy)\vec{k}$ is irrotational. With these values of a , b and c determine a scalar function w such that $\vec{F} = \nabla w$. 8M CO4

b) Prove that $\left(\frac{\vec{r}}{r^3}\right) = 0$ 4M CO4

| |
|---------------|
| UNIT-V |
|---------------|

10. Verify Gauss's divergence theorem for $\vec{F} = (x^2 - yz)\vec{i} + (y^2 - zx)\vec{j} + (z^2 - xy)\vec{k}$ take over the rectangular parallelepiped $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$. 12M CO5

OR

11. Verify Stokes' theorem for the vector field $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half surface of $x^2 + y^2 + z^2 = 1$ bounded by its projection on the xy -plane. 12M CO5

*** End ***

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| Hall Ticket Number : | | | | | | | | | | |
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R-20

Code: 20A221T

I B.Tech. II Semester Regular Examinations October 2021

Electrical Circuits

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two mark**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

- | | | |
|---|----|--------------|
| 1. Answer ALL the following short answer questions (5 X 2 = 10M) | CO | Blooms Level |
| a) List the properties of incidence matrix | 1 | L1 |
| b) What is complex power? | 2 | L2 |
| c) Define phase sequence and explain its importance. | 3 | L2 |
| d) State Millman's theorem. | 4 | L4 |
| e) What is meant by Band width & Quality factor? | 6 | L4 |

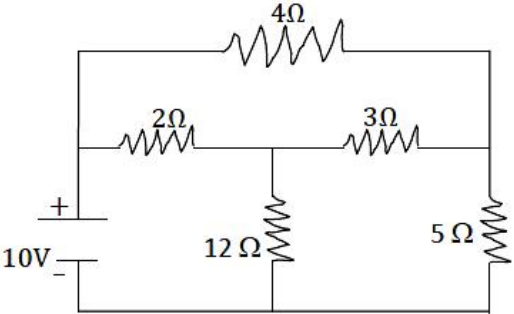
PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO Blooms Level

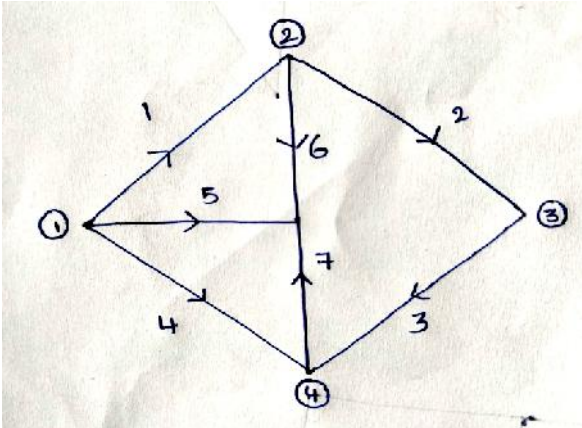
UNIT-I

2. a) Find the current supplied by 10 V battery by using mesh analysis.



6M 1 L1

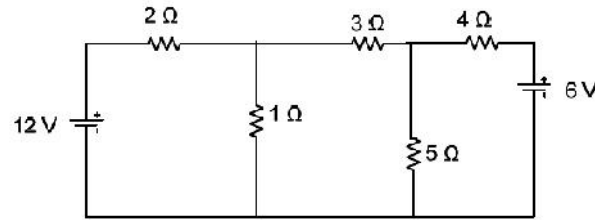
- b) For the below network draw the graph and write down the procedure to obtain incidence matrix and tie set matrix.



6M 1 L1

OR

3. a) Determine the current in the 3 ohm resistor of the circuit shown below use nodal analysis



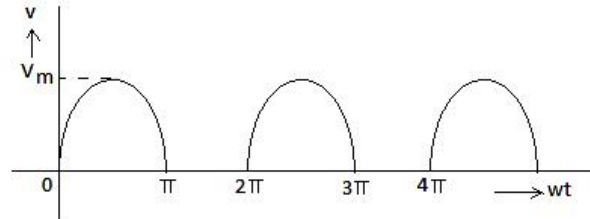
8M 1 L1

- b) Explain the procedure to draw a dual network.

4M 1 L1

UNIT-II

4. a) Find the form factor for the following periodic wave.



6M 2 L2

- b) The voltage applied to a circuit and the current drawn are $V = (200-j100)$ V and $I = (60+j40)$ A respectively. Determine the circuit parameters and power dissipated.

6M 2 L2

OR

5. A coil having a resistance of 20 Ω and an inductor of 0.2H is connected in series with a capacitor of 50 μ F across an AC voltage source of 250V, 50 Hz. Find
i) Impedance of the circuit ii) total current iii) voltage across coil iv) voltage across capacitor v) real power vi) power factor

12M 2 L2

UNIT-III

6. a) Derive the relationship between line and phase quantities in a 3-phase Delta connected system for balanced delta system
- b) Three impedances each of $(10+j24)$ Ω are connected in delta to a 240v, 3-phase, 50 HZ supply. Calculate the line and phase currents.

6M 3 L2

6M 3 L2

OR

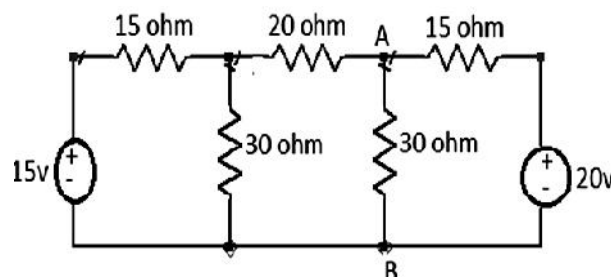
7. a) Derive the expressions for wattmeter readings in two wattmeter method with balanced starconnected load connected load
- b) A balanced 3-phase, 200v, 50HZ supply is given to a load consisting of 3-impedances $(4+j2)$, $(1+j3)$ and $(2+j4)$ ohms connected in star. Calculate the voltages across and currents in three-phases of load.

6M 3 L2

6M 3 L2

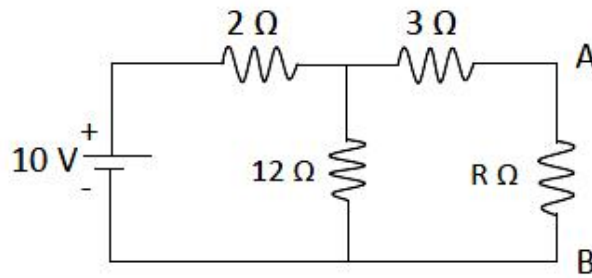
UNIT-IV

8. a) Find current through 20 ohm resistor using superposition theorem.



6M 4 L4

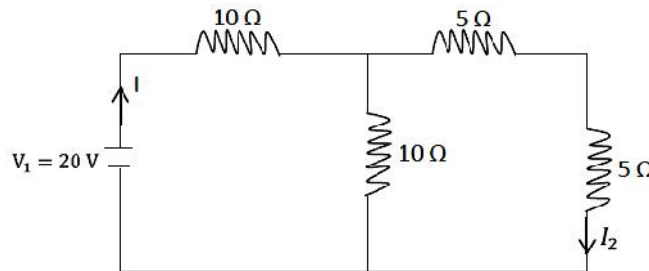
- b) When the load impedance R draws the maximum power? Find the maximum power delivered to the load by using maximum power transfer theorem for the given network.



6M 4 L4

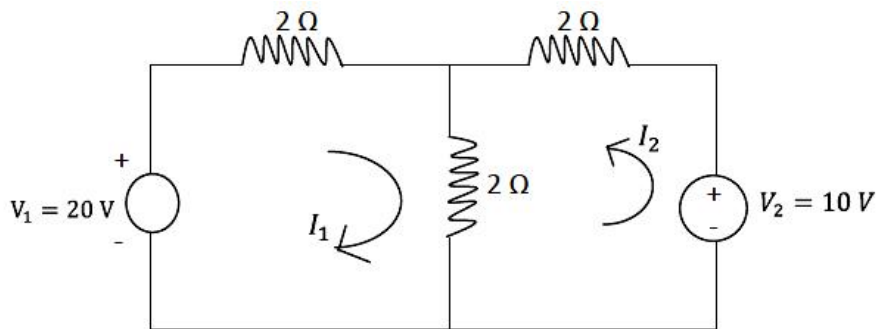
OR

9. a) Define & verify the reciprocity theorem for the network shown below.



6M 4 L4

- b) Define & verify Tellegen's theorem in the network shown below

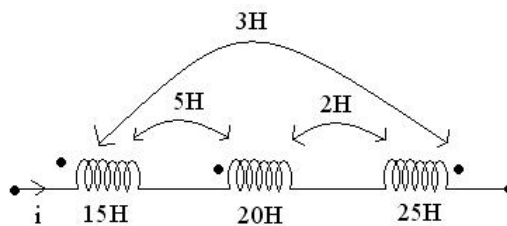


6M 4 L4

UNIT-V

10. a) Deduce the relation between bandwidth and resonant frequency.
 b) For the series connected coupled coils shown in figure, find the total inductance.

6M 5 L4



6M 6 L4

OR

11. a) Given a series RLC circuit with $R = 10$ ohms, $L = 1$ mH and $C = 1$ F is connected across a sinusoidal source of 20 V with variable frequency. Find: (i) The resonant frequency. (ii) Q factor of the circuit at resonant frequency. (iii) Half power frequencies.
 b) Define self-inductance of a coil, mutual inductance between two coils and coefficient of coupling. Derive the relation between the self, mutual inductances and coefficient of coupling.

6M 5 L4

6M 6 L4

*** End ***

Hall Ticket Number :

R-20

Code: 20A222T

I B.Tech. II Semester Regular Examinations October 2021

Fundamentals of Electronic Devices and Circuits

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two mark**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **ALL** the following short answer questions (5 X 2 = 10M)

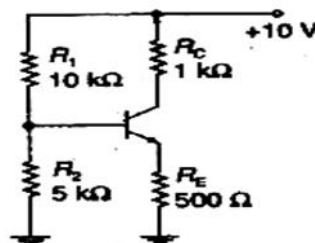
| | CO | Blooms Level |
|--|-----|--------------|
| a) List the applications of PN junction Diode | CO1 | L1 |
| b) Justify, why Self bias is considered as best biasing technique. | CO2 | L3 |
| c) Define amplifier. | CO3 | L1 |
| d) Draw the constructional diagram of Enhancement mode MOSFET | CO4 | L2 |
| e) Identify symbols of Photo diode and SCR | CO5 | L1 |

PART-BAnswer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

| | Marks | CO | Blooms Level |
|---|-------|-----|--------------|
| UNIT-I | | | |
| 2. a) Compare PN junction diode and Zener diode. | 6M | CO1 | L2 |
| b) Summarize the operation of bridge rectifier for applied sinusoidal signal using circuit diagram. | 6M | CO1 | L2 |
| OR | | | |
| 3. a) Explain the operation of Full wave Rectifier with neat Wave forms. | 6M | CO1 | L3 |
| b) Compare the Half-wave rectifier and full wave rectifier in terms of its current and voltage parameters | 6M | CO1 | L2 |

UNIT-II

4. a) For the circuit shown in the figure, determine the value of I_C and V_{CE} . Assume $V_{BE}=0.7V$ and $\beta=100$.



| | | | |
|---|----|-----|----|
| | 6M | CO2 | L3 |
| b) Summarize the operation of transistor using common Emitter configuration with its input and output characteristics | 6M | CO2 | L2 |

OR

5. a) For a fixed bias circuit, calculate I_B , I_C , and V_{CE} , when $V_{CC}=10V$, $V_{BE}=0.64V$, $R_B = 200K$, $R_C=1K$ and $\beta=50$. 6M CO2 L3
 b) Explain voltage divider biasing circuit.. 6M CO2 L3

| |
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| UNIT-III |
|-----------------|

6. Draw the CE amplifier, represent its H-Parameter model and derive the equations for input impedance, voltage and current gain. 12M CO3 L2

OR

7. Draw the equivalent circuit of a transistor and explain the amplification action with graphical approach. 12M CO3 L3

| |
|----------------|
| UNIT-IV |
|----------------|

8. a) Demonstrate the construction and operation of n channel JFET with neat sketch. 6M CO4 L2
 b) Differentiate, why MOSFET is popular over BJT. 6M CO4 L2

OR

9. a) Summarize the operation of Enhancement mode nMOSFET with its Drain and transfer characteristics 6M CO4 L2
 b) Recall the symbols of n channel JFET, p channel JFET, Enhancement mode n channel MOSFET and Depletion mode n channel MOSFET, Enhancement mode p channel MOSFET and Depletion mode p channel MOSFET. 6M CO4 L1

| |
|---------------|
| UNIT-V |
|---------------|

10. a) Explain the operation and Characteristics of UJT Diode. 6M CO5 L2
 b) By what way Tunnel diode is different from other diodes and explains with its characteristics. 6M CO5 L3

OR

11. a) List the applications of SiC & GaN devices. 6M CO5 L1
 b) How Varactor diode can be used as variable capacitor, describe with diagram. 6M CO5 L3

*** End ***

Code: 20AC23T

I B.Tech. II Semester Regular Examinations October 2021

Chemistry

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. In Part-A, each question carries **Two mark**.3. Answer **ALL** the questions in **Part-A** and **Part-B****PART-A****(Compulsory question)**1. Answer **ALL** the following short answer questions (5 X 2 = 10M)

| | CO | Blooms Level |
|---|-----|--------------|
| a) Define electrode potential | CO1 | L1 |
| b) Mention few applications of lithium-ion batteries | CO2 | L1 |
| c) What are the uses of Bakelite | CO3 | L1 |
| d) Discuss briefly about electromagnetic spectrum | CO4 | L4 |
| e) Explain about molecular machines (brief note only) | CO5 | L2 |

PART-BAnswer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

| | Marks | CO | Blooms Level |
|--|-------|-----|--------------|
| UNIT-I | | | |
| 2. What is an electrochemical cell? Differentiate between Galvanic Cell vs. Electrolytic Cell | 12M | CO1 | L4 |
| OR | | | |
| 3. a) Explain about the construction of Calomel electrode | 6M | CO1 | L2 |
| b) Write short notes on polymer membrane electrodes | 6M | CO1 | L1 |
| UNIT-II | | | |
| 4. Outline the chemistry involved in Li MnO ₂ Cell. Also present the redox reactions. | 12M | CO2 | L4 |
| OR | | | |
| 5. a) Mention the challenges of battery technology | 6M | CO2 | L1 |
| b) Illustrate the working principle involved in fuel cells | 6M | CO2 | L4 |
| UNIT-III | | | |
| 6. What are polymers? Explain the mechanism of coordination polymerization | 12M | CO3 | L2 |
| OR | | | |
| 7. a) Differentiate between thermoplastics and thermosetting polymers | 6M | CO3 | L4 |
| b) Describe various applications of polymers in our daily life | 6M | CO3 | L2 |
| UNIT-IV | | | |
| 8. a) What is the principle involved in Infrared spectroscopy? | 6M | CO4 | L1 |
| b) Outline the concept of Gas Chromatography | 6M | CO4 | L3 |
| OR | | | |
| 9. Explain the principle involved in Conductometry with a suitable example | 12M | CO4 | L3 |
| UNIT-V | | | |
| 10. Summarize various prototypes of molecular machines | 12M | CO5 | L5 |
| OR | | | |
| 11. What are molecular switches? Write about Cyclodextrin-based switches | 12M | CO5 | L1 |

*** End ***