Code: 20AC23T

I B.Tech. II Semester Regular Examinations October 2021

Chemistry

(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours

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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-B
Answer *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 ***

R-20

Code: 20AC25T

I B.Tech. II Semester Regular Examinations October 2021

Communicative English

(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours

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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)

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

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

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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)

		CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	Evaluate $\dfrac{1}{D^2 - 4D + 4} x e^{2x}$.	CO1	L2
b)	Solve the Euler's equation $x^2 \dfrac{d^2 y}{dx^2} + 3x \dfrac{dy}{dx} + y = 0$.	CO2	L3
c)	Find the general solution of $p + q = pq$	CO3	L2
d)	Prove that $\nabla . \bar{r} = 3$	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 $\left(D^2 - 4D \right) y = e^x + \sin 3x \cos 2x$.	12M	CO1	

OR

3.	Solve the following equation by the method of variation of parameters $\left(D^2 + 3D + 2 \right) y = e^x + x^2$	12M	CO1	

UNIT–II

4.	Solve $(1 + 2x)^2 \dfrac{d^2 y}{dx^2} - 6(1 + 2x) \dfrac{dy}{dx} + 16 y = 8(1 + 2x)^2$	12M	CO2	

OR

5. In an L-C-R circuit, the charge q on a plate of a condenser is given by
$L\dfrac{d^2 q}{dt^2} + R\dfrac{dq}{dt} + \dfrac{q}{C} = E \sin pt$. The circuit is tuned to resonance so that
$p^2 = \dfrac{1}{LC}$. 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 $\dfrac{Et}{2L} \sin pt$ 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) Fine 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

   $\vec{F}=(4xy+az^3)\vec{i}+\left(bx^2+3z\right)\vec{j}+(6xz^2+cy)\vec{k}$ 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 $\left(\dfrac{\vec{r}}{r^3}\right)=0$ 4M   CO4

UNIT–V

10. Verify Gauss's divergence theorem for $\vec{F}=\left(x^2-yz\right)\vec{i}+(y^2-zx)\vec{j}+(z^2-xy)\vec{k}$

    take over the rectangular parallelepiped $0\le x\le a, 0\le y\le b, 0\le z\le c$.   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 ***

R-20

Code: 20A224T

I B.Tech. II Semester Regular Examinations October 2021
Electrical Circuits and Technology
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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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)	Find the time constant of RL circuit having R=10 ohm and L=0.1 mH?	CO1	L1
b)	Define form factor?	CO2	L1
c)	Write the condition for symmetry in h-parameters?	CO3	L3
d)	Name any two applications of DC series generator?	CO4	L3
e)	What is the function of a transformer?	CO5	L1

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)	Explain the super node and super mesh concepts?	6M	CO1	L2
	b)	Find the currents in all branches of the network shown in figure by mesh method?			
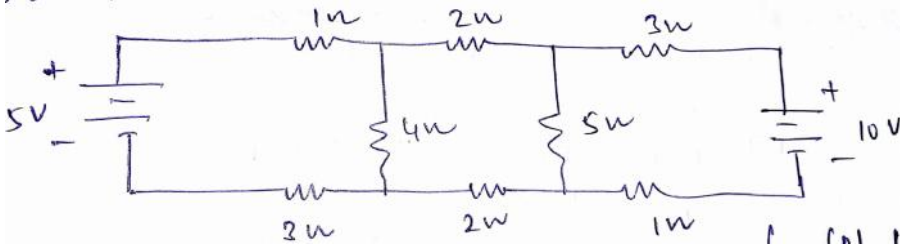
| | | | 6M | CO1 | L3 |

OR

| 3. | | In a series RLC circuit, R=1 Ohm, L=0.25H and C=1.33F. A dc voltage of 10V is applied at t=0. Obtain i(t)? | 12M | CO1 | L3 |

UNIT–II

| 4. | | Develop the expression for the RMS value, average value, form factor and peak factor the sinusoidal wave form. | 12M | CO1 | L3 |

OR

| 5. | a) | Develop the expression for the resonant frequency of RLC series circuit? | 6M | CO2 | L3 |
| | b) | A series RLC circuit has a bandwidth of 600 HZ. The quality factor is 10. If the value of L is 0.01H. Find the value of C? | 6M | CO2 | L4 |

UNIT–III

6. a) Explain the Z parameters of the two port network? 6M CO3 L2

   b) A two port network is described by the following equations

$$V_1 = 50\, I_1 + 25\, I_2$$
$$V_2 = 25 I_1 + 30\, I_2$$

   Find the ABCD parameters? 6M CO3 L3

OR

7. a) Explain the Y parameters of the two port network? 6M CO3 L2

   b) For a two port Network, Find the Z parameters. The parameters of the network are $Y_{11}=1$ mho, $Y_{12}= -0.2$ mho, $Y_{21}= -0.2$ mho, $Y_{22}=0.5$ mho? 6M CO3 L3

UNIT–IV

8. a) Explain the principle of operation of a DC motor? 6M CO4 L2

   b) Develop the expression for EMF equation of DC generator? 6M CO4 L2

OR

9. a) Draw and explain the magnetization characteristics of DC shunt generators? 6M CO4 L2

   b) Explain the Brake test on a DC shunt motor? 6M CO4 L2

UNIT–V

10. a) From first principles, derive the EMF equation of a transformer? 6M CO5 L2

    b) Describe the neat sketch, the constructional details of a single phase transformer? 6M CO5 L2

OR

11. a) Explain the principle of operation of a three phase Induction motor? 6M CO5 L2

    b) Explain the Brake test on three phase Induction motor? 6M CO5 L2

*** End ***

Code: 20A421T

I B.Tech. II Semester Regular Examinations October 2021
Electronic Devices and Circuits
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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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)	State the necessity for biasing a transistor?	CO1	L2
b)	Classify the types of Field Effect Transistors?	CO2	L2
c)	List the reasons for CE configuration is mostly used?	CO3	L2
d)	Sketch the small signal model of a JFET?	CO4	L3
e)	Describe the principle of operation of varactor diode?	CO5	L2

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

			Marks	CO	Blooms Level

UNIT–I

			Marks	CO	Blooms
2.	a)	Draw the fixed bias circuit of a BJT? Deduce the equation for stability factor?	8M	CO1	L4
	b)	List merits and demerits of fixed bias circuit?	4M	CO1	L1

OR

3. Sketch the dc load line for the following transistor configuration. Calculate the quiescent Point.
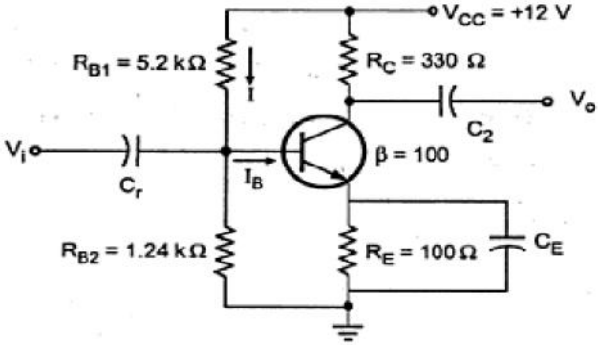
			12M	CO1	L3

UNIT–II

4.	Explain the Construction and working of n-channel JFET with neat sketches. Discuss its drain and transfer characteristics?	12M	CO2	L2

OR

| 5.	a)	Deduce the relationship among Transconductance, Drain Resistance and Amplification factor of a JFET?	8M	CO2	L4
	b)	Differentiate Depletion mode and Enhancement mode MOSFETs?	4M	CO2	L2

UNIT–III

6. Deduce the expressions for current gain, voltage gain, input impedance and output impedance of CB amplifier using H-parameter model?   12M   CO3   L4

OR

7. a) With the help of a graphical demonstration, illustrate how a transistor can be used as an amplifier?   6M   CO3   L3

   b) Classify the amplifiers based on different criteria and explain in brief?   6M   CO3   L2

UNIT–IV

8. For the circuit shown in Figure below, calculate input impedance, output impedance and voltage gain?
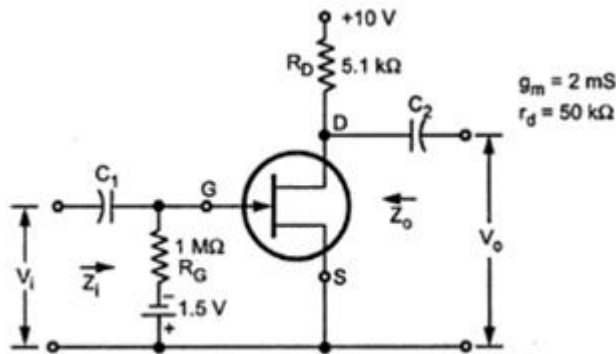
12M   CO4   L3

OR

9. Deduce the expressions for input impedance, output impedance and voltage gain of JFET Common Drain amplifier with neat diagram?   12M   CO4   L4

UNIT–V

10. a) With neat sketches, explain the principle of operation and characteristics of a Tunnel Diode?   8M   CO5   L2

    b) List the applications of Tunnel diode?   4M   CO5   L2

OR

11. a) With neat diagram explain operation and characteristics of LED?   8M   CO5   L2

    b) List the advantages of LED?   4M   CO5   L2

*** End ***