Hall Ticket Number :										

R-20

Code: 20AC23T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Chemistry

(Common to EEE, ECE and AI&ML)

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) Write about gas sensing electrodes	CO1	L1
b) Compare primary batteries, secondary batteries and fuel cells.	CO2	L2
c) Outline the preparation of Buna-N rubber	CO3	L4
d) State the beer lambert law with its mathematical expression.	CO4	L1
e) What are molecular machines? Give TWO examples.	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)	What is single electrode potential? Derive Nernst equation for the determination of single electrode potential.	6M	CO1	L2
b)	Describe the construction and working of Calomel electrode.	6M	CO1	L2
	OR			
3. a)	Explain the construction of galvanic cell and its conventions. Derive an equation for the determination of cell potential of galvanic cell.	6M	CO1	L2
b)	What is an ion selective electrode? Give the classification of selective electrodes.	6M	CO1	L2
	UNIT–II			
4. a)	Describe the construction, working and applications of Leclanche battery.	6M	CO2	L2
b)	Illustrate the construction working and applications of H_2-O_2 fuel cell.	6M	CO2	L4

OR

5.	a)	Describe the construction, working and applications of Li-MnO2 battery.	6M	CO2	L2
	b)	Illustrate the construction working and applications of propane-oxygen fuel cell.	6M	CO2	L4

UNIT–III

6.	a)	Differentiate thermoplastics and thermo settings.	6M	CO3	L4
	b)	Define step growth polymerization. Explain the preparation of Nylon-6, 6 by step growth polymerization process.	6M	CO3	L1

OR

7.	a)	Outline the synthesis Urea-Formaldehyde resin and discuss its applications.	6M	CO3	L4
	b)	Explain the conduction mechanism in polyacetylene and its uses.	6M	CO3	L2

UNIT–IV

8.	a)	Describe the working principle of Thin layer chromatography (TLC)? Write its applications	12M	CO4	L2

OR

9.	a)	Discuss the principle involved in conductometric titrations and its applications	6M	CO4	L2
	b)	Explain the working principle and applications of IR spectroscopy	6M	CO4	L2

UNIT–V

10.	a)	Explain Rotaxanes as artificial molecular machines	6M	CO5	L2
	b)	Describe molecular shuttle with an example	6M	CO5	L2

OR

11.		Explain about each of the following			
	a)	In and out molecular switching	6M	CO5	L2
	b)	Back and forth switching	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC25T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Communicative English

(Common to EEE, ECE and AI&ML)

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) What's the theme of the lesson 'On the Conduct of Life'?	1	2
b) What are the meanings of the words 'foamy' and 'lusty' in context in 'The Brook.?	1	2
c) How does the Prince take revenge on his disloyal guards?	1	2
d) What is so unique about Muhammad Yunus?	1	2
e) Is Mrinalini a role model for you? How?	1	2

PART-B

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

		Marks	CO	Blooms Level
	UNIT–I			
2.	Analyze the message of Hazlitt on the conduct of life.	12M	CO1	L4
	OR			
3. a)	**Identify the parts of speech of the underlined words in the following sentences.** i. It's a <u>breakable</u> item. ii. He <u>ran</u> very <u>fast</u>. iii. I like <u>black</u> bat. iv. What a <u>lovely</u> scenery! v. <u>Paint</u> it on the floor, please.	6M	CO3	L4
b)	**Choose the correct word (adjective/adverb) to complete each sentence.** i. She just_____(sudden / suddenly) decided that she'd had enough and she left him. ii. I only had time for a ___ (quick / quickly) glance at the paper this morning. iii. I've (near / nearly) _____finished that book you lent me. iv. The empty house was completely_____(silent / silently). v. (Scarce / scarcely) _____ resources should be used sensibly. vi. She stumbled (sleepy/sleepily)_____ into the bathroom.	6M	CO3	L4

UNIT–II

4.	What do these lines convey? 'I come from haunts of coot and hern, I make a sudden sally, And sparkle out among the fern, To bicker down a valley.'	12M	CO1	L1
	OR			
5.	Write a grammatical paragraph of about 100 words using cohesive devices on 'Advantages and Disadvantages of Online Classes.'	12M	CO4	L4

UNIT–III

6.	Explain the theme of 'The Death Trap' mentioning a few characters.	12M	CO1	L1
	OR			
7. a)	**Fill in the blanks using appropriate verb form given in brackets.** i. Where _____ (be) you yesterday? ii. I _____ (attend) his wedding in 2020. iii. 'Please have a cup of coffee.' Oh! Sorry. I have just ____(have) my lunch. iv. I found that my children _____already (sleep) when I went home. v. The call is _____ (be) recorded. vi. Why are you _____ (shout) at me?	6M	CO3	L4
b)	**Choose the appropriate one with regard to Subject-Verb agreement.** i. One of the boys _____ (is/are) not well. ii. Neither he nor I _____(is/am) fine. iii. Either the student or the teachers _____(is/are) in the campus. iv. The scissors _____(does/do) not work. v. Politics _____ (is/are) not an interesting subject for me. vi. Each doctor, nurse, and technician _____(get/gets) training here.	6M	CO3	L4

UNIT–IV

8.	How do you appreciate Muhammad Yunus for his contribution to the society?	12M	CO1	L2
	OR			
9.	Write a comparative essay on 'Are private schools better than state schools?' – 250 words.	12M	CO4	L4

UNIT–V

10.	"I was looking for subjects that would shake people in dance," What do you learn from the life of Mrinalini Sarabhai?	12M	CO1	L2
	OR			
11.	Write a formal letter to your municipal commissioner bringing to his notice about the growing number of malaria cases in your area due to the poor maintenance of sanitation work.	12M	CO4	L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC21T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

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)

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

		CO	BL
a)	Solve $\frac{d^4x}{dt^4} + 4x = 0$	CO1	L3
b)	Write the second order Legendre's Linear equation form.	CO2	L3
c)	Form the differential equation by eliminating a and b from $\log(az-1) = x + ay + b.$	CO3	L2
d)	Find the greatest value of the directional derivative of the function $f = x^2yz^3$ at $(2,1,-1).$	CO4	L2
e)	State stokes 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 $(D-2)^2 = 8\left(e^{2x} + \sin 2x + x^2\right)$	12M	CO1	L3
	OR			
3.	Solve the differential equation $(D^2+4)y = \sec 2x$ by the method of variation of parameters.	12M	CO1	L3
	UNIT–II			
4.	A condenser of capacity C discharged through an inductance L and resistance R in series and the charge q at time t satisfies the equation $L\frac{d^2q}{dt^2} + R\frac{dq}{dt} + \frac{q}{C} = 0.$ Given that L= 0.25 henries, R = 250 ohms, $C = 2\times10^{-6}$ farads, and that when t = 0, charge q is 0.002 coulombs and the current $dq/dt = 0,$ obtain the value of q in terms of t.	12M	CO2	L3
	OR			

5.		Solve $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=\log x\,.\sin(\log x)$	12M	CO2	L1

UNIT–III

6.	a)	Form a partial differential equation by eliminating the arbitrary functions f(x) and g(y) from $z=y\,f(x)+x\,g(y)$.	6M	CO3	L2
	b)	Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$.	6M	CO3	L3

OR

7.		Solve by the method of separation of variables $3u_x+2u_y=0$ where $u(x,0)=4e^{-x}$.	12M	CO3	L3

UNIT–IV

8.	a)	Find the directional derivative of $\phi=x^2yz+4xz^2$ at (1, -2, -1) in the direction of the vector $2\bar{i}-\bar{j}-2\bar{k}$.	6M	CO4	L2
	b)	Show that $\nabla^2(r^n)=n(n+1)r^{n-2}$.	6M	CO4	L3

OR

9.	a)	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point (2, -1, 2).	6M	CO4	L2
	b)	Find whether the function $\bar{F}=(x^2-y^3)\bar{i}+(y^2-3x)\bar{j}+(z^2-xy)\bar{k}$ is irrotational and hence find scalar potential function corresponding to it.	6M	CO4	L2

UNIT–V

10.	a)	Find the work done in moving a particle in the force field $\bar{F}=3x^2\bar{i}+(2xz-y)\bar{j}+z\bar{k}$ along the straight line from (0,0,0) to (2,1,3)	6M	CO5	L2
	b)	Apply Divergence theorem to evaluate $\iint_s (x+z)\,dy\,dz+(y+z)\,dz\,dx+(x+y)\,dx\,dy$ where s is the surface of the sphere $x^2+y^2+z^2=4$.	6M	CO5	L3

OR

11.		Verify Green's theorem in the plane for $\int_c (x^2-xy^3)\,dx+(y^2-2xy)\,dy$ where c is a square with vertices (0, 0), (2, 0), (2, 2), (0, 2).	12M	CO5	L5

*** End ***

Hall Ticket Number :										

R-20

Code: 20A224T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

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

a) What is a source transformation? What is its importance? 1

b) Derive the expression for resonant frequency 2

c) What are the conditions for symmetry and reciprocity in terms of Z parameters? 3

d) What are the different types of DC generators 4

e) What are the advantages of three phase system over single phase system 5

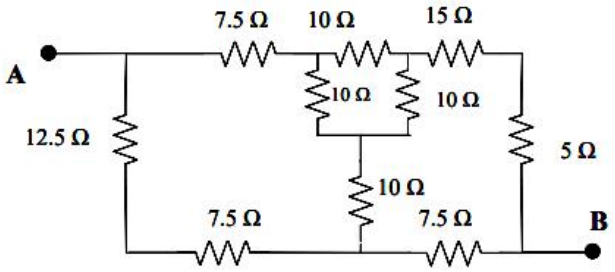
PART-B

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

Marks CO BL

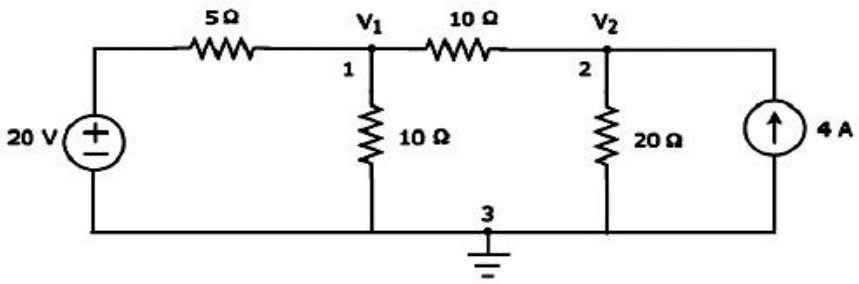
UNIT–I

2. a) Find the equivalent resistance between the terminals A and B of the circuit shown in figure.



6M 1 L2

b) Find the node voltages of the circuit shown in figure.



6M 1 L2

OR

3. A series RLC circuit with R=10 Ω, L=0.1 H and C=20 μF has a constant voltage of 100 Volts applied at time t=0. Determine the transient current i(t). 12M 1 L2

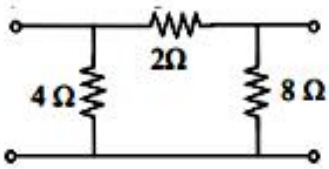
UNIT–II

4.	a)	Derive an expression for average and RMS value of a sinusoidal varying quantity.	6M	2	L1
	b)	A series RLC circuit consists of a resistance of 25 Ω, inductance 0.4 H, capacitance of 250 μF is connected a supply of 230V, 50 Hz. Find the total impedance, current, power, power factor, voltage across coil and capacitance.	6M	2	L3

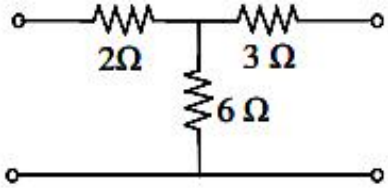
OR

5.	a)	Derive the expression for Bandwidth of a series RLC circuit	6M	2	L2
	b)	A coil of resistance 2 Ω and inductance of 0.01 H is connected in series with a capacitor across 200 V supply. Determine the value of capacitance that would produce resonance at a frequency of 50 Hz. Also find i) Current at resonance ii) Voltage across the coil and iii) Voltage across capacitor.	6M	2	L3

UNIT–III

6.	a)	Obtain Z parameters of the network shown in below figure. 	6M	3	L3
	b)	Derive the relation between Z in terms of Y and ABCD parameters.	6M	3	L2

OR

7.	a)	Find the hybrid parameters of the network shown in Figure 	6M	3	L3
	b)	Explain the interconnection of two port networks connected in series	6M	3	L2

UNIT–IV

8.	a)	Briefly explain the construction features of DC generator	6M	4	L2
	b)	Explain the Magnetization Characteristics and applications of DC generator	6M	4	L2

OR

9.	a)	Explain the principle of operation and characteristics of DC motor.	6M	4	L2
	b)	Explain the importance of testing of DC motor and explain Brake Test performed on DC motor.	6M	4	L2

UNIT-V

10.	a)	Explain the principle of operation of a transformer.	6M	4	L2
	b)	Explain the different tests that are conducted on Transformer?	6M	4	L2

OR

11.	a)	Explain the principle of operation of three phase induction motor	6M	4	L2
	b)	Explain the Torque-slip characteristics of a three phase induction motor	6M	4	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A421T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

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) Define DC and AC load line?

b) Draw the Drain and Transfer characteristics of N-Channel FET

c) What is the phase reversal?

d) Draw the circuit diagram of the common drain amplifier

e) Mention the applications of varactor diode

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 fixed bias with neat circuit diagram. Mention the demerits 6M

b) A collector to base bias circuit has Vcc=15v, Rc=1.8kΩ, R_B=39kΩ and hfe = 50. Determine the Ic and V_{CE} values 6M

OR

3. a) Define stability factor for a transistor fixed bias circuit. Compare the three basic bias circuits. 6M

b) A voltage divider bias circuit has Vcc=15v, Rc=2.7KΩ, Re=2.2kΩ, R1=22KΩ, R2=12KΩ. calculate VBE 6M

UNIT–II

4. Explain the construction and operation of N-channel JFET with the help of drain and transfer characteristics. 12M

OR

5. a) Analyze the self-bias circuit using JFET 6M
   b) A JFET voltage divider bias circuit has V_{DD}=20v, R_D=R_S=2.7Ω, R_1=7.7MΩ, R_2=1MΩ. determine the V_{DS} 6M

UNIT–III

6. a) Explain the operation of Single stage transistor amplifier with neat sketch. 6M
   b) Explain the graphical demonstration of transistor amplifier 6M

OR

7. a) Explain the practical single stage transistor amplifier circuit. 6M
   b) Derive the equations for CE transistor amplifier using h-parameter model. i) Voltage gain ii) Current gain iii) Input Impedance 6M

UNIT–IV

8. a) Explain the small signal model of JFET 5M
   b) With necessary diagram, derive the expressions for Zi, Zo, Av for common source amplifier. 7M

OR

9. Construct and Explain the common drain amplifier using JFET 12M

UNIT–V

10. a) Explain the operation of LED 6M
    b) Explain the operation of Varactor diode with characteristics 6M

OR

11. a) Explain the UJT in detail 6M
    b) Draw the characteristics of SCR and explain the operation 6M

*** End ***