Hall Ticket Number :										

R-20

Code: 20AC25T

I B.Tech. II Semester Regular & Supplementary Examinations July 2023

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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	Is it correct to judge a classmate's character by his very first acquaintance, according to William Hazlitt?	CO1	L2
b)	Explain the following lines: "For men may come and men may go, But I go on forever."	CO1	L2
c)	What did Muhammad Yunus learn when he interviewed a woman who was making bamboo stools?	CO1	L2
d)	Why does the prince feel "Life is so horribly fascinating when one is young"?	CO1	L2
e)	What do you learn from the life story of Mrinalini Sarabhai?	CO1	L2

PART-B

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

		Marks	CO	BL
	UNIT–I			
2.	Why should a pupil be courteous and polite to his classmates, according to William Hazlitt?	12M	CO1	L4
	OR			
3. a)	Change the following statements into questions. i. He killed a tiger. ii. He has an ulcer on his leg. iii. We shall be living in a day or two. iv. I prefer your company to theirs. v. The child has been suffering from viral fever since last week. vi. Time and tide waits for none.	6M	CO3	L3
b)	Identify the parts of speech for the underlined words in the following sentences. i. Bad habits grow unconsciously. ii. He is too ill to go to work. iii. The book is where you left it.	6M	CO3	L3
	UNIT–II			
4.	How successful is Alfred Lord Tennyson in conferring human qualities to the brook?	12M	CO2	L4
	OR			
5.	Write a well-constructed paragraph on Time is Money.	12M	CO2	L4

UNIT–III

6. In what ways does Dr Stronetz succeed in saving the prince's life from the blood-thirsty assassins? 12M CO3 L4

OR

7. a Rearrange each group of jumbled sentences below so as to have well-written paragraphs.
   i. It teaches you to interact with people, communicative with them and collaborate as a team.
   ii. Research has shown that playing badminton, tennis, cricket or baseball is said to improve mathematical skills in children.
   iii. They help develop one's personality, thanks to the numerous 'similar to life' situations that one experiences.
   iv. It helps develop leadership qualities too and fosters a sense of team spirit.
   v. Playing helps in the development of social skills.
   vi. It fosters collective thinking and harnesses your planning and delegation skills too.
   vii. Sports inculcate a sense of competition and help you deal with success and failure with a positive spirit. 7M CO4 L3

   b Put the verbs in correct form.
   i. I _____ relived to see that my friend had corrected the draft. (be)
   ii. They always _____ coffee at breakfast. (drink)
   iii. Sheldon _____ the process of strategic management. (describe)
   iv. Smriti _____ five kilometers a day for the last three years. (walk)
   v. He _____ here all his life. (live) 5M CO4 L3

UNIT–IV

8. What was Muhammad Yunus's idea of a "micro-credit model"? What major changes did it bring in the lives of Bangladeshi women? 12M CO1 L4

OR

9. Prepare an analytical essay on "Income Inequality: It's Causes and Consequences." 12M CO4 L4

UNIT–V

10. Correct the following sentences and rewrite them.
   a) She said that she will come home on Sunday.
   b) The place is not as bad like it looks.
   c) The management compensated him the loss.
   d) He has too much proudness to ask for help.
   e) The war lasted almost hundred years.
   f) They were shocked over the sight of the destruction.
   g) The burglar got in by the window besides the door.
   h) They have left for Bombay yesterday.
   i) He is driving too fastly.
   j) My sister always worked hardly.
   k) When did they arrived?
   l) l. Suppose if it rains, where shall we go? 12M CO3 L3

OR

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

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC21T

I B.Tech. II Semester Regular & Supplementary Examinations July 2023

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 marks.**
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) Find the particular integral of $(D^2 - 2D + 1)y = e^{2x}$ 1 2

b) Write the second order Legendre's Linear Equation form 2 3

c) Find the partial differential equations of Z=ax+by 3 2

d) Find div F if F= $(x^3 + y^3 + z^3 - 3xyz)$ 4 3

e) State Stoke's Thorem 5 3

PART-B

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

Marks CO BL

UNIT–I

2. Solve $(D-2)^2 y = e^{2x} + \sin 2x + x^2$ 12M 1 3

OR

3. Using variation of parameter to solve $\frac{d^2y}{dx^2} + a^2 y = \sec ax$ 12M 1 3

UNIT–II

4. Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = \sin[\log(1+x)]$ 12M 2 3

OR

5. An uncharged condenser of capacity C is charged by applying an e. m.f $E \sin \frac{t}{\sqrt{LC}}$ through leads of self-inductance L and negligible resistance, prove that at any time t, the charge on one of the plates is $\frac{EC}{2}\left\{\sin\frac{t}{\sqrt{LC}} - \frac{t}{\sqrt{LC}}\cos\frac{t}{\sqrt{LC}}\right\}$ 12M 2 3

UNIT–III

6. a) Form the partial differential equation by eliminating arbitrary functions f and g from $z = f(x+at) + g(x-at)$ 6M 3 3

b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$ 6M 3 3

OR

7.	Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x,0) = 6e^{-3x}$	12M	3	3

UNIT–IV

8.	a) Find the directional derivative of $f(x,y,z) = xy^2 + yz^3$ at the point (2,-1,1) in the direction of vector $\bar{i} + \bar{j} + \bar{k}$.	6M	4	3
	b) 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	4	3

OR

9.	Find constants a,b,c so that the vector $A = (x + 2y + az)\bar{i} + (bx - 3y - z)\bar{j} + (4x + cy + 2z)\bar{k}$ is irrotational. Also find ϕ such that $\bar{A} = \nabla\phi$	12M	4	3

UNIT–V

10.	Verify Green's theorem for $\int_C [(xy + y^2)dx + x^2 dy]$ where C is bounded by y=x and $y = x^2$	12M	5	3

OR

11.	Verify Stoke's theorem for $F = (x^2 + y^2)\bar{i} - 2xy\bar{j}$ taken around the rectangle bounded by the lines $x = \pm a, y = 0, y = b$	12M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A221T

I B.Tech. II Semester Regular & Supplementary Examinations July 2023

Electrical Circuits

(Electrical and Electronics 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 marks.**
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) Define Duality 1 L1

b) Define RMS and Average Values 2 L1

c) What are the advantages of three phase circuits over single phase circuits 3 L1

d) Define Thevenin's theorem 4 L1

e) Define Quality factor and selectivity 6 L1

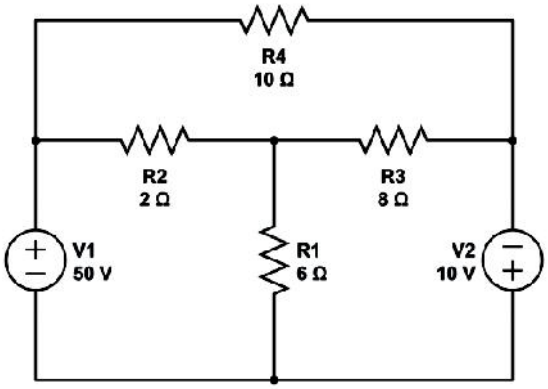
PART-B

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

Marks CO BL

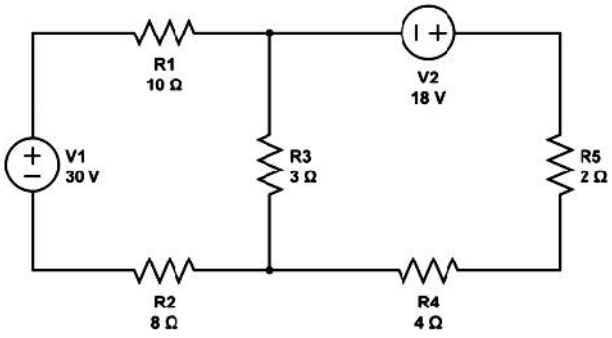
UNIT–I

2. a) Find the loop currents of the circuit shown.



6M 1 L2

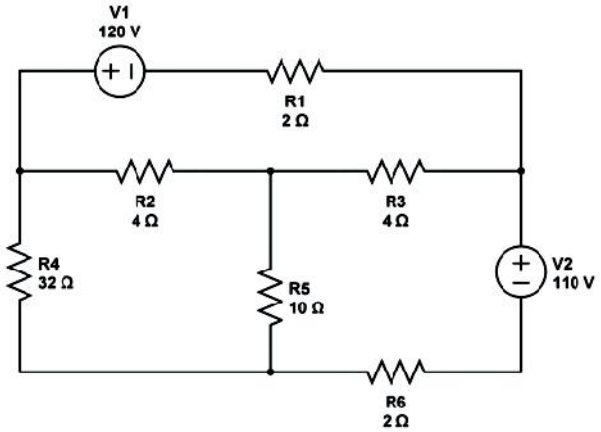
b) Using Node voltage method find the node voltages of the circuit shown.



6M 1 L2

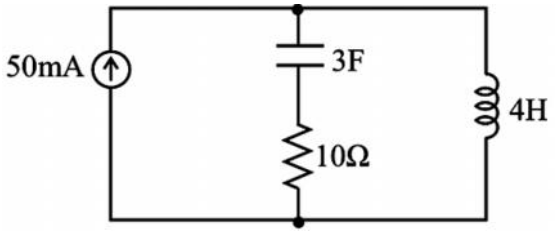
OR

3. a) Write the cutest matrix of the circuit shown in figure.



6M 1 L2

b) For the circuit shown in figure draw the dual network.



6M 1 L2

UNIT–II

4. a) Find the RMS, average and form factor of a sinusoidal wave form. 6M 2 L2

b) A coil having a resistance of 20Ω and an inductor of 0.2H connected in series across an AC voltage source of 250V, 50Hz. Find i) Impedance of the circuit ii) total current iii) real power iv) power factor 6M 2 L3

OR

5. Explain the steady state analysis of series RLC circuit. 12M 2 L2

UNIT–III

6. A unbalanced star connected load with Z_R=10Ω, Z_Y=15Ω and Z_B=20Ω, is supplied from a 3-phase, 440V, 4 wire symmetrical system. Determine the line currents, and the total power. 12M 3 L3

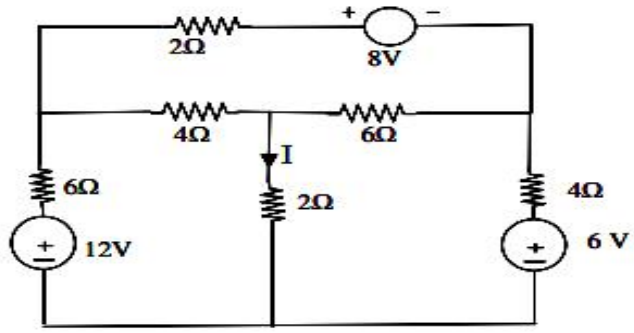
OR

7. a) Derive the relation between the line and phase quantities in star connected system 6M 3 L2

b) Two wattmeter's are used to measure power in a 3- Φ ,3 wire load .Determine the total power ,PF and Reactive power if wattmeter reads i) 1000W each both positive ii) 1000W each, but opposite sign 6M 3 L3

UNIT–IV

8. Verify superposition theorem by finding the current I of the circuit shown below.

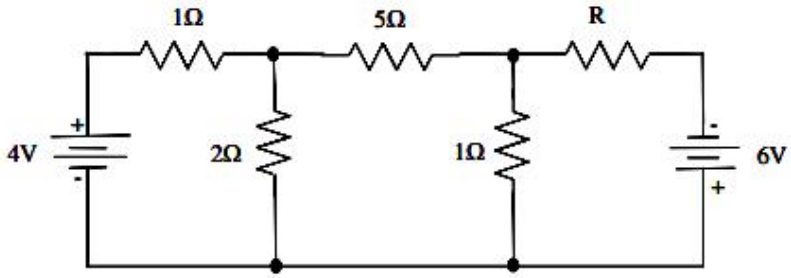


12M 4 L3

OR

9. a) State and explain compensation theorem. 6M 4 L2

   b) Find the value of R in the circuit shown in figure such that maximum power transfer takes place.



6M 4 L3

UNIT–V

10. a) Derive the expression for Bandwidth for series resonance. 6M 5 L2

    b) A series RLC circuit with R=100Ω, L = 0.5H, C=40μF has an applied voltage of 100 $\angle 0^0$ with variable frequency. Calculate the resonance frequency, current and impedance at resonance. Also calculate the Q-factor and bandwidth. 6M 5 L3

OR

11. a) Two coils connected in series have an equivalent inductance of 0.8 H when connected in aiding, and an equivalent inductance of 0.5 H when the connection is opposing. Calculate the mutual inductance of the coils. 5M 6 L3

    b) Find the equivalent inductance when the coupled coils are connected in parallel aiding mode. 7M 6 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A222T

I B.Tech. II Semester Regular & Supplementary Examinations July 2023

Fundamentals of Electronic Devices and Circuits

(Electrical and Electronics 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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)		
a)	Define the Clipper circuit and draw the simple Positive clipper.	1	L1
b)	List different methods of biasing.	2	L1
c)	What is an amplifier	3	L2
d)	Give any two applications of JFET	4	L3
e)	Draw the symbol of Tunnel diode and photo diode	5	L1

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Explain the operation of P-N junction diode with neat diagrams.	5M	CO1	L2
b)	Voltage of 5sinwt is applied to Half Wave Rectifier with load resistance of 5KΩ. Calculate the following i) Maximum DC Voltage ii) R.M.S iii) Ripple Factor iv)PIV v)Efficiency	7M	CO1	L3
	OR			
3. a)	Explain about different types of Clipper circuits.	5M	CO1	L2
b)	Explain the operation of Full wave Rectifier with neat Wave forms.	6M	CO1	L2
	UNIT–II			
4. a)	List the BJT configurations? Explain input and output characteristics of CE configuration with neat graphs.	8M	CO2	L2
b)	Define Stability factors S, S' and S".	4M	CO2	L1
	OR			
5. a)	What is biasing? What are the possible biasing conditions for BJT?	5M	CO2	L2
b)	List the biasing circuits of BJT. Explain emitter biasing circuit and derive its stability factors.	7M	CO2	L3

UNIT–III

6.	a)	Explain about the transistor amplifying action.	4M	CO3	L2
	b)	Analyze a single stage transistor amplifier using h-parameters	8M	CO3	L4

OR

7.	a)	Derive the input impedance, output impedance, voltage gain, current gain in CC configuration using approximate model.	8M	CO3	L3
	b)	Compare CB, CE and CC amplifiers	4M	CO3	L4

UNIT–IV

8.	a)	Explain the construction and operation of N-channel JFET.	8M	CO4	L2
	b)	Draw and explain the Drain and Transfer characteristics of JFET.	4M	CO4	L3

OR

9.	a)	Explain about the construction of MOSFET	6M	CO4	L2
	b)	Show and explain the drain and transfer characteristics of Enhancement type MOSFET.	6M	CO4	L2

UNIT–V

10.	a)	Discuss the principle of operation and VI characteristics of Photo Diode	6M	CO5	L3
	b)	Explain the principle of operation of Varactor Diode	6M	CO5	L2

OR

11.	a)	Enumerate the applications of GaN	6M	CO5	L2
	b)	Explain the operation and characteristics of UJT	6M	CO5	L2

** End ***

Hall Ticket Number :										

R-20

Code: 20AC23T

I B.Tech. II Semester Regular & Supplementary Examinations July 2023

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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ALL the following short answer questions (5 X 2 = 10M)		
	a) What is a solid-state ion selective electrode. Give two examples.	CO1	L1
	b) Distinguish between cell and battery.	CO2	L2
	c) What is copolymerization. Give any one example.	CO3	L1
	d) Describe the basic principle of IR-Spectroscopy.	CO4	L2
	e) Define molecular elevator.	CO5	L1

PART-B

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

		Marks	CO	BL
	UNIT–I			
2.	Discuss the origin of electrode potential? Derive the Nernst equation for determination of single electrode potential	12M	CO1	L4
	OR			
3. a)	Describe the classification gas sensing electrodes. Give its significance.	6M	CO1	L2
b)	Explain briefly how the Nernst equation is useful in calculating the electrode potential. Calculate the electrode potential of copper wire (1M) dipped in 0.1M copper sulphate solution at 25 ^{O}C. The standard electrode potential of copper is 0.34V.	6M	CO1	L3
	UNIT–II			
4. a)	Distinguish between primary and secondary batteries.	6M	CO2	L2
b)	What are dry cells? Explain the respective cell reactions involved in Leclanché cell.	6M	CO2	L2
	OR			

5.		Discuss about the classification of fuel cells. Differentiate between ordinary galvanic cell and fuel cell. Give the advantages of fuel cells.	12M	CO2	L4

UNIT–III

6.		What are conducting polymers? Discuss about the mechanism conduction in poly acetylene. Give its applications.	12M	CO3	L4

OR

7.	a)	Discuss about the preparation and applications of the following polymers. i) Urea- formaldehyde resin ii) Buna-N	8M	CO3	L4
	b)	Comment on "All thermosets are condensation polymers but all condensation polymers may not be thermosets. Explain?	4M	CO3	L2

UNIT–IV

8.		Describe the principle of Thin Layer chromatography (TLC)? How do you separate components of a sample mixture by Thin Layer chromatography?	12M	CO4	L2

OR

9.	a)	Discuss about Beer-Lambert's law. Give its limitations.	6M	CO4	L4
	b)	Distinguish between Potentiometry and conductometry.	6M	CO4	L2

UNIT–V

10.		What are rotaxanes? Describe the structure of rotaxane.	12M	CO5	L2

OR

11.	a)	Define molecular switches. Discuss about cyclodextrin - based molecular switches.	6M	CO5	L4
	b)	Distinguish between rotaxane and catenane. Describe the linear motions in rotaxanes.	6M	CO5	L2

*** End ***