



MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)

Accredited by NBA & NAAC – 'A' Grade

NIRF India Ranking, Accepted by MHRD, Govt. of India

B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024

BASIC ELECTRICAL ENGINEERING

(CSE, CSE-AIML, CSE-CS)

[Time: 3 Hours]

[Max. Marks: 60]

PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1Mark.

1	A	Define the following terms (a) Charge (b) Energy	1M	BTL1
	B	Write down the expression of equivalent resistance for 'n'–number of resistors in parallel connection.	1M	BTL1
	C	What is parallel resonance? Write the condition.	1M	BTL1
	D	Define active power and write its expression.	1M	BTL1
	E	Write advantages and applications of three phase transformer.	1M	BTL1
	F	Write the expression for efficiency of transformer.	1M	BTL1
	G	Define slip of induction motor with all parameters.	1M	BTL1
	H	List out the applications of DC shunt motor.	1M	BTL1
	I	What is the function of relay in an electrical circuit?	1M	BTL1
	J	What is power factor? List the methods to improve power factor.	1M	BTL1

PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

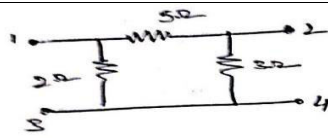
2.A	Obtain the Norton's equivalent circuit at the terminals A and B for the circuit shown in below fig.	5M	BTL3
2.B	Explain the behavior of series RL circuit with AC supply	5M	BTL2

(OR)

3.A	Explain about KVL and KCL with examples	5M	BTL2
3.B	A series RC circuit is supplied by DC voltage. Determine the expression for I(t) when the switch is closed at t=0	5M	BTL3

SECTION - II

4.A	In an electrical circuit R,L and C are connected in parallel. $R=10\Omega$, $L=0.1H$, $C=100\mu F$. The circuit is energized with a supply at 230V, 50Hz. Calculate (i) Impedance (ii) Current taken from supply (iii) Power factor of the circuit (iv) Power consumed by the circuit	5M	BTL2
4.B	Convert the following Π -network into its equivalent T-network using star delta transformation.	5M	BTL3



(OR)

5.A	A non-alternating periodic waveform has been shown figure. Find its form factor and peak factor.	5M	BTL2
5.B	Derive the relation between line voltage, phase voltage and line current and phase current in a balanced three phase star connected system.	5M	BTL2

SECTION - III

6.A	Why the core of Transformer is laminated? Explain the construction of single phase transformer.	5M	BTL2
6.B	A 25 KVA, 2200/110V Transformer has $R_1=1.75\Omega$ $R_2=0.0045\Omega$. The leakage reactance are $X_1=2.6\Omega$ and $X_2=0.0075\Omega$ Calculate equivalent parameters i) equivalent resistance referred to primary and secondary ii) equivalent reactance referred to primary and secondary iii) equivalent impedance referred to primary and secondary iv) Total copper losses	5M	BTL2

(OR)

7.A	Derive the condition for maximum efficiency of a transformer	5M	BTL2
7.B	Explain the principle of operation of single phase transformer with phasor diagrams.	5M	BTL2

SECTION – IV

8.A	Explain the construction of squirrel cage induction motor.	5M	BTL2
8.B	Explain the construction working of 3-phase synchronous generator	5M	BTL2

(OR)

9.A	Describe the principle of operation of three phase induction motor. Explain why the rotor is forced to rotate in the direction of rotating magnetic field.	5M	BTL2
9.B	Explain the principle of operation of a DC motor. Classify the DC motors with the help of voltage and power equations.	5M	BTL2

SECTION – V

10.A	Explain the construction and operation of and MCCB	5M	BTL2
10.B	Classify the types of batteries used in electrical installations along with its specifications. Explain about the important characteristics of batteries.	5M	BTL2

(OR)

11.A	Explain the construction and operation of ELCB	5M	BTL2
11.B	How can the energy consumed by electrical systems can be calculated? Explain the procedure to evaluate the energy consumed by an electrical motor.	5M	BTL2



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B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024

ENGINEERING CHEMISTRY

(Common to CSE, CSE-AI&ML, CSE-CS)

[Time: 3 Hours]

[Max. Marks: 60]

PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1 Mark.

1.	A	What is the basic principle of LCAO method?	1M	BTL1
	B	Write any two salient features of crystal field theory.	1M	BTL2
	C	What is meant by caustic embrittlement? Give reason.	1M	BTL1
	D	Justify “Calgon conditioning is better than phosphate conditioning”.	1M	BTL3
	E	Define fuel cell. Give an example.	1M	BTL1
	F	What does metal cladding mean? Give an example.	1M	BTL1
	G	Define optical activity.	1M	BTL1
	H	What is anti Markonikoff's rule?	1M	BTL1
	I	State Beer-Lambert's law of absorption.	1M	BTL2
	J	Define chemical shift.	1M	BTL1

PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Draw the molecular orbital energy level diagram of F ₂ molecule.	5M	BTL4
2.B	Illustrate crystal field splitting in octahedral complex.	5M	BTL3

(OR)

3.A	Describe π molecular orbitals of Benzene.	5M	BTL2
3.B	Give an account on effect of doping on conductance with an example.	5M	BTL2

SECTION - II

4.A	Calculate the temporary hardness and permanent hardness of a sample of water containing Mg (HCO ₃) ₂ = 7.5 mg/L, Ca (HCO ₃) ₂ = 11.5 mg/L CaSO ₄ = 15.8mg/L and MgCl ₂ = 12.4 mg/L.	3M	BTL4
4.B	Provide a detailed discussion on ion exchange process for demineralization with neat labeled diagram.	7M	BTL3

(OR)

5.A	State the principle of EDTA method. Describe estimation of hardness of water by complexometric method.	5M	BTL2
5.B	What is meant by desalination? Explain the process and advantages of reverse osmosis.	5M	BTL2

SECTION - III

6.A	Define battery. Explain the construction, working and uses of Lead-acid storage battery.	6M	BTL1
6.B	Distinguish between Galvanizing and tinning.	4M	BTL2

(OR)

7.A	Explain in detailed the measurement of pH of solution using glass electrode.	5M	BTL2
7.B	Describe the mechanism of electrochemical corrosion with an example.	5M	BTL2

SECTION – IV

8.A	Give an account on reduction of carbonyl compounds using LiAlH_4 and NaBH_4 .	5M	BTL3
8.B	Describe the structure, synthesis and applications of Aspirin.	5M	BTL2

(OR)

9.A	Elucidate the conformation analysis of n-butane.	5M	BTL3
9.B	What is Saytzeff rule? Explain dehydro halogenation of alkylhalides with an example.	5M	BTL2

SECTION – V

10.A	Describe the types of electronic excitations in UV-spectroscopy with an example.	4M	BTL4
10.B	Give an account on a) Selection rules b) Force constant	6M	BTL2

(OR)

11.A	Outline the principle and modes of vibrations in IR spectroscopy.	5M	BTL4
11.B	State the principle of NMR spectroscopy. Provide short notes on magnetic resonance imaging.	5M	BTL3



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B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

(COMMON TO ALL)

[Time: 3 Hours]

[Max. Marks: 60]

PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer **All Questions**. Each question carries 1Mark.

1	A	Make use this information and give the answer. If A is symmetric matrix, prove that KA is symmetric	1M	BTL3
	B	Find the adjoint of $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	1M	BTL2
	C	Find the sum and product of the eigen values of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	1M	BTL2
	D	State the Cayley-Hamilton theorem	1M	BTL2
	E	Find the general solution of the equation $\frac{dy}{dx} = \cos(x + y)$	1M	BTL2
	F	Identify the solution of the equation $x \frac{dy}{dx} + y = 0$ passing through the point (1,1)	1M	BTL3
	G	$\frac{1}{D^2-1} e^x = ?$	1M	BTL2
	H	Find the complementary function of $(D^3 + 1)y = 0$	1M	BTL2
	I	Use, $x = r \cos \theta$, $y = r \sin \theta$, then $J\left(\frac{x,y}{r,\theta}\right)$	1M	BTL2
	J	Find the stationary points of $x^3y^2(1 - x - y)$	1M	BTL2

PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS
2. Answer any 1 question from each Section. Each question carries 10 Marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Identify the rank of the matrix A by converting into normal form, where $A = \begin{bmatrix} 1 & -1 & -1 \\ 1 & 1 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.	5M	BTL3
2.B	Examine whether the following system of equations consistent or not? If so solve them $x+y+2z+w=5$, $2x+3y-z-2w=2$, $4x+5y+3z=7$	5M	BTL3

(OR)

3.A	By reducing matrix $A = \begin{bmatrix} 1 & 2 & -1 & 3 \\ 4 & 1 & 2 & 1 \\ 3 & -1 & 1 & 2 \\ 1 & 2 & 0 & 1 \end{bmatrix}$ in to normal form, determine the rank of A.	5M	BTL3
3.B	Solve the following system of non-homogenous linear equation by Gaussian elimination method.	5M	BTL3

	$2x_1 + x_2 + 2x_3 + x_4 = 6, 6x_1 - 6x_2 + 6x_3 + 12x_4 = 36,$ $4x_1 + 3x_2 + 3x_3 - 3x_4 = -1, 2x_1 + 2x_2 - x_3 + x_4 = 10$		
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SECTION - II

4.A	Find the eigen values and eigen vectors of $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	5M	BTL2
4.B	Verify Cayley-Hamilton theorem for A and hence find A^{-1} and A^4 . Where $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ 2 & -4 & -4 \end{bmatrix}$	5M	BTL3

(OR)

5.	Reduce the quadratic form in to canonical form by orthogonal transformation method of $3x^2 + 5y^2 + 3z^2 - 2xy + 2xz - 2yz$.	10M	BTL3
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SECTION - III

6.A	Solve $\cos x \, dy = y(\sin x - y)dx$	5M	BTL3
6.B	Make use of the following information and give correct answer. If the surroundings are maintained at 30°C and the temperature of the body cools from 80°C to 60°C in 12 minutes., find the temperature of body after 24 minutes	5M	BTL3

(OR)

7.A	Solve $(3y^2 + 4xy - x)dx + x(x + 2)dy = 0$	5M	BTL3
7.B	Solve $xy(y')^2 + (x^2 + xy + y^2)y' + x^2 + xy = 0$ by the method of solvable by p type.	5M	BTL3

SECTION - IV

8.A	Solve the differential equation $(D^3 + 4D)y = 5 + \sin 2x$	5M	BTL3
8.B	Solve the differential equation $(D^2 - 6D + 13)y = 8e^x \sin 2x$	5M	BTL3

(OR)

9.A	Solve the differential equation $(D^3 - 3D^2 + 3D - 1)y = x^3$	5M	BTL3
9.B	Apply the method of variation of parameter to solve the differential equation $(D^2 + 1)y = \sec^2 x$	5M	BTL3

SECTION - V

10.A	Make use of $x^x y^y z^z = e$ and show that at $x = y = z, \frac{\partial^2 z}{\partial x \partial y} = -(x \log e x)^{-1}$	5M	BTL3
10.B	Show that the functions $u = x + y + z, v = x^2 + y^2 + z^2 - 2xy - 2yz - 2zx$ and $w = x^3 + y^3 + z^3 - 3xyz$ are functionally related	5M	BTL3

(OR)

11.A	Verify Euler's theorem for $z = ax^2 + 2hxy + by^2$	5M	BTL4
11.B	Find the shortest distance from origin to the surface $xyz^2 = 2$	5M	BTL2



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B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2024
PROGRAMMING FOR PROBLEM SOLVING
(COMMON TO ALL)

[Time: 3 Hours]

[Max. Marks: 60]

PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS
 2. Answer **All Questions**. Each question carries 1Mark.

1	A	Define Pseudo code.	1M	BTL1
	B	Find $(1256)_{10} = ()_2$	1M	BTL2
	C	What is the use of the ternary operator?	1M	BTL2
	D	How are strings initialized?	1M	BTL2
	E	Give the importance of scope rules.	1M	BTL3
	F	Define an array.	1M	BTL1
	G	Define a pointer to int.	1M	BTL1
	H	What is the use of free()	1M	BTL2
	I	What is a text file?	1M	BTL1
	J	Define the complexity of an algorithm.	1M	BTL1

PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS
 2. Answer any 1 question from each Section. Each question carries 10 Marks.
 3. Illustrate your answers with NEAT sketches wherever necessary.

SECTION - I

2.A	Explain the types of operators in C.	5M	BTL1
2.B	Write down the steps for program development.	5M	BTL2

(OR)

3.A	What is a computer? Explain the different parts of a computer with a neat sketch.	5M	BTL2
3.B	Draw a flow chart to find the sum of digits of a given number.	5M	BTL4

SECTION - II

4.A	Write a program for the diamond star pattern as shown below: * *** ***** ***** ***** ***** ***** ***** *** *	5M	BTL4
4.B	Discuss the use of break and continue in loops.	5M	BTL2

(OR)

5.A	Explain the nested if statement with a suitable example.	5M	BTL3
5.B	Write a program to check whether the given number is Palindrome or not.	5M	BTL4

SECTION - III

6.A	Explain the call-by-value mechanism in functions.	5M	BTL2
6.B	Define the towers of Hanoi problem for 3 discs	5M	BTL3

(OR)

7.A	How are multi-dimensional arrays declared and initialized?	5M	BTL2
7.B	Explain auto and extern storage classes with examples.	5M	BTL2

SECTION – IV

8.A	Create a structure named book with name, author, and publisher as members. Write a program using this structure to read and print data.	5M	BTL4
8.B	Define structures in C. How are they different from unions?	5M	BTL2

(OR)

9.A	What are bit fields? Give its importance.	5M	BTL2
9.B	Define self-referencing structure. How are pointer variables initialized?	5M	BTL3

SECTION – V

10.A	Write an algorithm for bubble sort.	5M	BTL2
10.B	Explain the use of fseek () and ftell() with suitable examples.	5M	BTL4

(OR)

11.A	Write about different file opening modes.	5M	BTL2
11.B	Discuss different file handling functions in C.	5M	BTL3

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