

17/01/25



ARKA JAIN University
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch	ME / EEE / CSE / AIDS / AIML	Program	B. Tech
Subject Name	Engineering Mathematics-I	Semester	I
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under Unfair Means and will Result in the Cancellation of the Paper(s). 		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)			
Q.N	QUESTIONS	Marks	COs
1			KL
i	State Rolle's theorem.	2	CO5
ii	Find the rank of the matrix: $\begin{pmatrix} 1 & 3 & 3 \\ 0 & 0 & 0 \\ 1 & 2 & 3 \end{pmatrix}$	2	CO5
iii	Define homogeneous functions of the variables x, y, z .	2	CO4
iv	If $f(x, y) = \sin(x^2 + y^3)$, find $\frac{\partial^2 f}{\partial x^2}$ and $\frac{\partial^2 f}{\partial y^2}$.	2	CO3
v	If u, v, w be three functions of three variables x, y, z . Write down the formula of their Jacobian, $J = \frac{\partial(u,v,w)}{\partial(x,y,z)}$.	2	CO1
vi	Verify Rolle's theorem for $f(x) = (x - 1)(x - 2)(x - 3)$ on $[1,3]$. If possible, find the required point c.	2	CO4
vii	What are the three Elementary transformations (E-transformation)?	2	CO2
viii	Expand $\sin x$ in powers of x .	2	CO5
			K3

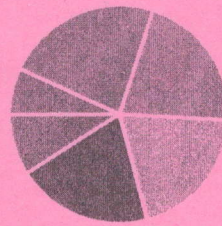
ix	Find all eigen vectors of $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ with respect to every eigen value/s of A .	2	CO5	K1
x	Check the consistency of the system of linear equations: $x + y = 1$ $y + z = 2$ $x + 2y + z = 5$	2	CO4	K6
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Find the derivative $\frac{dy}{dx}$ for $y = x^x + x^{\sin x}$.	05	CO4	K1
3	Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$.	05	CO3	K6
4	If $z = \sin^{-1} \frac{x+2y+3z}{x^2+y^2+z^2}$, then find the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$.	05	CO6	K2
5	Using Cayley Hamilton theorem find the inverse of the matrix $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$.	05	CO4	K1
6	Find the rank of the given matrix by row reducing echelon form, $A = \begin{pmatrix} 1 & 3 & 4 \\ -2 & 1 & -1 \\ 3 & -1 & 2 \end{pmatrix}$.	05	CO1	K6
7	Verify Lagrange's theorem for $f(x) = x^3 - 3x$ on $[0,4]$. If possible, find the required point c .	05	CO5	K3
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Prove by Taylor's theorem: $\tan^{-1}(x+h) = \tan^{-1} x + h \sin \alpha \frac{\sin \alpha}{1} - (h \sin \alpha)^2 \frac{\sin 2\alpha}{2} + (h \sin \alpha)^3 \frac{\sin 3\alpha}{3} - \dots$, where $x = \cot \alpha$.	10	CO1	K2
9	The circle $x^2 + y^2 = a^2$ is revolving about x axis, find the volume of the solid formed.	10	CO4	K1

10	Test the diagonalizability of $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$. If it is diagonalizable find the corresponding diagonal matrix D to which A is similar to the same.	10	CO3	K4
11	If $I = \int_{x=1}^2 \int_{y=0}^2 (x^2 y + yx^3) dx dy$ and $J = \int_{x=1}^2 \int_{y=0}^2 \frac{1}{x^2 + y^2} dx dy$, find $I + J$.	10	CO6	K3
12	If $u_1 = \frac{x_2 x_3}{x_1}$, $u_2 = \frac{x_3 x_1}{x_2}$ and $u_3 = \frac{x_1 x_2}{x_3}$, then find $\frac{\partial(u_1, u_2, u_3)}{\partial(x_1, x_2, x_3)}$.	10	CO2	K2

CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

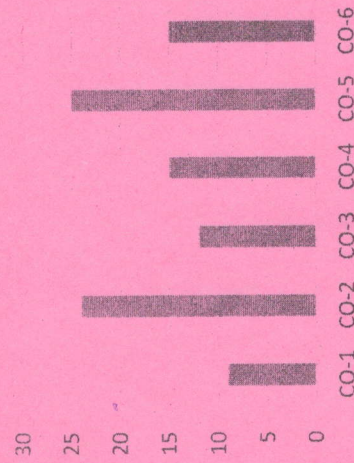
CO1	Remember the matrix representation of a set of linear equations and solve the solution of the system of equations
CO2	Understand how to find the Eigenvalues and Eigen vectors
CO3	Reduce the quadratic form to canonical form using orthogonal transformations.
CO4	Solve the applications on the mean value theorems.
CO5	Evaluate the improper integrals using Beta and Gamma functions
CO6	Find the extreme values of functions of two variables with/ without constraints.
Course Outcomes	GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution




■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



CO-1 CO-2 CO-3 CO-4 CO-5 CO-6

20/01/25

	ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	END TERM EXAMINATION School of Engineering & IT
Branch	EEE / ME	Program	B.Tech
Subject Name	Programming for Problem Solving	Semester	I
Time: 3 Hour Max. Marks: 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Papers.</u> 	Year	January, 2025
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

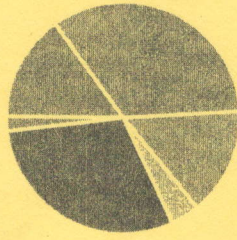
Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)				
Q. N1	QUESTIONS	Marks	COs	KL
i	Why do we use header files?	2	CO2	K1
ii	Create a snippet to show the use of do-while loop.	2	CO1	K2
iii	Mention any two rules for naming a variable.	2	CO1	K4
iv	What is an operator? Mention any two binary operators.	2	CO2	K1
v	Name any one primary and one secondary data type in C.	2	CO1	K4
vi	Write down the syntax of struct data type with example.	2	CO2	K1
vii	Discuss about the term "fallthrough".	2	CO1	K1
viii	What is the range of int data type in C?	2	CO3	K4
ix	Name different types of pointers in C?	2	CO4	K1
x	What is the use of puts() and gets()?	2	CO4	K2

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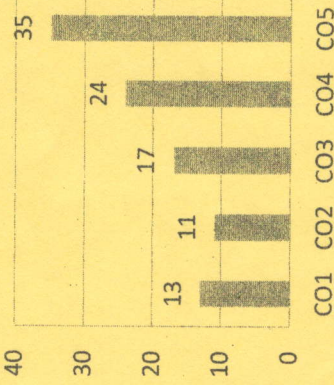
CO1	Formulate simple algorithms for arithmetic and logical problems.
CO2	Test and execute the programs and correct syntax and logical errors.
CO3	Implement conditional branching, iteration and recursion.
CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
CO5	To use arrays, pointers and structures to formulate algorithms and programs

GRAPHICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



Course Outcome wise Marks Distribution





Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Create a program to perform Linear search on an array of size n.	5	CO1	K2
3	Perform a comparative analysis of algorithm, flowchart, and program.	5	CO5	K3
4	Write a program to check a given year is a leap year or not. Also show the variable description.	5	CO3	K1
5	Compare the operators & and &&. Also explain the term conditional compilation.	5	CO4	K2
6	What is meant by pointer arithmetic? Create a C program that will calculate the sum of every 3 rd integer, beginning with i=2 (sum=2+5+8+...) for all values of i less than 100.	5	CO4	K2
7	Define function? Write down the structure of a user defined function with an example.	5	CO2	K2

Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	What is data type? Write a program to find smallest and second smallest value in an array.	10	CO5	K2
9	Compare static and extern storage classes. Also give any 2 applications of Union.	10	CO4	K3
10	What is an array? Show its syntax/structure. Write a program to display the sum of all the even numbers from 20 to 100.	10	CO3	K3
11	Explain the syntax and purpose of fgetc() and fputs(). Create a program to show the use of any 3 string functions.	10	CO5	K5
12	What is Recursion? Write a program to calculate the factorial of a number using recursion. Also provide the variable description.	10	CO5	K5

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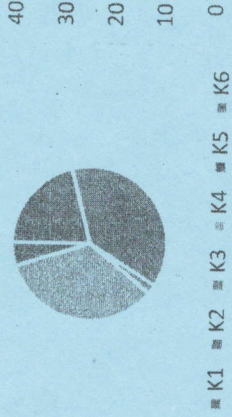
	ARKA JAIN University Jharkhand		END SEM EXAMINATION School of Engineering & IT
Branch	ME / EEE / AIDS	Program	B. Tech
Subject Name	Computer Aided Engineering Graphics	Semester	I
		Year	January, 2025
Time: 1.5 Hour Max. Marks : 35	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Five out of Six of Section B Answer Any Two out of Four of Section C Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Papers.</u> 		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 01 Marks from Q1-i to v) - 05 Marks			
Q. N1	QUESTIONS	Marks	COs
i	Write Different method of dimensioning.	01	CO1
ii	What is the Difference between Sketch & Engg. Drawing.	01	CO2
iii	What do you mean by R.F. / Scale Ratio?	01	CO2
iv	Name the different types of drawing instruments.	01	CO2
v	What conic section is formed if a cutting plane cuts the cone parallel with base.	01	CO3
Section B (Answer any FIVE out of SIX) - 10 Marks (Each question Carry 02 Marks)			
Q. No.	QUESTIONS	Marks	COs
2	Difference between plain scale & diagonal scale.	02	CO1
3	If a line makes different angle with both the plane (HP & VP) then what will be the length of line in front view & top view (explain).	02	CO2
4	Why 4th angle projection not in use explain.	02	CO2
5	Difference between 1st angle & 3rd angle projection.	02	CO2

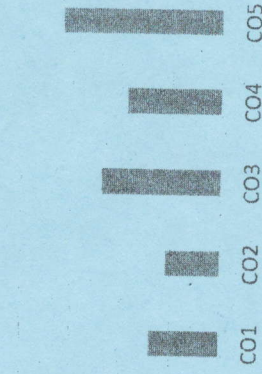
Course	CO1	Students will understand the role of CAD in mechanical component and system design by creating geometric models and engineering drawings
Outcomes	CO2	Students will understand the basic mathematics fundamental to CAD software
	CO3	Students will work in teams to design a mechanical system and fabricate a prototype of their design
	CO4	Upon completion of this course, the students can use computer and CAD software for modelling mechanical components.
	CO5	Design and analysis of engineering components.

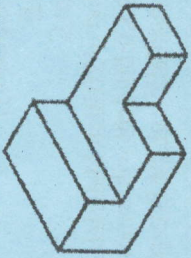
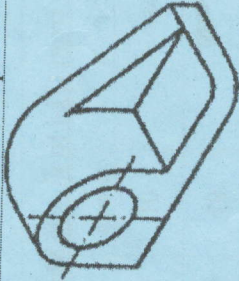
GRAPHICAL REPRESENTATION

Bloom's Level wise Marks Distribution




Course Outcome Wise Marks Distribution



Q. No.	QUESTIONS	Marks	COs	KL
6	What is true length & amp; foreshortened length of a line.	02	CO2	K2
7	What are the different sizes of drawing sheet in ISI Std.	02	CO2	K4
Section C (Answer any TWO out of FOUR) - 20Marks (Each question Carry 10 Marks)				
8	 Draw the Front, Top and Side view for shown fig.	10	CO1	K2
9	 Draw the Front, Top and Side view for shown fig.	10	CO1	K2
10	Draw the Front, Top and Side view for shown fig. A point A is 25 mm above the H.P and 30 mm in front of the V.P. Draw its projections.	10	CO2	K5
11	A line PQ, 90 mm long, is in the H.P and take an angle 30° with the V.P. Its end P is 25 mm in front of the V.P. Draw its Projections.	10	CO2	K2

24/01/25

	ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	END SEM EXAMINATION School of Engineering & IT
Branch	ME / EEE / AIDS	Program	B. Tech
Subject Name	Engineering Physics	Semester	I
		Year	January, 2025
Time: 3 Hour Max. Marks: 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussion with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>. 		
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
	K2: Understanding	K4: Analysing	K6: Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)			
Q.N	QUESTIONS	Marks	COs
1			KL
i	Give Significance of Plank's Constant?	2	CO4 K2
ii	How Energy Band Formed in a solid?	2	CO4 K3
iii	Differentiate between the damped and Undamped Oscillations?	2	CO1 K4
iv	Summarize conditions for critical Damping?	2	CO1 K6
v	Lists Component of Laser?	2	CO2 K1
vi	Compute necessary conditions for obtaining sustained interference?	2	CO2 K3
vii	Classify Four Maxwell's equation?	2	CO3 K2
viii	Illustrate divergence of vector field?	2	CO3 K2
ix	Show How will you determine the V-I characteristics of a p-n diode?	2	CO6 K3
x	Why the Hall coefficient is negative for intrinsic semiconductor?	2	CO6, K1 CO5

CO1	Remembering proficiency and perceptive of the basic concepts of different types of wave equations
CO2	Understanding the principles of optics to solve various complex engineering problems.
CO3	Apply fundamental laws and relations to evaluate problems in electricity and electromagnetism
CO4	Analyzing the kinds of experimental results which are incompatible with classical Physics leading to the development of a quantum theory of matter and light
CO5	Evaluate principle, concept, working and application of new technology and comparison of results with theoretical calculations.
CO6	Create and design a wide range of semiconductor devices through the basic concepts

GRAPHICAL REPRESENTATION





Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Derive time-dependent Schrodinger wave equation?	05	CO4	K5
3	Calculate the smallest possible uncertainty in the position of an electron moving with velocity 3×10^7 m/s. OR In Newton's ring experiment, the diameter of the 10th dark ring is 0.433 cm. Find the wavelength of incident light, if the radius of curvature of the lens is 70 cm?	05	CO4	K3
4	Find the Equation for displacement y of the particle executing SHM?	05	CO1	K4
5	Explain Stimulated and spontaneous emission of radiation?	05	CO2	K2
6	Discuss Displacement Current?	05	CO3	K6
7	Explain operation of Zener diode?	05	CO5	K2

Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Establish energy Eigen value and energy Eigen function for a particle confined in a box.	10	CO4	K5
9	The amplitude of an oscillator of frequency 200 per second falls to 1/10 of its initial value after 2000 cycles. Calculate (i) relaxation time, (ii) quality factor and (iii) damping constant.	10	CO1	K3
10	Discuss the description of Ruby laser and explain the construction and working of it?	10	CO2	K6
11	State and prove Gauss's Divergence Theorem	10	CO3	K4
12	Derive an expression for the concentration of electrons in conduction band and holes in valence band intrinsic semiconductors?	10	CO6, CO5	K5

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				END SEM EXAMINATION School of Engineering & IT	
Branch	AIDS / ME / EEE	Program	B.Tech	Semester	I
Subject Name	Sports and Yoga or NSS / NCC	Year	January, 2025		
Time: 1.5 Hour Max. Marks : 35	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Five out of Six of Section B Answer Any Two out of Four of Section C Possession of <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Papers.</u> 				
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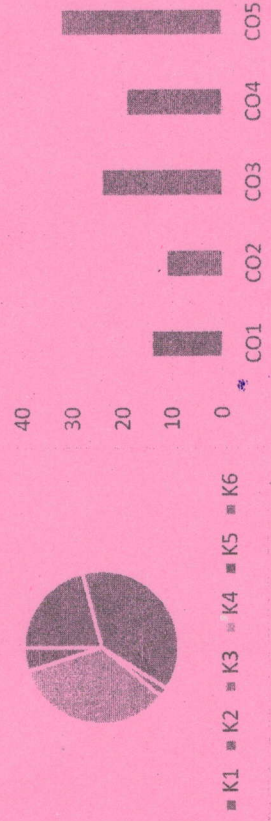
Section A (Each question Carry 01 Marks from Q1-i to v) - 05 Marks					
Q.N	QUESTIONS	Marks	COs	KL	
1					
i	What is the National Cadet Corps	01	CO1	K3	
ii	What are the key duties and responsibilities of an NCC cadet	01	CO4	K1	
iii	How many players are there in a cricket team?	01	CO2	K4	
iv	How many players are allowed on the field for a cricket team during a match?	01	CO3	K1	
v	How many players are there on the playing court for a handball team?	01	CO4	K3	

Section B (Answer any FIVE out of SIX) - 10 Marks (Each question Carry 02 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	
2	What is the full form of FIFA in Sports?	02	CO3	K3	
3	What are the basic rules and regulations of cricket that players must follow during a match?	02	CO1	K2	
4	What are the key benefits of participating in sports for physical and mental health?	02	CO2	K3	
5	What is the role of a goalkeeper in football (soccer), and what special rules apply to them?	02	CO4	K5	

Course Outcomes	CO1	Train volunteer youth to become confident, committed and competent leaders in all walks of life.
	CO2	Enhance awareness levels of cadets to become empowered and responsible citizens of the country.
	CO3	Undertake adventure activities to hone leadership qualities and risk taking abilities.
	CO4	Provide a platform to launch 'Good Will Ambassadors' to project the image of the country overseas.
	CO5	Provide opportunities and encourage cadets to enrich their knowledge, develop communication skills and build character.

GRAPHICAL REPRESENTATION

Bloom's Level wise Marks Distribution **Course Outcome Wise Marks Distribution**



Q. No.	QUESTIONS	Marks	COs	KL
6	How is a winner determined in a marathon?	02	CO1	K3
7	What are the key strategies for long-distance running?	02	CO2	K1
Section C (Answer any TWO out of FOUR) – 20Marks (Each question Carry 10 Marks)				
8	What is the National Cadet Corps (NCC), and how does it contribute to the development of discipline, leadership, and national service among youth in India?	10	CO2	K2
9	What are the key duties and responsibilities of a NSS students, and how do they contribute to the organization's mission of fostering discipline and patriotism?	10	CO1	K3
10	How does the NCC contribute to social service and community development, and what are some key activities undertaken by cadets in this area?	10	CO4	K5
11	What is the National Service Scheme (NSS), and how does it promote social welfare and volunteerism among students?	10	CO3	K2

30/01/25

ARKA JAIN University
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NAAC GRADE A
ACCREDITED UNIVERSITY

JGI

END SEM EXAMINATION
School of Engineering & IT

Branch	ME / EEE / AIDS	Program	B. Tech
Subject Name	Basic Electrical Engineering	Semester	I
Year		Year	January, 2025

Time: 3 Hour Max. Marks : 70

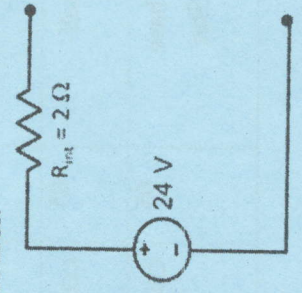
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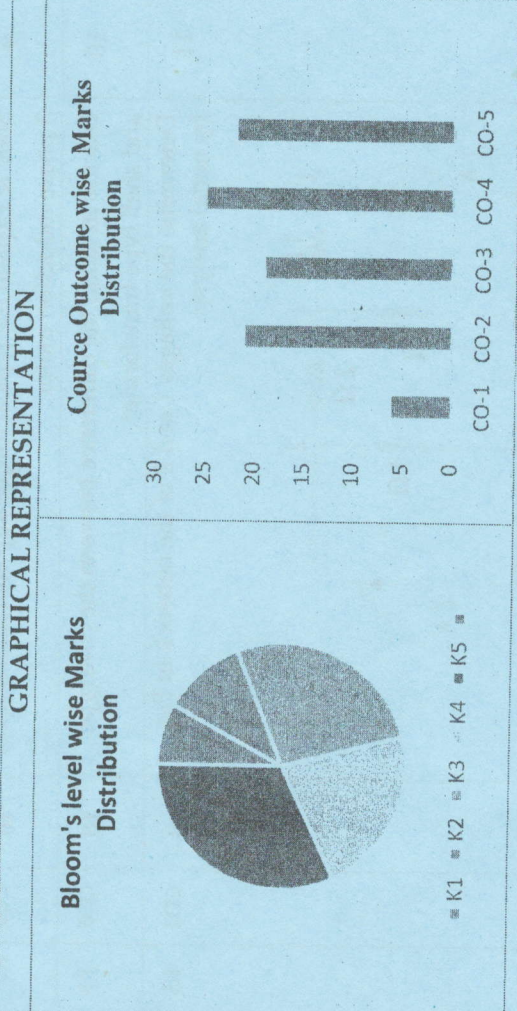
Knowledge Level (KL)	K1: Remembering	K3: Applying	K5: Evaluating
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Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)

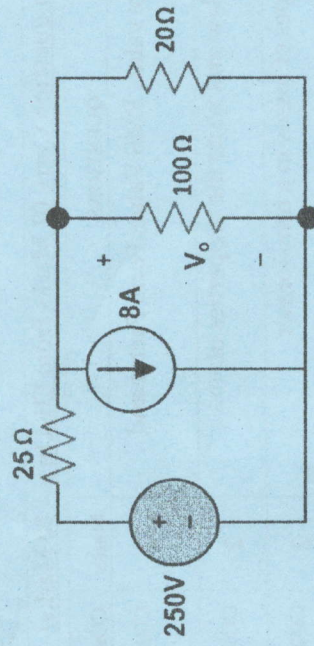
Q. No.	QUESTIONS	Marks	COs	KL
i	Define Average value, RMS Value, Form Factor and peak factor.	2	CO1	K1
ii	Explain ohms law and write the properties of resistance	2	CO1	K2
iii	Classify the types of losses in a transformer	2	CO2	K2
iv	An alternating voltage is given by $V=230\sin314t$. Calculate i) Frequency, ii) Maximum value, iii) Average value, iv) RMS value.	2	CO1	K2
v	Convert a voltage source of 24 V having a series internal resistance of $2\ \Omega$ into an equivalent current source.	2	CO2	K4



CO- Course Outcomes,	KL- Knowledge Level,	PO - Program Outcome
CO1	Understand the basic knowledge of electrical quantities such as current, voltage, power, energy and frequency	
CO2	Solve the Problems of DC Circuits using different Laws (KVL, KCL, Mesh Analysis and Nodal Analysis)	
CO3	Analyze the Electrical Circuits by applying Theorems.	
CO4	Analysis of single-phase and three phase ac circuits.	
CO5	Identify the type of electrical machine used for that particular application.	
CO6	Design Three Phase induction motor	



Q. No.	QUESTIONS	Marks	COs	KL
vi	What do you mean by time domain analysis? Discuss.	2	CO3	K1
vii	Give the Comparison of Series and Parallel Resonant Circuit.	2	CO3	K3
viii	Derive an expression of Pure Resistive AC Circuit. Draw the circuit diagram, wave form and phasor diagram.	2	CO2	K4
ix	Define Slip of Induction Motor	2	CO5	K1
x	Differentiate between AC and DC Circuit.	2	CO4	K1
Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Find V_o using source Transformation.	05	CO2	K4
3	Write the Principle of a Transformer and define turns ratio.	05	CO5	K3
4	Derive an Expression of first-order RL circuit.	05	CO4	K4
5	State Superposition. Write the steps to solve the super position theorem with circuit diagram.	05	CO3	K4
6	Why single phase induction motors are not self-starting? Explain in brief.	05	CO5	K2
7	Derive an expression for Line Voltage and Phase Voltage, Line Current and Phase Current in Star connection in three phase ac Circuit.	05	CO4	K4



Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Three impedances each consisting of $20\ \Omega$ and $15\ \Omega$ inductive reactance in series are connected in star across $400\ \text{V}$ $3\ \phi$ supply. Calculate the i) line current ii) phase current iii) total power consumed and iv) the p.f of the load.	10	CO4	K5
9	State & Explain the typical torque-slip characteristics of 3 phase induction motor.	10	CO5	K3
10	Discuss in detail the difference between the core type and shell type transformer.	10	CO5	K3
11	Determine the voltages 1 and 2 of the network in Fig. by nodal analysis.	10	CO2	K5
12	For the circuit shown in Fig. calculate the current in the $10\ \text{ohm}$ resistance. Use Thevenin's theorem only	10	CO3	K5

