BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025

NUMERICAL TECHNIQUES AND STATISTICAL METHODS (Civil)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define transcendental equation with an example.	1	1	(2M)
b)	Prove that $\Delta = E - 1$	1	1	(2M)
c)	Define initial value problem with an example.	1	2	(2M)
d)	Use Euler's method to find the approximate value of y(1.2) for $\frac{dy}{dx} = 2x - 1,\ y(1) = 2$ with h=0.2.	2	2	(2M)
e)	Define mean and variance of continuous random variable.	1	3	(2M)
f)	The mean and variance of a binomial distribution are 4 and 4/3 respectively. Find q.	2	3	(2M)
g)	If the size of the population is 2000 and size of the sample is 200 then find the correction factor.	1	4	(2M)
h)	State Central limit theorem	1	4	(2M)
i)	Write aboutone-tailed and two-tailed tests.	1	5	(2M)
j)	Write the test of statistic formula for two proportions by the test of hypothesis.	1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	a) Find the positive real root of the equation $x \log_{10}^{x} - 1.2 = 0$ using Newton-Raphson method.	3	1	(5M)
	b) Find the value of y when x = 10 using Lagrange's interpolation from the following data.	2	1	(5M)

x	5	6	9	11
y	12	13	14	16

(OR)

	Year x 1891 1901 1911 1921 1951 Population of y 46 66 81 93 101			
	UNIT-II			
4.	Find the value of $\int_1^2 \frac{1}{x} dx$ by using Simpson's rules. Given n=6	2	2	(10M)
	(OR)			
5.	a) Evaluate $\int_0^1 x^3 \, dx$ with 5 subintervals using Trapezoidal rule. b) Using R-K method, find y(0.2) for the equation $\frac{dy}{dx} = y - x$, $y(0) = 1$ with h=0.2	2 2	2 2	(5M) (5M)
	UNIT-III			
6.	a) A businessman goes to hotels X, Y, Z, 20%, 50%, 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faculty pluming. What is the probability that business man's room having faulty pluming is assigned to hotel Z? b) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) none is defective (ii) one is defective	3 2	3 3	(5M) (5M)
	(OR)			
7.	a) A random variable X has the following probability function value of X Find (i) k (ii) $P(X < 4)$ (iii) $P(x \geq 5)$ b) If X follows a Poisson distribution such that $2P(X=0) = P(X=2)$ then find $P(2 \leq X \leq 5)$	2 2	3 3	(5M) (5M)
	UNIT-IV			
8.	a) What is the size of the smallest sample equipped to estimate to an unknown population to within a maximum error of 0.06 with at least 95% confidence. b) Determine the expected number of random samples having their meansbetween 22.39 and 22.41 for the following data: N =	2 3	4 4	(5M) (5M)

X	0	1	2	3	4	5	6
P(X)	k	3k	5k	7k	9k	11k	13k

	(OR)			
9.	A population consists of 1, 5, 6 and 8. Consider all possible samples of of size 2 which can be drawn without replacement from the population. Find (i) mean of the population (ii) standard deviation of the population (iii) mean of the sampling distribution of means (iv) standard deviation of the sampling distribution of means.	2	4	(10M)
	UNIT-V			
10.	a) Given the following information relating to two places A & B. Test whether there is any significant difference between their mean wages.	3	5	(5M)
	b) Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal.	3	5	(5M)
	(OR)			
11.	a) According to the norms established for a mechanical aptitude test , persons who are 18 years old should have average 73.2 with a S.D 8.6.If 4 randomly selected persons of that age averaged 76.7 then test the null hypothesis $\mu=73.2$ against alternative hypothesis $\mu>73.2$ at the level of significance 5%. b) In a big city 325 men out of 600 men were found to be cool drinkers. Does this information support the conclusion that the majority of men in this city are smokers?	3	5	(10M)

	A	B
Mean wages(Rs)	47	49
S.D(Rs)	28	40
No.ofworkers(Rs)	1000	1500

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Course Code: **23BS3T06**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)
II B.Tech I Semester Regular/Supplementary Examinations (BR23), NOV-2025
COMPLEX VARIABLES & NUMERICAL METHODS (EEE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Evaluate $\Delta(tan^{-1}x)$	L3	1	(2M)
b)	Write the iterative formula to find $\frac{1}{\sqrt{N}}$	L3	1	(2M)
c)	Write the formula Runge Kutta fourth order method	L2	2	(2M)
d)	Using Euler's method to find $y(0.1)$ given $y^1 = x + y,\ y(0) = 1$	L3	2	(2M)
e)	Find 'a' such that $f = 2x - x^2 + ay^2$ is harmonic	L2	3	(2M)
f)	State Cauchy's integral formula	L1	3	(2M)
g)	Define singular point.	L1	4	(2M)
h)	Find the poles of $f(z) = \frac{z-3}{(z^2+2z+5)}$	L2	4	(2M)
i)	Find the fixed point of the map ping are $w = \frac{5z+4}{z+5}$	L2	5	(2M)
j)	Find the inverse mapping of $\frac{az+b}{cz+d}$	L3	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks

UNIT-I

2. Find the real root of the equation $x \log_{10} x = 1.2$ using Regula-false method up to 3 decimal places — L3, 1, (10M)

(OR)

3. Using Newton's Forward Formula Compute the pressure of steam at temperature 142^0c from the following table — L3, 1, (10M)

Temperature	140	150	160	170	180
Pressure	3.685	4.854	6.302	8.076	10.255

UNIT-II

4.	Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ by using (i) Trapezoidal Rule (ii) Simpson's $1/3^{th}$ Rule (iii) Simpson's $3/8^{th}$ Rule	L5	2	(10M)
	(OR)			
5.	Solve $y^l = x^2 - y, y(0) = 1$ using Taylor's series Method and Compute $y(0.1)$.	L3	2	(10M)

UNIT-III

6.	Prove that the function $f(z) = \frac{2xy(x+iy)}{x^2+y^2}(z \neq 0), f(0) = 0$ is the Cauchy-Riemann equations are satisfied at the origin, yet $f^1(0)$ does not exist.	L4	3	(10M)
	(OR)			
7.	Evaluate $\int_{1+i}^{2+3i}(x + 2y - iy)\,dz$ along the line $y = 2 - x$.	L5	3	(10M)

UNIT-IV

8.	Expand $f(z) = \frac{(z+3)}{z(z+1)(z-2)}$ as a Laurent's series i) $\|z\| < 1,\ ii) 1 < \|z\| < 2$	L3	4	(10M)
	(OR)			
9.	Applying Residue theorem, Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)}dx$	L5	4	(10M)

UNIT-V

10.	Obtain the bilinear transformation which maps the points $z = \infty, i, 0$ *into the points* $w = 0, i, \infty$ respectively.	L3	5	(10M)
	(OR)			
11.	Find the graph of the strip $0 < y < 1/2$ under the mapping $w = \frac{1}{z}$.	L3	5	(10M)

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Course Code: **23BS3T07**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), Nov-2025

NUMERICAL METHODS AND TRANSFORM TECHNIQUES (ME)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Write Newton-Raphson formula to find root of equation.	L1	1	(2M)
b)	Prove that $\Delta\nabla = \Delta - \nabla$.	L2	1	(2M)
c)	Write formula to solve differential equations in Picard's method.	L1	2	(2M)
d)	Write Trapezoidal Rule for number of sub intervals equals to 10.	L2	2	(2M)
e)	State First shifting theorem on Laplace Transforms.	L1	3	(2M)
f)	Find L [$\delta(t-3)$].	L2	3	(2M)
g)	Write Fourier coefficients of even function in the interval $(-\pi, \pi)$	L2	4	(2M)
h)	Write Fourier series of $f(x)$ in the interval $(0,2l)$	L1	4	(2M)
i)	State Fourier integral theorem.	L1	5	(2M)
j)	Write formula for Inverse Fourier sine and cosine transforms.	L1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Using Regula-Falsi Method, find the root of $4\sin x = e^x$ correct to 3 decimal places.	L3	1	(10M)
	(OR)			
3.	Apply Lagrange's interpolation formula to find y(x) from the following data			

x	3	7	9	10
y	168	120	72	63

Hence find y(6). L3 1 (10M)

UNIT-II

4.	Evaluate $\int_0^6 \frac{e^x\ dx}{1+x}$ using Simpson's 1/3 rd Rule.	L3	2	(10M)
	(OR)			
5.	Using Picard's method find y at x = 0.1 and 0.2, If $\frac{dy}{dx} = y - x^2$, $y(0) = 1$.	L3	2	(10M)

UNIT-III

6.	Evaluate $\int_0^\infty t^2\, e^{-4t} sin2t\ dt$ using Laplace Transforms.	L3	3	(10M)
	(OR)			
7.	Solve $y^{11} + 2y^1 + 5y = 8 \sin t + 4 \cos t$, $y(0) = 1$ and $y(\frac{\pi}{4}) = \sqrt{2}$ using Laplace Transforms.	L3	3	(10M)

UNIT-IV

8.	Obtain the Fourier series of $f(x) = x - x^2$ in $(-\pi, \pi)$.	L2	4	(10M)
	(OR)			
9.	Find half range sine series of $f(x) = \begin{cases} x, & 0 < x < \frac{l}{2} \\ l - x, & \frac{l}{2} < x < l \end{cases}$.	L2	4	(10M)

UNIT-V

10.	Find the Fourier transform of $e^{-\frac{x^2}{2}}$.	L2	5	(10M)
	(OR)			
11.	Find the Fourier sine transform of the function f(x) = x in (0, 4).	L2	5	(10M)

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Course Code: **23BS3T08**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular End Examinations (BR23), November 2025

Probability Theory and Stochastic Processes (ECE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define the Following (i) Independent Events (ii) Mutually Exclusive Events.	1	1	(2M)
b)	The distribution function of a random variable X is $F_x(x)=x^2/2$ then find the density function.	3	1	(2M)
c)	What is Transformation? Classify the different types Transformation of Random Variable.	2	2	(2M)
d)	The variance of the random variable X is 4 and mean is 2 then find its mean square value.	3	2	(2M)
e)	Define a random process and explain the different types of random processes.	2	3	(2M)
f)	Two stationary random process X(t) and Y(t) are independent having mean value 4 and 11 respectively then find the cross correlation.	3	3	(2M)
g)	Show that $S_{xx}(-\omega)= S_{xx}(\omega)$.	3	4	(2M)
h)	Find whether given power density spectrum $\omega^2/(\omega^6+3\omega^2+3)$ is valid or not.	2	4	(2M)
i)	Define noise figure of a system.	1	5	(2M)
j)	Why is Huffman coding considered an efficient source coding technique?	2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	Define a random variable. What are the conditions for a Random Variable?	**2**	**1**	(5M)
2.(b)	A random variable X has probability density function shown below. i) Find the value of k. ii) Find $P(1/4 < X < ½)$. $$f_x(x) = \begin{cases} kx & for \quad 0 < x < 1 \\ 0 & otherwise \end{cases}$$	**2**	**1**	(5M)
	(OR)			

3.	Explain about the distribution and density function and prove their properties.	2	1	(10M)
	UNIT-II			
4.(a)	What is meant by Variance? State and prove its properties.	3	2	(5M)
4.(b)	A random variable Y has a probability density function of the form $f_y(y) = \begin{cases} ky & 0 < y < 6 \\ 0 & elsewhere \end{cases}$ Find the value of K variance of Y.	3	2	(5M)
	(OR)			
5.(a)	Find the mean, Mean square value, Variance and characteristic function of uniformly distributed random variable.	4	2	(5M)
5.(b)	A random variable X has a probability density $f_x(x) = \frac{1}{2} Cos(x), -\frac{\pi}{2} < x < \frac{\pi}{2}$. Find the mean value of the function on $g(x) = 4x^2$.	3	2	(5M)
	UNIT-III			
6.(a)	Define Random Process and explain the classification of Random Process.	3	3	(5M)
6.(b)	Prove that the random process $X(t) = A\ cos(\omega_c t + \Theta)$ is wide sense stationary if it is assumed that ω_c is a constant and Θ is uniformly distributed variable in the interval $(0,2\pi)$.	2	3	(5M)
	(OR)			
7.	Find the mean and mean square values of output y(t) of an LTI system with input x(t). Assume that x(t) is a WSS process.	1	3	(10M)
	UNIT-IV			
8.	State and prove Weiner - Khintchin relationship.	1	4	(10M)
	(OR)			
9.(a)	State and prove any four properties of cross power spectrum.	2	4	(5M)
9.(b)	Find the PSD of the Random process with auto correlation function $R_{XX}(\tau) = 1 + e^{-a\lvert\tau\rvert}$.	3	4	(5M)
	UNIT-V			
10(a)	Define Narrow band pass Noise and list out the properties.	2	5	(5M)
10(b)	Define noise figure and deduce the relation of noise figure when connected in cascaded form.	2	5	(5M)
	(OR)			
11.	Define a) Information b) Channel capacity c) Entropy d) Mutual transformation.	4	5	(10M)

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Course Code: **23BS3T09**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular End Examinations (BR23), November 2025

DISCRETE MATHEMATICS AND GRAPH THEORY

(Common to CSE, CSE (AI&ML), AIML, CSE (AI&DS)and IT)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

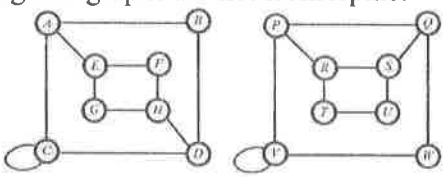
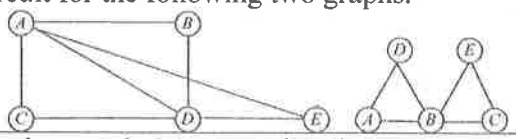
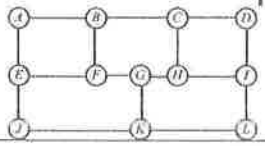
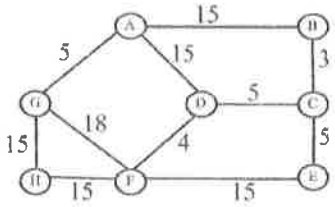
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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Construct the truth table for the formula $[q \wedge (p \rightarrow q)] \rightarrow p$.	L2	1	(2M)
b)	Explain equivalence rules	L1	1	(2M)
c)	State principle of Inclusion-Exclusion principle for any two non-empty sets.	L1	2	(2M)
d)	Define recursive function.	L1	2	(2M)
e)	Explain sum rule.	L1	3	(2M)
f)	Determine the order and degree of the recurrence relation $u_{n+2} + u_{n+1} + u_n = 0,\ \forall n \geq 0$.	L4	3	(2M)
g)	Explain Handshaking property with a suitable example.	L1	4	(2M)
h)	Define bipartite graph and give a suitable example.	L1	4	(2M)
i)	Define a spanning tree.	L1	5	(2M)
j)	Find the number of regions of the connected graph with 6 vertices and 9 edges.	L2	5	(2M)

PART–B (5X10 = 50M)

	UNIT-I			
2.(a)	Examine whether $[(p \vee q) \rightarrow r] \leftrightarrow [\neg r \rightarrow \neg(p \vee q)]$ is a tautology?	**L4**	**1**	(5M)
(b)	Find principal conjunctive normal form of $[p \rightarrow (q \wedge r)] \wedge [\neg p \rightarrow (\neg q \wedge \neg r)]$.	**L3**		(5M)
	(OR)			
3.	Verify the validity of the following argument "every living thing is a plant or an animal. John's gold fish is alive and it is not a plant. All animals have hearts. Therefore John's gold fish has a heart".	**L3**	1	(10M)
	UNIT-II			
4.	Prove that a binary relation R is defined on a set $S = \{1, 2, 3, 4, 5, 6, 7\}$ as $xRy \Leftrightarrow x - y$ is divisible by 3 is an equivalence relation.	L3	2	(10M)
	(OR)			
5(a)	Let the relation $R = \{(1, 2), (2, 3), (3, 3)\}$ be defined on the set $S = \{1, 2, 3\}$. Then find the transitive closure of R?	L3	2	(5M)

5(b)	Draw the hasse diagram of divisors of 42 under the partial order relation '$\leq$' defined as $x \leq y$ if x *divides* y.	L4	2	(5M)
	UNIT-III			
6.	Solve $a_{n+2} - 5a_{n+1} + 6a_n = 0$, $n \geq 0$ where $a_0 = 3$, $a_1 = 7$.	L3	3	(10M)
	(OR)			
7. (a)	Evaluate the coefficient of $x_1^2 x_2^3 x_3^3 x_4^4$ in $(x_1 - 2x_2 - 3x_3 + 4x_4 + x_5)^{12}$.	L5	3	(5M)
(b)	Solve $a_n = a_{n-1} + 3^n$, $n \geq 1$, $a_0 = 1$.	L3	3	(5M)
	UNIT-IV			
8.	Show that the following two graphs are not isomorphic. 	L3	4	(10M)
	(OR)			
9.(a)	Find the Euler's circuit for the following two graphs. 	L3	4	(5M)
9.(b)	Show that the following graph G has Hamiltonian path & cycle. 	L3	4	(5M)
	UNIT-V			
10.(a)	Show that a complete graph K_n $(1 \leq n \leq 4)$ is a planar graph and Kuratowski's first graph K_5 is a non-planar graph.	L3	5	(5M)
(b)	Explain Depth First Search (DFS) algorithm to find a spanning tree, in a connected graph G.	L2	5	(5M)
	(OR)			
11.	Using Kruskal's algorithm to find the minimal spanning tree of the following weighted graph. 	L3	5	(10M)

Course Code: 23HM3T02

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025

UNIVERSAL HUMAN VALUES-UNDERSTANDING THE HARMONY AND ETHICAL HUMAN CONDUCT (Common to all branches)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	**Marks**
1.a)	What is right understanding	1	1	(2M)
b)	Explain at the level of living.	1	1	(2M)
c)	Define harmony.	2	2	(2M)
d)	Define self?	1	2	(2M)
e)	What is co-existence?	3	3	(2M)
f)	Define the term respect	2	3	(2M)
g)	What is mutual fulfilment	4	4	(2M)
h)	Define existence	4	4	(2M)
i)	Explain units, space	4	5	(2M)
j)	Define Human conduct	3	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	**Marks**
	UNIT-I			
2.	Self – exploration as process for value education?	**1**	**1**	(10M)
	(OR)			
3.	Explain human basic aspirations?	**1**	1	(10M)
	UNIT-II			
4.(a)	Distinguishing between the needs of the self and the body.	2	2	(5M)
4.(b)	Elaborate understanding harmony in the self?	2	2	(5M)
	(OR)			
5.(a)	Explain the development of Human consciousness with a neat diagram.	2	2	(5M)

5.(b)	Discuss the programme for self-regulation and Health	2	2	(5M)
	UNIT-III			
6.	Write a brief note on feeling of relationship as the basis for harmony in the family?	3	3	(10M)
	(OR)			
7.	Discuss the other values naturally acceptable feelings in relationship	3	3	(10M)
	UNIT-IV			
8.	What are the four orders in Nature? How are they inter-dependent and mutually fulfilling for each other? Explain.	4	4	(10M)
	(OR)			
9.	The holistic perception of harmony in existence?	4	4	(10M)
	UNIT-V			
10(a)	Can you explain whether the concept of definitiveness of Ethical Human conduct?	3	5	(5M)
10(b)	Explain the concept of human common goals?	4	5	(5M)
	(OR)			
11(a)	Define profession and issues in Professional Ethics – The current scenario	3	5	(5M)
11(b)	Strategies for transition towards value-based life and profession	3	5	(5M)

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(5) 22/11/25 (BR23)

Course Code: **23ES3T05**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/ Supplementary End Examinations (BR23), Nove - 2025

SURVEYING (CE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	List out the various principles of surveying.	BL1	1	(2M)
b)	Explain the surveying instruments.	BL1	1	(2M)
c)	Expalin the concept of contour.	BL2	2	(2M)
d)	Explain the prismoidal formula for volume estimation.	BL2	2	(2M)
e)	Explain the concept of reiteration method.	BL2	3	(2M)
f)	Identify various methods of traversing.	BL3	3	(2M)
g)	Make use of a sketch what is the concept of reverse curve.	BL3	4	(2M)
h)	List various EDM instruments.	BL4	4	(2M)
i)	Classify various plotting instruments.	BL4	5	(2M)
j)	Write the differences between plane surveying and geodetic surveying.	BL4	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	A survey line BAC crosses a river, A and C being on the near and distant banks respectively. Standing at D, a point 50m measured perpendicularly to AB from A, the bearings of C and B are 320^0 and 230^0 respectively, AB being 25m. Find the width of the river.	BL1	**1**	(5M)
2.(b)	What are various tape corrections and discuss any two in detail.	BL1	**1**	(5M)
	(OR)			
3.(a)	Explain the concept of prismatic compass and surveyor compass.	BL4	1	(5M)
3.(b)	Compare whole circle and quadratic bearing systems in detail.	BL4	1	(5M)
	UNIT-II			
4. (a)	Demonstrate a page of typical levelling field book and explain how the readings are record.	BL2	2	(5M)
4.(b)	A series of offsets were taken from a chain line to a curved boundary line at intervals of15m in following order: 0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85m. Make use of Trapezoidal rule evaluate the area.	BL3	2	(5M)
	(OR)			
5.(a)	Make use of a sketch explain the concepts of reciprocal leveling.	BL3	2	(5M)
5.(b)	Identify the various characteristics of contour lines with suitable sketches	BL 3	2	(5M)

	UNIT-III			
6. (a)	Identify and discuss in detail the various temporary adjustments of a theodolite.	BL3	3	(5M)
6.(b)	In a traverse the latitudes and departures of the sides were calculated and given as Σ latitudes = 1.39 and Σ departures = - 2.17. Interpret the length and bearing of closing error.	BL2	3	(5M)
	(OR)			
7. (a)	Explain step by step procedure for measurement of horizontal angle by repetition method with a sketch.	BL2	3	(5M)
7.(b)	What is Thedolite and explain the types of Theodolite?	BL2	3	(5M)
	UNIT-IV			
8.(a)	What are the classification of horizontal curves and discuss them with sketches.	BL1	4	(5M)
8.(b)	What are the various advantages and applications of total station	BL1	4	(5M)
	(OR)			
9.(a)	Writ the relation between degree of curve and radius of curvature.	BL2	4	(5M)
9.(b)	Explain the various methods of tachometry with sketches	BL2	4	(5M)
	UNIT-V			
10(a)	What is photogrammetry and explain the types of photogrammetry?	BL 4	5	(5M)
10(b)	Explain the concept of terrestrial photogrammetry in detail.	BL 4	5	(5M)
	(OR)			
11(a)	Distinguish between relief and tilt displacements.	BL4	5	(5M)
11(b)	Analyze the number of photographs required if net length covered by each photograph is 1.5 km and length of the strip is 18 km.	BL 4	5	(5M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
II B.Tech I Semester Regular/ Supply End Examinations (BR23), NOV-2025
Electromagnetic Field Theory (EEE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	State Divergence theorem	BL1	1	(2M)
b)	Write an equation for Del operator property (Divergence) for Cylindrical coordinating system	BL1	1	(2M)
c)	Write an equation for Ohm's law in point form	BL1	2	(2M)
d)	Write an equation for energy stored and energy density in static electric field	BL1	2	(2M)
e)	Write Maxwell's second equation cylindrical coordinating system	BL1	3	(2M)
f)	What is magnetic dipole and dipole moment?	BL1	3	(2M)
g)	Differentiate Solenoid and toroid	BL1	4	(2M)
h)	Write an expressions for energy stored and energy density in magnetic fields	BL1	4	(2M)
i)	What is the significance of maxwell's fourth equation	BL1	5	(2M)
j)	State Faraday's laws of electromagnetic induction	BL1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Write del operator properties in rectangular and cylindrical coordinating systems	BL3	1	(10M)
	(OR)			
3.	Derive an expression for electric Field Intensity due to line charge distribution	BL2	1	(10M)
	UNIT-II			
4.(a)	Explain the concept of polarization	BL2	2	(4M)
4.(b)	Prove that the derivative of the energy stored in an electrostatic field with respect to volume is ½ D.E, where D and E are electric flux density and electric field intensity respectively	BL3	2	(6M)
	(OR)			
5.	Derive the boundary conditions for dielectric to dielectric interface for static electromagnetic fields.	BL3	2	(10M)

UNIT-III

6.	Define Biot-Savart's law. Derive the equation for Magnetic Field Intensity due to Square Current loop.	BL3	3	(10M)
	(OR)			
7.	Differentiate electric force and Magnetic force. Derive the force equation of moving charges in magnetic fields	BL3	3	(10M)
	UNIT-IV			
8.(a)	Derive the expression for self-inductance of solenoid.	BL4	4	(5M)
8.(b)	A solenoid of 10 cm in length consists of 1000 turns having the cross section radius of 1 cm. Find the inductance of solenoid. What is the value of current required to maintain a flux of 1 milli-Wb in the toroid. Take μr= 1500.	BL4	4	(5M)
	(OR)			
9.	Two long parallel conductors carrying currents 100A and 150A respectively. If the conductors are separated by 20mm. Find the force/meter length of each conductor, if the current flow is in opposite direction? Derive an expression for the equation which is used while solving the problem.	BL3	4	(10M)
	UNIT-V			
10(a)	Describe the Poynting Vector and derive its necessary expression	BL2	5	(5M)
10(b)	Derive Maxwell's equations for time varying fields from their basics.	BL2	5	(5M)
	(OR)			
11(a)	State and explain Farady's laws of electro-magnetic induction	BL3	5	(5M)
11(b)	Write the Maxwell's equations of sinusoidal (Harmonic)time varying fields	BL2	5	(5M)

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Course Code: **23ES3T07**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/ Supplementary Examinations (BR23), Nov 2025

THERMODYNAMICS (ME)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define thermodynamic system and surroundings.	1	1	(2M)
b)	Differentiate between intensive and extensive properties with examples.	2	1	(2M)
c)	Define the terms Heat and Work.	1	2	(2M)
d)	Explain the concept of internal energy.	2	2	(2M)
e)	State Clausius statement of Second Law of Thermodynamics.	1	3	(2M)
f)	Explain the concept of entropy in thermodynamic processes.	2	3	(2M)
g)	Define triple point of water.	1	4	(2M)
h)	Differentiate between dry saturated steam and superheated steam.	2	4	(2M)
i)	Define COP of a refrigeration system.	1	5	(2M)
j)	Explain the function of a condenser in a vapour compression refrigeration system.	2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	Explain the closed, open and isolated systems.	2	1	(5M)
2.(b)	Air at a Pressure of 50 bar and a volume of $0.2m^3$ is expanded at constant pressure until the volume is doubled. It is then expanded according to $PV^{1.3}$ = constant until the volume is $0.8m^3$. Calculate the work done in each process.	3	1	(5M)
	(OR)			
3.(a)	Explain Quasi static process.	2	1	(5M)
3.(b)	Explain about concept of thermodynamic equilibrium.	3	1	(5M)
	UNIT-II			
4.(a)	State and explain the First Law of Thermodynamics.	2	2	(5M)
4.(b)	A heat engine receives heat at the rate of 1500 kJ/min and gives an output of 8.2 kW. Determine: (i) The thermal efficiency. (ii) The rate of heat rejection.	3	2	(5M)
	(OR)			

5.(a)	State and Explain the Zeroth Law of Thermodynamics with examples.	2	2	(5M)
5.(b)	Establish the mathematical relation between Celsius and Fahrenheit Temperature scales.	3	2	(5M)

UNIT-III

6.	Explain about clausius inequality and equivalence of clausius and Kelvin planck statement.	3	3	(10M)

(OR)

7.(a)	Explain the principle of Increase of Entropy.	2	3	(5M)
7.(b)	Calculate entropy change of the universe as a result of a copper block of 600 gms, C_p of 150 J/Kg.K at 100^0C is placed in a lake 8°C.	4	3	(5M)

UNIT-IV

8.(a)	Describe the construction of the PV diagram for water.	3	4	(5M)
8.(b)	Explain the measurement of steam quality using the separating and throttling calorimeter through a schematic diagram.	3	4	(5M)

(OR)

9.(a)	What is Steam calorimetry? Explain the working of Throttling calorimeter.	3	4	(5M)
9.(b)	Write a short note on the Clausius-Clapeyron Equation.	3	4	(5M)

UNIT-V

10.	Describe the working of Vapour Compression Refrigeration Cycle with the help of schematic diagram, T-s and P-h Plots and also derive COP.	3	5	(10M)

(OR)

11(a)	Define and discuss the following psychrometric properties. (i) DBT, (ii) WBT, (iii) DPT, (iv) SH, (v) RH	2	5	(5M)
11(b)	Two streams of air, one at 25°C, 50% RH and other at 25°C and 60% RH are mixed adiabatically to obtain 3 kg of dry air at 30°C. Calculate the air drawn from both the streams and the humidity ratio of the mixed air.	4	5	(5M)

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Course Code: 23ES3T08

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/ Supply Examinations (BR23), November 2025

SIGNALS AND SYSTEMS (ECE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define continuous and discrete time signals	BL2	1	(2M)
b)	Define even and odd signal	BL2	1	(2M)
c)	State Dirichlet conditions for the existence of Fourier transform	BL4	2	(2M)
d)	Expand the Fourier series of a periodic continuous time signals	BL4	2	(2M)
e)	Compare time variant and time invariant systems	BL2	3	(2M)
f)	Give the conditions for a system to be linear and time invariant	BL2	3	(2M)
g)	What is auto-correlation?	BL1	4	(2M)
h)	Define aliasing	BL1	4	(2M)
i)	Draw the ROC of the Laplace transform of a signal $x(t) = e^{at}u(-t)$	BL3	5	(2M)
j)	What is ROC in Z transform?	BL3	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	Describe the following signals with their graphical and mathematical representations Step (ii) Ramp (iii) Impulse (iv) Pulse (v) Sinusoids	BL2	**1**	(10M)
	(OR)			
3.(a)	Determine the periodicity of the continuous signal i) $x(t) = 5\cos 4\pi t + 3\sin 8\pi t$	BL2	1	(10M)
	UNIT-II			
4.(a)	State and prove any two properties of Fourier Transforms.	BL4	2	(10M)
	(OR)			
5.(a)	Determine the Fourier series representation of $x(t) = 2\sin(2\pi t - 3) + \sin(6\pi t)$	BL4	2	(10M)

	UNIT-III			
6.(a)	State whether the following system is linear, casual, time variant and dynamic $y(t) = x(t-3) + (3-t)$	BL2	3	(10M)
	(OR)			
7.(a)	Determine whether the system $y(t) = 10x(t) + 5$ is static, linear, time invariant, casual and stable or not	BL3	3	(10M)
	UNIT-IV			
8.(a)	State and prove sampling theorem	BL1	4	(5M)
8.(b)	Explain the Energy density spectrum	BL1	4	(5M)
	(OR)			
9.(a)	Explain the method of detection of periodic signals in the presence of noise by correlation	BL1	4	(5M)
9.(b)	Explain the effect of aliasing	BL1	4	(5M)
	UNIT-V			
10(a)	Find the Laplace transform of the signal $f(t) = e^{-at}\sin(\omega t)$ and $x(t) = u(t-2)$	BL3	5	(10M)
	(OR)			
11(a)	State and prove initial and final value theorems of Z-transforms.	BL3	5	(10M)

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Course Code: **23ES3T09**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)
II B.Tech-I Semester Regular/Supply End Examinations (BR23), NOV-2025
DIGITAL LOGIC & COMPUTER ORGANIZATION (CSE& IT)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Convert $(101101)_2$ to decimal?	3	1	(2M)
b)	What is a K-map? Why is it used?	1	1	(2M)
c)	What is the difference between latch and flip-flop?	1	2	(2M)
d)	Define bus structure	1	2	(2M)
e)	What is signed-operand multiplication	1	3	(2M)
f)	What are the steps in instruction execution?	1	3	(2M)
g)	List different types of semiconductor memories.	2	4	(2M)
h)	Differentiate between primary and secondary storage.	2	4	(2M)
i)	Differentiate between memory-mapped I/O and isolated I/O.	2	5	(2M)
j)	What is a device controller?	1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Explain the conversion between binary, octal, and hexadecimal number systems for the following i) $(10101.010)_2 = (\ )_8$ ii) $(234.16)_8 = (\ )_2$ iii) $(ABCD.EF)_{16} = (\ )_2$ iv) $(10110.01110)_2 = (\ )_{16}$	**3**	**1**	(10M)
	(OR)			
3.	Implement a combinational circuit to realize the function $F(A,B,C) = \Sigma(1,2,4,7)$	**3**	1	(10M)
	UNIT-II			
4.	Explain about the full adder with neat diagram and truth table.	4	2	(10M)
	(OR)			

5.	Explain the working of any two types of flip-flops with truth tables and timing diagrams	2	2	(10M)

UNIT-III

6.(a)	Explain the addition and subtraction of signed numbers using 2's complement representation.	2	3	(5M)
6.(b)	Design a 4-bit carry look-ahead adder and explain its operation	3	3	(5M)
	(OR)			
7.	Construct how multiple-bus architecture improves processor performance.	3	3	(10M)

UNIT-IV

8.	What is a Virtual Memory? Explain the process of converting virtual addresses to Physical addresses with a neat diagram?	2	4	(10M)
	(OR)			
9.	Analyze performance considerations in memory design.	4	4	(10M)

UNIT-V

10.	Explain the working of Direct Memory Access (DMA) with a neat diagram	2	5	(10M)
	(OR)			
11.	What is Asynchronous Data Transfer? Explain any one method to achieve the asynchronous way of data transfer.	2	5	(10M)

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Course Code: 23ES3T10

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/ Supply End Examinations (BR23), November 2025

DATABASE MANAGEMENT SYSTEM (CSE (AI&DS))

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Brief the key characteristics of database.	2	1	(2M)
b)	What is the purpose of an ER diagram? Mention the symbols used in it.	2	1	(2M)
c)	Discuss the concept of a domain in the relational model.	1	2	(2M)
d)	Define a "tuple" and a "relation" in the relational model.	1	2	(2M)
e)	State the purpose of defining relationships between tables when creating them?	2	3	(2M)
f)	What are integrity constraints? Name and explain any two.	2	3	(2M)
g)	Describe the primary purpose of normalization in a database?	2	4	(2M)
h)	Explain about MVD and its purpose.	2	4	(2M)
i)	List and discuss about the different states of a transaction in a database system?	2	5	(2M)
j)	What is the purpose of a B+ Tree? Write an example.	2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	With neat sketch, explain in detail about the structure of database system.	2	1	(10M)
	(OR)			
3.(a)	Describe the advantages and disadvantages of DBMS over traditional file systems.	2	1	(5M)
(b)	Explain the three-schema architecture of DBMS with a neat diagram.	2	1	(5M)

	UNIT-II			
4.(a)	Describe about various constraints in a relational database, and explain them.	2	2	(5M)
(b)	State the purpose of Relational Algebra, explaining the fundamental operations with suitable examples.	4	2	(5M)
	(OR)			
5. (a)	Elaborate about various types of integrity constraints.	6	2	(5M)
(b)	List and explain basic DML operations in SQL?	2	2	(5M)
	UNIT-III			
6.	What is a view in SQL, and how is it created and explain the types of views.	2	3	(10M)
	(OR)			
7.	Explain the different types of joins in SQL with examples for each.	2	3	(10M)
	UNIT-IV			
8.	Explain the purpose of normalization. Describe the process of decomposing a relation into 1NF, 2NF, 3NF and BCNF with a suitable example.	4	4	(10M)
	(OR)			
9.(a)	Discuss functional dependencies and their role in normalization.	4	4	(5M)
(b)	Distinguish between 4NF and 5NF with relevant examples.	4	4	(5M)
	UNIT-V			
10(a)	Analyse about ACID properties and why they are essential for transactions in database management.	5	5	(5M)
(b)	Differentiate between Serializability and Recoverability with examples.	4	5	(5M)
	(OR)			
11(a)	Describe the concept of concurrent executions and serializability. Describe how lock-based protocols ensure serializability.	2	5	(5M)
(b)	Explain the concept of hash-based indexing and its advantages and disadvantages.	2	5	(5M)

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Course Code: **23ES3T11**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/ Supply End Examinations (BR23), November 2025

ARTIFICIAL INTELLIGENCE (AI&ML & CSE(AI&ML))

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	What is Artificial Intelligence?	BL1	1	(2M)
b)	Define Rational Agent.	BL1	1	(2M)
c)	How to improve the effectiveness of a search-based problem-solving technique?	BL2	2	(2M)
d)	How DFS is differed from BFS?	BL1	2	(2M)
e)	What is unification algorithm?	BL1	3	(2M)
f)	What is knowledge representation?	BL2	3	(2M)
g)	List out the advantages of non-monotonic reasoning.	BL2	4	(2M)
h)	Define Entropy in Decision Tree.	BL3	4	(2M)
i)	What role does the inference engine play in an expert system?	BL1	5	(2M)
j)	What is shell in Expert Systems?	BL1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	What is Agent and Environment? Explain different types of Environments with examples.	BL1	1	(10M)
	(OR)			
3.	Design Model Based and Goal Based Agents with neat sketch.	BL1	1	(10M)
	UNIT-II			
4.(a)	Describe how Alpha-Beta search works with relevant examples.	BL2	2	(5M)
4.(b)	Explain about iterative deepening AO* with an example.	BL2	2	(5M)
	(OR)			
5.(a)	Write a detail note on Min-Max Game play with example.	BL2	2	(5M)
5.(b)	Compare and contrast Informed and Uninformed Search Strategies.	BL2	2	(5M)

	UNIT-III			
6.(a)	What is predicate logic? Explain predicate logic with suitable example.	BL3	3	(5M)
6.(b)	Show that "It is humid today and if it is humid then it will rain so it will rain today "is a valid argument.	BL3	3	(5M)
	(OR)			
7.	Illustrate Bayes Theorem and Dempster Shafer theory.	BL3	3	(10M)
	UNIT-IV			
8.(a)	Define inductive learning and provide an example. How does it differ from deductive learning?	BL1	4	(5M)
8.(b)	What are statistical learning methods? Provide examples and discuss their applications in artificial intelligence.	BL1	4	(5M)
	(OR)			
9.	Describe the importance of Predicate logic and First Order Logic with examples.	BL2	4	(10M)
	UNIT-V			
10.	Define Expert Systems and explain its architecture with examples.	BL1	5	(10M)
	(OR)			
11(a)	Discuss the concept of meta-knowledge in expert systems. Why is it important for decision-making processes?	BL2	5	(5M)
11(b)	Imagine you are designing an expert system for diagnosing plant diseases. What knowledge would you need to acquire, and how would you structure the knowledge base?	BL3	5	(5M)

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Course code: **23CE3T02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE ODALAREVU
(AUTONOMOUS)

II B. Tech I-Semester Regular/Supplementary Examinations (BR23), Nov 2025
Strength of Materials (CE)

Time: 3 Hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

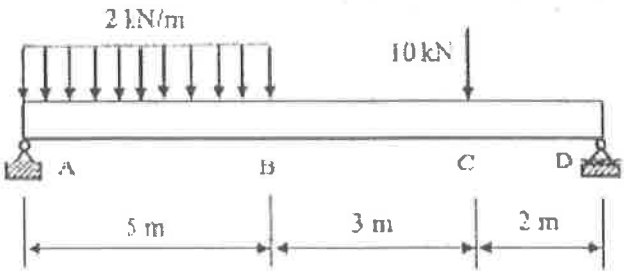
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PART–A (10X2 = 20M)

		Marks	CO	BL
1.a)	Define Bulk Modulus. How it is related to Young's Modulus?	2	CO1	L2
b)	In a tensile test on a mild steel specimen of original diameter 30 mm and gauge length 50mm, the axial load is 69kN and the extension is 0.03mm. Find the stress, strain and Young's Modulus.	2	CO1	L2
c)	What is point of contraflexure?	2	CO2	L2
d)	Differentiate between sagging bending moment and hogging bending moment.	2	CO2	L2
e)	What is neutral axis? Why stress and strain are zero in the neutral layer?	2	CO3	L2
f)	Sketch the variation of shear stress across the depth T-section, showing the positions of maximum and average shear stress.	2	CO3	L2
g)	State Mohr's first and second theorems.	2	CO4	L2
h)	A concentrated load of 10kN is acting at the free end of a cantileverbeam of span 3m. Determine the value of flexural rigidity of beam section if the maximum slope is 3mm.	2	CO4	L2
i)	How the thickness of the cylinder is decided whether it is thick or thin?	2	CO5	L2
j)	A vessel in the shape of cylindrical shell of 1.20m internal diameter and 12mm wall thickness is subjected to pressure of 1.6N/mm^2. Determine the stresses induced in cylindrical shell?	2	CO5	L2

PART–B (5X10 = 50M)

	UNIT-I	**Marks**	**CO**	**BL**
2.	A bar of uniform thickness t and length L tapers uniformly from width b_1 at one end to b_2 at the other end ($b_1 > b_2$). If an axial tensile load P is applied at the ends and E is the Young's Modulus, derive the expression for the elongation of the bar.	10	CO1	L3
	OR			
3.	A 3m steel rod of diameter 20mm is placed inside a brass tube of the same length and inside and outside diameters of 25mm and 35mm respectively. What is the deformation of the rod and the tube when a force of 50kN is applied on them through a rigid plate? Take Young's Modulus of steel and brass are 200GPa and 100GPa respectively.	10	CO1	L3
	UNIT-II			
4.	Draw the shear force and bending moment diagram for the loaded beam as shown in figure.	10	CO2	L3



OR

5.	A simple supported beam of length 8m rests on supports 6m apart, the right hand end is overhanging by 2m. The beam carries a uniformly distributed load of 1500N/m over the entire length. Draw the shear force and bending moment diagrams and find the point of contra flexure, if any?	10	CO2	L3

UNIT-III

6.	A rectangular beam 300mm deep is simply supported over a span of 4m. Determine the U.D.L per meter which the beam may carry, if the bending stress should not exceed 120N/mm^2. Take I = 8x 10^{6}mm^4.	10	CO3	L3

OR

7.	An I-section beam 350mm×150mm has a web thickness of 10mm and a flange thickness of20mm. If the shear force acting on the section is 40kN, find the maximum shear stress developed in the section. Sketch the shear stress distribution across the section.	10	CO3	L3

UNIT-IV

8.	A single overhanging beam ABC is simply supported at A and B and free at C. It carries a point load of 4.5kN at its free end C and a uniformly distributed load of 3kN/m for a length of 3m for the entire span. If flexural rigidity El = 2700 kNm^2. Determine: (i) slope at end A (ii) deflection at the free end (iii) the maximum deflection between A and B	10	CO4	L3

OR

9.	A beam AB of length 8 m is simply supported at its ends and carries two point loads of 50kN and 40kN at a distance of 2m and 5m respectively from left support A. Determine, deflection under each load, maximum deflection and the position at which maximum deflection occurs. Take E = 2 x 10^{5}N/mm^2 and I = 8.5 X10^{6}mm^4.	10	CO4	L3

UNIT-V

10.	Find the Euler's crippling load for a cylindrical steel column of 38mm diameter and take length of the column as 2.3m and hinged at its both ends. Take E=205GPa. Also determine the crippling load by Rankine's formula using constants as 335MPa and 1/7500?	10	CO5	L3

OR

11.	A cylindrical thin drum 80cm in diameter and 3m long has a shell thickness of 1cm. If the drum is subjected to an internal pressure of 2.5N/mm^2, determine the i) change in diameter ii) change in length iii) change in volume?	10	CO5	L3

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)
II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025
ELECTRICAL CIRCUIT ANALYSIS-II (EEE)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

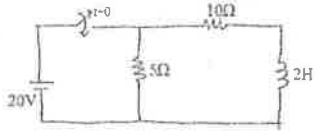
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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	List two advantages of three-phase systems over single-phase systems.	2	1	(2M)
b)	Explain why neutral wire is necessary in some three-phase systems.	1	1	(2M)
c)	Define Laplace transform and give its standard notation.	1	2	(2M)
d)	Transform V(t) = 10sin(100t) into s-domain.	2	2	(2M)
e)	Write the condition for reciprocity in a two port network.	1	3	(2M)
f)	Differentiate between series and parallel interconnection of two port networks.	4	3	(2M)
g)	Differentiate between trigonometric and exponential Fourier series.	2	4	(2M)
h)	Give an example of a periodic function and compute its Fourier coefficients.	3	4	(2M)
i)	Classify the different types of filters used in power supplies.	2	5	(2M)
j)	Compare the roles of passive and active filters.	4	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	With neat diagrams, explain the measurement of power in a three-phase circuit using the two-wattmeter method.	**2**	**1**	(5M)
2.(b)	Three identical coils, each of resistance 10ohm and inductance 42mH are connected (a) in star and (b) in delta to a 415V, 50 Hz, 3-phase supply. Determine the total power dissipated in each case.	**3**	**1**	(5M)
	(OR)			
3.(a)	Derive the relationship between line and phase voltages and currents for both star and delta connections.	**2**	1	(10M)
	UNIT-II			
4.(a)	Briefly explain the shifting theorem and apply it to solve a sample signal.	3	2	(5M)
4.(b)	In the circuit shown in figure below, obtain an expression for voltage across the inductor if the switch is closed at t = 0 using Laplace Transform method.	3	2	(5M)

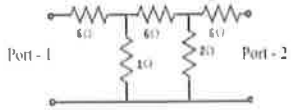


(OR)

5.	DC Transient response of series RL-Circuit to Determine the output Voltage and Voltage across the Inductor and Resister	4	2	(10M)

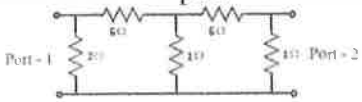
UNIT-III

6.(a)	Derive the Expression impedance and transmission parameters.	2	3	(6M)
6.(b)	Determine impedance parameters of the two port network below.	3	3	(4M)



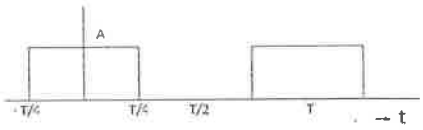
(OR)

7.(a)	Discuss about the parallel connection of two port networks.	2	3	(5M)
7.(b)	Determine hybrid parameters of the two port network below.		3	(5M)

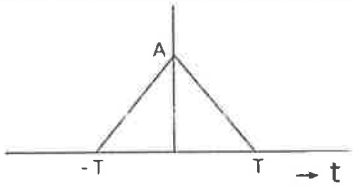


UNIT-IV

8.(a)	Find the exponential Fourier series for the waveform shown below. Draw the Fourier spectrum.	3	4	(5M)



8.(b)	Find the Fourier transform of the function shown in the below figure.	3	4	(5M)



(OR)

9.	Derive the Fourier series in Exponential form? And State and explain the properties of Fourier theorem?	4	4	(10M)

UNIT-V

10(a)	Design both T and π sections of a high pass filter having an infinite frequency characteristic impedance of 2000 Ω and a cut-off frequency of 2000 Hz.	2	5	(5M)
10(b)	Design a derived T-section low pass filter with nominal characteristic impedance 600 Ω, f_c = 1 kHz to give infinite attenuation at 1.1 kHz.	3	5	(5M)

(OR)

11(a)	What is filter? How filters are classified? Give Low pass filter an Ideal gain versus frequency characteristics of filter.	4	5	(10M)

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Course Code: 23ME3T01

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025

MECHANICS OF SOLIDS (ME)

Time: 3 hours Max. Marks: 70

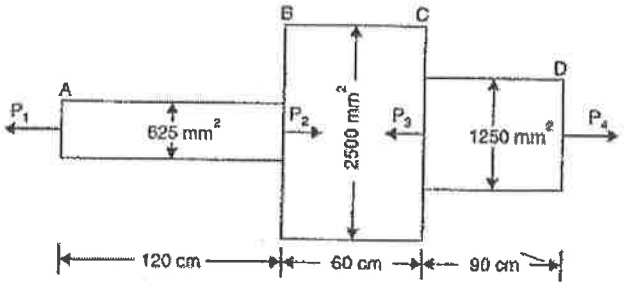
Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	State the Hooke's Law?	BTL1	1	(2M)
b)	Write the types of stresses and strains?	BTL2	1	(2M)
c)	Draw the SFD and BMD of a CB with UDL throughout its span?	BTL1	2	(2M)
d)	Define the term Point of contra flexure?	BTL1	2	(2M)
e)	What is the section modulus and how it will affect the strength of the beam?	BTL1	3	(2M)
f)	Define pure bending	BTL1	3	(2M)
g)	State the Mohr's theorem I & II to determine the Deflection of the beam?	BTL1	4	(2M)
h)	Write the torsion formula? Describe the each quantity present in the formula.	BTL1	4	(2M)
i)	Write about circumferential and longitudinal stress?	BTL2	5	(2M)
j)	Write Expression for Euler's crippling load for column when it has both ends hinged and both ends fixed?	BTL1	5	(2M)

PART–B (5X10 = 50M)

	UNIT-I			
2.(a)	A member ABCD is subjected to point loads P_1, P_2, P_3, P_4 as shown in figure. Calculate the force P_2 necessary for equilibrium, if P_1=45NP_3=450N, P_4=130N. Determine the total elongation of the member, assuming the modulus of elasticity to be 2.1 $\times 10^5$ N/mm^2. 	BTL2	1	(5M)
2.(b)	Derive the total elongation of the vertical bar rigidly fixed at one end and is strained due to self-weight.	BTL2	1	(5M)
	(OR)			

3.	Explain stress strain diagram of Mild steel.	BTL2	3	(10M)
	UNIT-II			
4.	Draw the shear force and bending moment diagrams of Cantilever beam carries UDL throughout the span.	BTL4	2	(10M)
	(OR)			
5.	A simply supported rectangular beam is 150mm wide by 300mm deep carries a central concentrated load of 12KN and a distributed load of 8KN/m on a span of 3metres. Determine the maximum bending stress in the beam and bending stress at 1metre from the left end.	BTL4	2	(10M)
	UNIT-III			
6.	A beam of T section is used as cantilever with the flange uppermost. The flange is 10cm wide and 2.5cm deep and the web is 1.5cm wide and 15cm deep whilst the cantilever is 2m long. Determine the maximum permissible load which may be suspended from the end of the cantilever if the limiting stresses in tension and compression are 90 and 150 MN/m^2.	BTL3	3	(10M)
	(OR)			
7	Derive the equation for the simple bending of the beam	BTL1	3	(10M)
	UNIT-IV			
8.	A cantilever of length 2m carries a point load of 20 kN at the free end and another load of 20 kN at its center. If E = 10^5 N/mm2 and I=10^8 mm4 for the cantilever then determine by moment area method, the slope and deflection of the cantilever at the free end.	BTL3	4	(10M)
	(OR)			
9.	Derive an expression for equation of elastic curve.	BTL3	4	(10M)
	UNIT-V			
10.	The internal and external diameters of a thick hollow cylinder are 80 mm and 120 mm respectively. It is subjected to an external pressure of 40 N/mm^2 and an internal pressure of 120 N/mm^2. Calculate the circumferential stress at the external and internal surfaces and determine the radial and circumferential stresses at the mean radius.	BTL4	5	(10M)
	(OR)			
11(a)	Derive the expressions for longitudinal and hoop stress in a thin cylinder subjected to fluid pressure internally.	BTL2	5	(5M)
11(b)	A thin cylindrical vessel of 2 m diameter and 4m length contains a particular gas at a pressure of 1.65 N/mm^2. If the permissible tensile stress of the material of the shell is 150 N/mm2, find the maximum thickness required.	BTL4	5	(5M)

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Course Code: **23EC3T01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025

ELECTRONIC DEVICES AND CIRCUITS (ECE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Draw the Fermi level in intrinsic and extrinsic Semiconductors.	BTL2	1	(2M)
b)	A P-N junction silicon diode has a reverse saturation current of 50nA at room temperature 27°C. If the new reverse saturation current is observed to be 160nA, calculate the value of new temperature.	BTL3	1	(2M)
c)	Explain the working principle of Varactor diode.	BTL2	2	(2M)
d)	Explain how a switch can act as a sampling gate.	BTL2	2	(2M)
e)	Calculate the collector current and emitter current for a transistor with $\alpha_{DC} = 0.99$ and I_{CB0}=50μA when the base current is 20 μA.	BTL3	3	(2M)
f)	Differentiate between bias stabilization and compensation techniques.	BTL2	3	(2M)
g)	Explain the h-parameters using a two port network model.	BTL2	4	(2M)
h)	Give the approximate h-parameter conversion formulae for CB in terms of CE.	BTL1	4	(2M)
i)	Explain how MOSFET act as a variable resistor.	BTL2	5	(2M)
j)	Draw MOS small signal model.	BTL2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Derive diode current equation in terms of applied voltage.	BTL3	1	(10M)
	(OR)			
3.(a)	Derive general expression for conductivity in terms of concentration of electrons, electron charge, mobility and electric field density.	BTL3	1	(6M)
3.(b)	Find the concentration of holes and electrons in a p-type Germanium at 300°K, if the conductivity is 100 Ω-cm and mobility of holes in Germanium μ_p = 1800 cm^2 /V-Sec.	BTL3	1	(4M)
	UNIT-II			
4.(a)	Explain the construction and working of SCR with its characteristics.	BTL2	2	(5M)
4.(b)	Determine the rating of a transformer to deliver 125 watts of dc power to a load for the following. (i) Half wave rectifier. (ii) Full wave rectifier (iii) Bridge rectifier.	BTL3	2	(5M)
	(OR)			
5.(a)	Write short notes on Light Emitting Diode and Photo Diode.	BTL2	2	(5M)
5.(b)	Draw and analyze the characteristic curve of a double ended clipper with circuit diagram.	BTL4	2	(5M)

	UNIT-III			
6.	Explain the input and output characteristics of transistor in CB configuration with a neat circuit diagram.	BTL2	3	(10M)
	(OR)			
7.	In a Self bias circuit containing R_1=50KΩ, R_2=25KΩ, R_E=1KΩ, R_C=3KΩ, β =90, V_{CC}=12V, V_{BE}=0.7V. Find the operating point, S, S' and S".	BTL3	3	(10M)
	UNIT-IV			
8.	A transistor used in CE amplifier has the following set of h-parameters, h_{ie} = 1KΩ, h_{fe} = 100, h_{re} = 5×10^{-4}, h_{oe} = $2 \times 10^{-5}\Omega^{-1}$, R_S = 15KΩ, R_L = 5KΩ. Determine input impedance, output impedance, current gain and voltage gain.	BTL4	4	(10M)
	(OR)			
9.	Derive the general expressions for voltage gain, current gain, input impedance and output impedance of CC amplifier using approximation model.	BTL4	4	(10M)
	UNIT-V			
10.	Explain construction and working of n channel JFET with its characteristics.	BTL3	5	(10M)
	(OR)			
11(a)	Explain construction and characteristics of enhancement MOSFET.	BTL2	5	(5M)
11(b)	Derive the expressions for Z_i, Z_o and A_v for common drain JFET amplifier.	BTL4	5	(5M)

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Course Code: 23CS3T02

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)
II B.Tech I Semester Regular/Supplementary Examinations (BR23), November 2025
ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS
(Common to CSE, CSE (AI&ML), AIML, CSE (AI&DS)and IT)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Explain the difference between time complexity and space complexity?	BL1	1	(2M)
	b) Why do B+ Trees have separate leaf and internal node structures compared to AVL trees?	BL2	1	(2M)
c)	How a priority queues is implemented using a heap tree?	BL2	2	(2M)
d)	Define a connected component in a graph?	BL2	2	(2M)
e)	What is the key difference between the greedy method and dynamic programming?	BL1	3	(2M)
f)	Why is the Travelling Salesperson Problem (TSP) not efficiently solvable using a greedy approach?	BL1	3	(2M)
g)	What is the string editing in the backtracking approach?	BL1	4	(2M)
h)	Describe the goal of the graph coloring problem and its constraints?	BL1	4	(2M)
i)	Explain Cook's theorem in the context of NP-Complete problems?	BL2	5	(2M)
j)	State the Travelling Salesperson Decision Problem (TSP) and its importance in combinatorial optimization?	BL3	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Discuss various the asymptotic notations used for best case average case and worst case analysis of algorithms.	BL2	1	(10M)

(OR)

3.	Create an AVL tree using the following sequence of data: 16, 27, 9, 11, 36, 54, 81, 63, 72.	BL3	1	(10M)

UNIT-II

4.	Explain the process of building a max-heap from an unsorted array. Describe the heap operation in detail and provide a step-by-step example?	BL2	2	(10M)

(OR)

5.	Describe how to perform a graph traversal using BFS and DFS? Explain how these algorithms differ in terms of their approach and potential applications.	BL2	2	(10M)

UNIT-III

6.	Illustrate merge sort algorithm and discuss time complexity.	BL1	3	(10M)

(OR)

7.	Find an optimal solution to the knapsack instance n = 5 objects and the capacity of knapsack. M = 60. The profits and weights of the objects are (P1, P2, P3, P4, P5) = (30, 40, 45, 77, 90) and (W1, W2, W3, W4, W5) = (5, 10, 15, 22, 25) respectively.	BL3	3	(10M)

UNIT-IV

8.	Explain the Bellman-Ford / dijkastra's algorithm in detail. Provide a step-by-step example using a sample graph, showing how the algorithm updates distances and detects negative weight cycles if present?	BL2	4	(10M)

(OR)

9.	Define backtracking. Explain the N-Queens problem in detail, outlining how backtracking is applied to solve it for n=4. Provide step-by-step reasoning.	BL3	4	(10M)

UNIT-V

10.	Use the Branch and Bound for the 0/1 knapsack problem and find the solution for the instance P: {20, 30, 35, 12, 3}, w: {2, 5, 7, 3, 1}, Knapsack capacity, m: 19.	BL3	5	(10M)

(OR)

11	Difference between NP-hard and NP-complete problems? Discuss in detail.	BL3	5	(10M)

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(S) 27/11/25 (BR23)

Course Code: 23CS3T03

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supply End Examinations (BR23), November 2025

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to CSE,IT,CSE(AI&DS),AIML&CSE(AI&ML))

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	List the principles of OOPs.	BL1	1	(2M)
b)	Define Ternary Operator and write the suitable example.	BL1	1	(2M)
c)	Differentiate between class and object.	BL1	2	(2M)
d)	What is the purpose of constructor in Java programming?	BL1	2	(2M)
e)	What is final class?	BL1	3	(2M)
f)	Define method overloading.	BL1	3	(2M)
g)	Define Random class.	BL1	4	(2M)
h)	Classify stream classes.	BL1	4	(2M)
i)	Define thread.	BL1	5	(2M)
j)	What is the core JDBC API components?	BL1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	a) Explain various Java statements with an example.	BL2	1	(5M)
	b) Describe command line arguments? Write a Program to add two numbers using command line arguments.	BL2	1	(5M)
	(OR)			
3.	Explain the Control Statements in Java with example.	BL2	1	(10M)
	UNIT-II			
4.(a)	Discuss about the class, objects with suitable example programs.	BL3	2	(5M)
4.(b)	Write a java program to illustrate Constructor Overloading.	BL4	2	(5M)
	(OR)			
5.(a)	How the keyword "final" can be used to prevent overriding?	BL3	2	(5M)

	Describe with example program.			
5.(b)	Compare Method Overriding and Method Overloading.	BL3	2	(5M)
	UNIT-III			
6.	a) What is an array? Discuss one dimensional & two-dimensional arrays. Illustrate declaration & initialization of two-dimensional arrays.	BL2	3	(5M)
	b) Demonstrate the importance of abstract classes? Show it with an example.	BL2	3	(5M)
	(OR)			
7.	Illustrate how interfaces can be used to implement hierarchical and multiple inheritance with an example.	BL2	3	(10M)
	UNIT-IV			
8.	a) How can we add a class to a package? Write about relative and absolute paths.	BL2	3	(5M)
	b) Discuss useful methods of Output Stream.	BL2	3	(5M)
	(OR)			
9.	Discuss various types of Exceptions with an example.	BL2	4	(10M)
	UNIT-V			
10(a)	Explain string handling in java.	BL2	5	(5M)
10(b)	Illustrate Java FX App window structure.	BL2	5	(5M)
	(OR)			
11.	What is JDBC in Java? Explain steps to connect JDBC with simple program.	BL4	5	(10M)

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Course Code: 23EC3T02

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supply End Examinations (BR23), November 2025

SWITCHING THEORY AND LOGIC DESIGN (ECE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Calculate $(12)_{10}$ -$(14)_{10}$ using 9's complement.	BTL2	1	(2M)
b)	Define De Morgan's theorems.	BTL1	1	(2M)
c)	Draw the logic diagram of Half Adder.	BTL2	2	(2M)
d)	Simplify the following Boolean function to a minimum number of literals. F (A, B)= ∑m(0,1,3).	BTL2	2	(2M)
e)	Write about PROM.	BTL1	3	(2M)
f)	Differentiate between Encoder and Decoder.	BTL1	3	(2M)
g)	Compare between Synchronous Sequential and Asynchronous Sequential Circuits.	BTL2	4	(2M)
h)	What is a Shift register?	BTL1	4	(2M)
i)	Define Finite state machine	BTL1	5	(2M)
j)	Sketch Mealy circuit and explain.	BTL2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Solve the following by doing the Conversions: a)$(10512.145)_8$ =($)_{10}$ b)$(EBF1.A2)_{16}$ = ($)_{10}$ c)$(1234.567)_{10}$ = ($)_2$ d) $(010111100)_2$ = ($)_8$ e)$(832.91)_{10}$ = ($)_8$	BTL2	1	(10M)
	(OR)			
3.	Generate the Hamming Code for the message of 00110011 using Odd parity	BTL3	1	(10M)
	UNIT-II			
4.(a)	Simplify the SOP expression F= Σm (0,1,4,5,6,8,9,12,13,14) using K-map method?	BTL3	2	(5M)

4.(b)	Draw the logic diagram of 4-bit binary adder-subtractor circuit and explain its operation	BTL2	2	(5M)
	(OR)			
5.(a)	Realize full adder using two half adders and logic gates.	BTL2	2	(5M)
5.(b)	Design BCD to gray code converter and realize using logic gates.	BTL4	2	(5M)
	UNIT-III			
6.	Realize a 3 to 8 decoder using 2 to 4 decoder and other required gates.	BTL3	3	(10M)
	(OR)			
7.	Implement the following Boolean functions using PLA. $A(x,y,z)= \sum m(0,1,2,4,6)$ $B(x,y,z)= \sum m(0,2,6,7)$ $C(x,y,z)=\sum m(3,6)$	BTL4	3	(10M)
	UNIT-IV			
8.	Explain the following Flip-flops with Truth table and neat sketch i) D Flip-Flop ii) RS Flip-Flop iii) T Flip-flop	BTL3	4	(10M)
	(OR)			
9.	Draw the circuit diagram of MOD-10 Counter and explain the operation of it.	BTL4	4	(10M)
	UNIT-V			
10(a)	Design a Sequence detector for 010.	BTL3	5	(5M)
10(b)	Explain the procedure of Meelay to Moore Conversion.	BTL3	5	(5M)
	(OR)			
11(a)	Write about the Analysis of the Clocked Sequential Circuits?	BTL3	5	(5M)
11(b)	Write about Realization of Sequence Generator?	BTL3	5	(5M)

Course Code: 23ME3T02

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
II B.Tech I Semester Regular/Supplementary End Examinations (BR23), NOV-2025
Material Science & Metallurgy (ME)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define crystallization of metals?	1	1	(2M)
b)	What is the difference between Lever rule and phase rule for a metal system?	2	1	(2M)
c)	What are different types of Cast irons?	1	2	(2M)
d)	What are super alloys?	2	2	(2M)
e)	What is tempering? List the classification of various tempering process.	2	3	(2M)
f)	Write short notes on Age hardening.	3	3	(2M)
g)	Define compaction.	1	4	(2M)
h)	Name any two secondary operations used in powder metallurgy.	1	4	(2M)
i)	What are ceramics?	1	5	(2M)
j)	Define particulate-reinforced composite.	2	5	(2M)

PART–B (5X10 = 50M)

UNIT-I

2.	What are the three most common intermediate alloy phases? Explain them.	**2**	1	(10M)
	(OR)			
3.	List and explain three reactions present in the Fe − Fe3C equilibrium diagram with neat sketch.	**4**	1	(10M)

UNIT-II

4.	What is Plain Carbon Steel? Also explain all type of plain carbon steel with the composition and specific application.	2	2	(10M)
	(OR)			
5.(a)	Describe the properties and applications of aluminium and its alloys.	2	2	(5M)
5.(b)	Explain Alpha-Beta alloys of Titanium.	2	2	(5M)

UNIT-III

6.	Explain the various stages in heat treatment cycle.	2	3	(10M)
	(OR)			
7.	What are surface - hardening methods? Which are the Surface Hardening processes? With neat sketch Explain any one of them in detail.	4	3	(10M)

UNIT-IV

8.(a)	Explain the basic steps involved in the powder metallurgy process.	2	4	(5M)
8.(b)	Write short notes on: (a) Granulation and (b) Electrolytic deposition method.	2	4	(5M)
	(OR)			
9.	With neat sketches, describe the atomization and electrolytic deposition methods of metal powder production.	4	4	(10M)

UNIT-V

10(a)	Distinguish between the properties of ceramics, glasses and cermets.	4	5	(5M)
10(b)	What is meant by tampered glass? Explain	2	5	(5M)
	(OR)			
11(a)	Write the classification of composites? Also indicate their typical applications	2	5	(5M)
11(b)	Explain the properties and applications of metal matrix composites (MMC)	2	5	(5M)

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Course Code: **23EE3T04**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supplementary Examinations (BR23), Nov-2025

DC MACHINES & TRANSFORMERS (EEE)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Define Critical speed and resistance.	BL2	1	(2M)
b)	State applications for DC compound motor.	BL1	1	(2M)
c)	List the various speed control methods of DC shunt motors.	BL1	2	(2M)
d)	What are the precautions to be taken during starting of a DC series motor?	BL1	2	(2M)
e)	Draw the typical equivalent circuit of a single-phase transformer.	BL1	3	(2M)
f)	Why transformer rating is always in KVA not in KW.	BL1	3	(2M)
g)	What are the conditions for parallel operation of single-phase transformer?	BL1	4	(2M)
h)	What is an auto transformer?	BL1	4	(2M)
i)	What are the conditions for parallel operation of 3-phase transformers?	BL1	5	(2M)
j)	Write the advantages and dis-advantages of star-star connection.	BL2	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.(a)	Deduce an expression for E.M.F equation of DC Generator?	BL1	1	(5M)
2.(b)	A 4-pole generator having lap wound armature winding has 50 slots each slot contains 20 conductors. What will be the volage generated in the machine, when driven at 1500rpm, assuming the flux per pole to be 70 mwb?	BL3	1	(5M)
	(OR)			
3.	Explain the process of commutation of DC generator with neat sketches.	BL1	1	(10M)
	UNIT-II			
4.	Draw a neat diagram of the 3-point starter and explain how they are used to start a DC shunt motor.	BL3	2	(10M)
	(OR)			
5.	What is meant by speed control of a DC motor? Explain the various methods in detail.	BL2	2	(10M)

UNIT-III

6.(a)	A 500kVA, 11000V/400V, 50Hz single phase transformer has 100 turns on the secondary winding, calculate: a) The approximate no. of turns in the primary winding. b) The approximate value of primary and secondary currents. The maximum value of flux in the core.	BL3	3	(5M)
6.(b)	Draw and explain the No-load phasor diagram of 1-ϕ transformer.	BL3	3	(5M)

(OR)

7.(a)	Draw and explain the phasor diagram of transformer when it is operating under load.	BL1	3	(5M)
7.(b)	What are the various losses in a transformer?	BL1	3	(5M)

UNIT-IV

8.	With a circuit diagram how to obtain equivalent circuit by conducting O.C. & S.C. test in a single-phase transformer.	BL3	4	(10M)

(OR)

9.(a)	Draw and explain briefly about equivalent circuit of an auto transformer?	BL2	4	(5M)
9.(b)	An auto transformer supplies a load of 5kW at 125V and at unity power factor. If the primary voltage is 250V. Determine (a) Transformation ratio (b) Secondary current (c) Primary current (d) No. of turns across secondary if total number of turns is 250 (e) Power transformed (f) Power conducted directly from the supply mains to load.	BL3	4	(5M)

UNIT-V

10.	A Δ-Δ bank consisting of three 40kVA, 2300/230V transformers supplies a load of 80kVA. If one transformer is removed, find for the resulting V V connection i) KVA load carried by each transformer ii) percent of rated load carried by each transformer. iii) ratio of the V-V bank to Δ-Δ bank transformer ratings. iv) percent increase in load on each transformer when bank is converted into V-V bank.	BL2	5	(10M)

(OR)

11.	Explain star-star and delta delta connection of transformer with diagrams.	BL1	5	(10M)

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Course Code: **23CE3T03**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALAREVU
(AUTONOMOUS)

II B.Tech I Semester Regular/Supply End Examinations (BR23), November - 2025

FLUID MECHANICS (CE)

Time: 3 hours | Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the questions of Part-A
Part-B consists of 5 questions with either/or choice, answer any one from either/or choice

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PART–A (10X2 = 20M)

		BTL	CO	Marks
1.a)	Differentiate between density and weight density.	BL1	1	(2M)
b)	State Newton's law of viscosity.	BL1	1	(2M)
c)	State Pascal's law.	BL1	2	(2M)
d)	Define pressure.	BL2	2	(2M)
e)	Write the expression for three dimensional continuity equation.	BL1	3	(2M)
f)	What is meant by stream line and steak line?	BL1	3	(2M)
g)	List out the various forces acting on a flowing fluid.	BL1	4	(2M)
h)	What are the assumptions of Bernouli's equation?	BL2	4	(2M)
i)	Differentiate between pipes in series and pipes in parallel.	BL2	2	(2M)
j)	What is meant by equivalent pipe?	BL1	5	(2M)

PART–B (5X10 = 50M)

		BTL	CO	Marks
	UNIT-I			
2.	Calculate the capillary rise in a glass tube of 2.5mm diameter when immersed vertically in (a) water and (b) mercury. Take surface tensions 0.0725N/m for water and 0.52 N/m for mercury in contact with air. The specific gravity for mercury is given as 13.6 and angle of contact = 130^0.	**BL3**	**1**	(10M)
	(OR)			
3.	Explain briefly about types of fluids with the help of stress strain diagram.	**BL3**	1	(10M)
	UNIT-II			
4.	A hydraulic press has a ram of 20 cm diameter and a plunger of 4 cm diameter. It is used for lifting a weight of 30 kN. Find the force required at the plunger.	BL2	2	(10M)
	(OR)			
5.	Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface sub-merged in the liquid.	BL4	2	(10M)
	UNIT-III			
6.	Explain briefly classification of fluid flow?	BL3	3	(10M)
	(OR)			
7.	If for a 2D potential flow, the velocity potential is given by Ø = x(2y-1). Determine the velocity at the point P (4,5). Determine also the value of stream function at the point P.	BL3	3	(10M)

	UNIT-IV			
8.	Describe about Bernouli's equation and Euler's equation and derive the expression.	BL4	4	(10M)
	(OR)			
9.	Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm^2 and the pressure at the upper end is 9.81 24.525 N/cm^2. Determine the difference in datum head if the rate of flow through pipe is 40 lit/s.	BL4	4	(10M)
	UNIT-V			
10(a)	Explain about Energy loss equations.	BL4	5	(10M)
	(OR)			
11.	A horizontal pipe of 300mm diameter and 80m long is connected to a water tank of one and discharges freely to atmosphere of the other end. If height of the water in the tank is 5m above the center of the pipe. Calculate the rate of flow of water. Consider all loses and take f = 0. 009. Also draw the hydraulic grade line (H.GL) and Total energy line(T.E.L).	BL3	5	(10M)

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