



**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram-521 230 :: NTR Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

B.Tech. (III Semester) (R23) Semester End Examinations (Regular & Supplementary) – November 2025

TIME TABLE

R23

Time : 10.00 AM to 01.00 PM

A.Y. : 2025-26

Branch	17-11-2025 (Monday)	19-11-2025 (Wednesday)	21-11-2025 (Friday)	24-11-2025 (Monday)	26-11-2025 (Wednesday)	28-11-2025 (Friday)
AI & DS	Minor Program 23QT01-Survey of Quantum Technologies and Application (AI & DS, CSE (AI & ML), ECE & EEE)	23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE11-Discrete Mathematics & Graph Theory	23CS03-Database Management Systems	23CS04-Advanced Data Structures & Algorithm Analysis	23CS05-Object Oriented Programming through Java
ASE		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE09-Numerical Methods and Transform Techniques	23AE01-Introduction to Aerospace Engineering	23AE02-Engineering Fluid Mechanics	23AE03-Engineering Thermodynamics
CE		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE08-Numerical Techniques And Statistical Methods	23CE01-Surveying	23CE02-Strength of Materials	23CE03-Fluid Mechanics
CSE		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE11-Discrete Mathematics & Graph Theory	23IT01-Digital Logic & Computer Organization	23CS04-Advanced data structures & Algorithm Analysis	23CS05-Object Oriented Programming through Java
CSE (AI&ML)		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE11-Discrete Mathematics & Graph Theory	23AD02-Artificial Intelligence	23CS04-Advanced Data Structures & Algorithm Analysis	23CS05-Object Oriented Programming Through Java
ECE		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE12-Probability Theory and Stochastic Process	23EC02-Signals and Systems	23EC03-Electronic Devices and Circuits	23EC04-Switching Theory and Logic Design
EEE		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE07-Complex Variables and Numerical Methods	23EE03-Electromagnetic Field Theory	23EE04-Electrical Circuit Analysis-II	23EE05-DC Machines & Transformers
IT		23HS01-UHV2 - Understanding Harmony and Ethical Human Conduct	23FE11-Discrete Mathematics & Graph Theory	23IT01-Digital Logic & Computer Organization	23CS04-Advanced Data Structures & Algorithm Analysis	23CS05-Object Oriented Programming through Java
ME		23HS01-UHV 2 - Understanding Harmony and Ethical Human Conduct	23FE09-Numerical Methods and Transform Techniques	23ME03-Thermodynamics	23ME04-Mechanics of Solids	23ME05-Material Science and Metallurgy

Note(s): Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 01-11-2025

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs
3. Canteen, PD, Security & Hostels

2. T&P cell, Transport in-charge & Librarian
4. Coordinator-Disciplinary 5. Notice Boards

17 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular Examinations

23QT01-SURVEY OF QUANTUM TECHNOLOGIES AND APPLICATIONS

(AI&DS, CSE(AI&ML), ECE and EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is quantum Entanglement? Give one example.	2M	CO1	L1
(b)	Differentiate between quantum physics and classical physics.	2M	CO1	L2
(c)	What is a qubit and how does it differ from a classical bit?	2M	CO2	L2
(d)	What are the DiVincenzo criteria used for?	2M	CO2	L1
(e)	List different types of quantum sensors.	2M	CO3	L2
(f)	Explain entangled photon generation.	2M	CO3	L2
(g)	Explain the meaning of Shannon entropy.	2M	CO4	L1
(h)	Compare classical and quantum communication.	2M	CO4	L1
(i)	What are quantum materials?	2M	CO2	L1
(j)	Give two examples of applications of quantum materials.	2M	CO2	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	What is the concept of superposition in quantum mechanics?	5M	CO1	L2
(b)	Explain what tunneling means in the context of quantum physics.	5M	CO1	L2
(OR)				
3(a)	How do Hermitian operators relate to quantum measurements?	5M	CO1	L2
(b)	Summarize Feynman's idea of a quantum simulator.	5M	CO1	L2
4(a)	Summarize the basic operations performed by quantum gates and how they differ from classical logic gates.	5M	CO1	L2
(b)	What are the main physical implementations of qubits, and how do they vary qualitatively?	5M	CO1	L2
(OR)				
5(a)	Explain how semiconductor qubits such as quantum dots and spins are used in quantum computing.	5M	CO2	L2
(b)	Describe the advantages of superconducting qubits in terms of charge, flux, and phase.	5M	CO2	L2
6(a)	Explain the basic principle behind quantum sensing.	5M	CO3	L2
(b)	Describe how quantum coherence improves the sensitivity of sensors.	5M	CO3	L2
(OR)				
7(a)	Explain the difference between single-photon and entangled-photon generation.	5M	CO3	L2
(b)	Illustrate how photon detection is achieved in quantum sensing experiments.	5M	CO3	L2
8(a)	Explain the basic principles of digital communication.	5M	CO4	L2
(b)	Define Shannon entropy and explain its significance in quantifying classical information.	5M	CO4	L2
(OR)				
9(a)	What is quantum communication? Explain how it differs from classical communication.	10M	CO3	L2
(b)	Describe how quantum communication ensures security.			
10(a)	Describe the main applications of quantum materials in emerging technologies.	5M	CO2	L2
(b)	Explain the structure and unique properties of topological insulators.	5M	CO2	L2
(OR)				
11(a)	Differentiate between conventional materials and quantum materials with suitable examples.	5M	CO3	L2
(b)	Explain why quantum materials are important for modern science and technology.	5M	CO3	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23HS01-UHV 2-UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT

(Common to All)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Specify the Basic Human Aspirations.	2M	CO1	L1
(b)	Mention any TWO Important Implications of Self-exploration.	2M	CO1	L1
(c)	Draw the tree diagram expressing the state of Human imagination in Harmony.	2M	CO2	L2
(d)	Mention any THREE Human decisions based on "Knowing and Assuming" and based on "Assuming without Knowing".	2M	CO2	L2
(e)	List out the Dimensions (systems) in Human Society.	2M	CO3	L2
(f)	How should be the production process so that it will be sustainable, eco-friendly and human friendly?	2M	CO3	L2
(g)	Identify the Innateness among the four orders of nature.	2M	CO4	L2
(h)	List out the natural characteristics of four orders of nature.	2M	CO4	L2
(i)	Mention any TWO criteria's for the development and adoption of innovative technologies and systems, tools, techniques and models which are claimed for the 'betterment' of society	2M	CO5	L2
(j)	Mention any THREE steps that each one of us can take for transition from our present state towards a holistic, fulfilling way of life towards humane society (universal human order).	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Why is right understanding required in relationship for mutual happiness? Illustrate with the help of two examples from your life.	5M	CO1	L3
(b)	Mention the content of Value Education? Discuss the need for it in technical and other professional institutions.	5M	CO1	L2
(OR)				
3(a)	Define self-exploration. What is the content of self – exploration?	5M	CO1	L2
(b)	Explain the basic guidelines for Value Education. What is the need for these guidelines?	5M	CO1	L2
4(a)	'Human being is co-existence of the Self and the Body' – elaborate on this statement.	5M	CO2	L2
(b)	Discuss programs to ensure proper functioning of your body. Can we sustain them without right understanding.	5M	CO2	L2
(OR)				
5(a)	Distinguishing between the Needs of the self and the body.	5M	CO2	L2
(b)	Explain how pre-conditioning can lead to unhappiness. Discuss the problems that are created by having desire, thoughts and expectation on the basis of preconditioning.	5M	CO2	L2
6(a)	Explain the understanding of human-human relationships for harmony in a family.	5M	CO3	L2
(b)	Explain the evaluation of trust between two individuals.	5M	CO3	L3
(OR)				
7(a)	Describe the problems in society and the role of human goal and systems for its fulfilment.	5M	CO3	L3
(b)	Explain the various production activities for ensuring prosperity in every family in the society.	5M	CO3	L2
8(a)	Explore the Interconnectedness and Interdependencies of the Four orders of nature.	5M	CO4	L3
(b)	Explain the Tendency of Human Living with Animal Consciousness and Natural Characteristic of Human Living with Human Consciousness.	5M	CO4	L2
(OR)				
9(a)	Explain the activities of four orders of nature.	5M	CO4	L2
(b)	Justify that "All units in the existence are submerged in space" Co-existence.	5M	CO4	L3
10(a)	List out the Universal Values Naturally Emerging from the Right Understanding	5M	CO5	L2
(b)	Explain the values, policy and Character of ethical human conduct.	5M	CO5	L2
(OR)				
11(a)	Elaborate the role of competence in ensuring professional ethics.	5M	CO5	L2
(b)	Explain the criteria's for Production Systems and Management Models.	5M	CO5	L3

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23FE11-DISCRETE MATHEMATICS & GRAPH THEORY
(AI&DS,CSE,CSE(AI&ML) and IT)

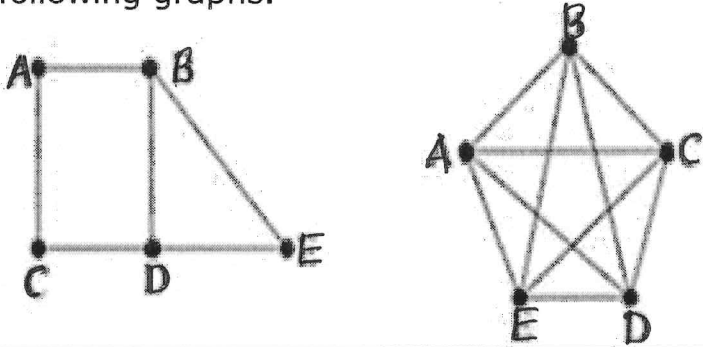
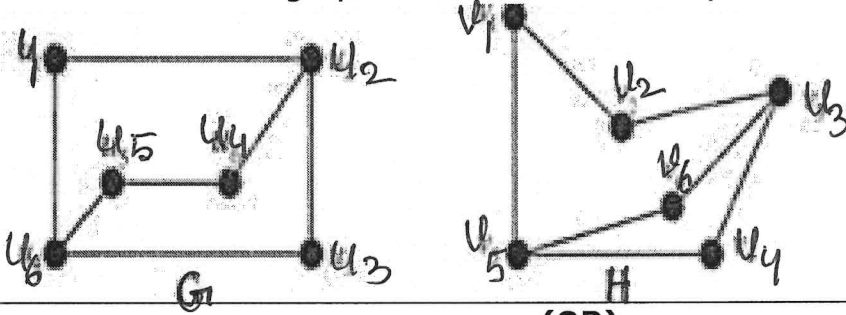
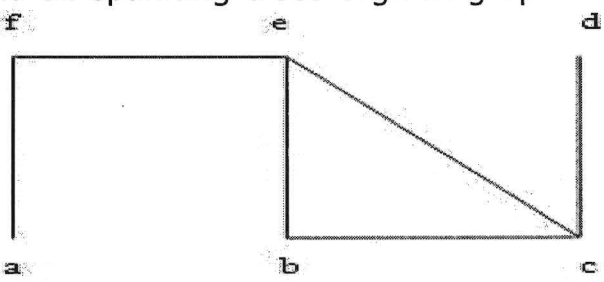
001004
2-1/1/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define statement and atomic statement.	2M	CO1	L1
(b)	Explain logical equivalence with an example.	2M	CO1	L1
(c)	Find inverse of $f(x)$ and $g(x)$ where $f(x) = x^3, g(x) = 2x + 3$?	2M	CO2	L2
(d)	What is bijective function?	2M	CO2	L2
(e)	Find the co-efficient of x^{27} of $(x^4 + 2x^5 + 3x^6)^5$.	2M	CO3	L1
(f)	Define permutation.	2M	CO3	L1
(g)	What is the order and size of a graph?	2M	CO4	L1
(h)	Define complete graph.	2M	CO4	L1
(i)	Define multi graph.	2M	CO5	L1
(j)	What is prim's algorithm?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Determine the negations of the following statements, (i) Jan will take a job in industry or go to graduateschool (ii) James will bicycle or run tomorrow. (iii) If the processor is fast then the printer is slow	5M	CO1	L3
(b)	Explain the term tautology? Show that $[(p \rightarrow q) \rightarrow r] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$ is tautology	5M	CO1	L2
(OR)				
3(a)	(i) Explain the direct proof of the statement "The square of an odd integer is an odd integer". (ii) Explain the indirect proof of the statement. "If n^2 is odd, then n is odd".	5M	CO1	L3
(b)	Demonstrate the disjunctive normal form of the formula: $P \rightarrow ((P \rightarrow Q) \wedge \sim(\sim Q \vee \sim P))$	5M	CO1	L2
4.	Let $A = \{1, 2, 3, 4, 6, 12\}$ on set A define the relation A to B, iff A divides B.. Show that R is partial order relation and draw the Hasse diagram form this relation	10M	CO2	L2
(OR)				
5(a)	Let $A = \{1, 2, 3, 4\}$, $B = \{a, b, c\}$, $C = \{w, x, y, z\}$ with $f: A \rightarrow B$ and $g: B \rightarrow C$ given by $f = \{(1, a), (2, a), (3, b), (4, c)\}$ and $g = \{(a, x), (b, y), (c, z)\}$ Find $g \circ f$ and $f \circ g$.	5M	CO2	L3
(b)	Explain in brief about Inversive and Recursive functions with examples.	5M	CO2	L2
6(a)	Explain sum rule and product rule with suitable examples.	5M	CO3	L2
(b)	Solve the recurrence relation $a_n + a_{n-1} + 10a_{n-2} - 7 = 0$ $n \geq 2$, $a_0 = 10, a_1 = 41$.	5M	CO3	L2
(OR)				
7(a)	Write the generating functions for the following sequences (i) 1, 2, 3, 4 (ii) 1, -2, 3, -4 (iii) 0, 1, 2, 3 (iv) 0, 1, -2, 3, -4.	5M	CO3	L3

23FE11-DISCRETE MATHEMATICS & GRAPH THEORY

(b)	Find the co-efficient of x^{12} of $x^3(1 - 2x)^{10}$.	5M	CO3	L2
8(a)	Find the Euler path or an Euler circuit, if it exists, in the following graphs. 	5M	CO4	L3
(b)	Find whether the graphs G and H are isomorphic. 	5M	CO4	L2
(OR)				
9(a)	Find the adjacency matrix of the digraph $G=(v_1, v_3), (v_1, v_2), (v_2, v_4), (v_3, v_1), (v_2, v_3), (v_3, v_4), (v_4, v_1), (v_4, v_2), (v_4, v_3)$. Also draw the graph.	5M	CO4	L3
(b)	Show that a simple graph with n vertices must be connected if it has more than $(n - 1)(n - 2) / 2$ edges.	5M	CO4	L2
10(a)	Show that a simple graph is bipartite if and only if it is possible to assign one of two different colors to each vertex of the graph so that no two adjacent vertices are assigned the same color.	5M	CO5	L2
(b)	Explain the procedure for Kruskal's algorithm with suitable examples.	5M	CO5	L2
(OR)				
11(a)	Find all spanning trees of given graph. 	5M	CO5	L3
(b)	What is meant by depth first search algorithm? Explain with suitable examples.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23FE09-NUMERICAL METHODS AND TRANSFORM TECHNIQUES

(ASE&ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL												
1(a)	Write the formula for Bisection method.	2M	CO1	L1												
(b)	Write the formula for Newton's forward interpolation.	2M	CO1	L1												
(c)	Write the formula for Simpson's 1/3 rule.	2M	CO2	L2												
(d)	Write the formula for Runge-Kutta order.	2M	CO2	L2												
(e)	Evaluate $L\left\{\frac{1}{t}\right\}$	2M	CO3	L1												
(f)	Evaluate the Laplace transform of unit step function.	2M	CO3	L1												
(g)	Write the Dirichlet's conditions of Fourier series.	2M	CO4	L1												
(h)	Write the formula for half range Fourier sine series.	2M	CO4	L1												
(i)	Write the formula for Fourier sine transform.	2M	CO5	L1												
(j)	Write the formula for convolution theorem.	2M	CO5	L1												
(OR)																
Q.No	All questions carry equal marks	Marks	CO	BL												
2(a)	Derive a formula for finding \sqrt{N} . Hence evaluate $\sqrt{28}$ to two decimal places.	5M	CO1	L3												
(b)	Using method of false position method, compute real root of $xe^x - 2 = 0$.	5M	CO1	L3												
(OR)																
3(a)	Show that $\mu\delta = \frac{1}{2}(\Delta + \nabla)$	5M	CO1	L3												
(b)	Estimate the missing terms in the following table	5M	CO1	L2												
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>45</td> <td>50</td> <td>55</td> <td>60</td> <td>65</td> </tr> <tr> <td>y</td> <td>3</td> <td>-</td> <td>2</td> <td>-</td> <td>-2.4</td> </tr> </table>					x	45	50	55	60	65	y	3	-	2	-	-2.4
x	45	50	55	60	65											
y	3	-	2	-	-2.4											
4.	Use Runge-Kutta method to find y when x = 1.2 in steps of h = 0.2, given that: $\frac{dy}{dx} = x^2 + y^2$, y(1) = 1.5	10M	CO2	L3												
(OR)																
5(a)	Evaluate $\int_0^9 \frac{1}{x^3 + 1} dx$ using Trapezoidal rule, Simpson's 3/8 rule taking n = 6.	5M	CO2	L3												
(b)	Applying Euler's method find an approximate value of y corresponding to x = 1 given that $\frac{dy}{dx} = x + y$ and y(0) = 1 and h = 0.2	5M	CO2	L3												
6(a)	Find the Laplace transform of $f(t) = \frac{e^{-t} \sin t}{t}$	5M	CO3	L3												
(b)	Find $L^{-1}\left\{\log\left(\frac{s+1}{s}\right)\right\}$	5M	CO3	L2												
(OR)																

23FE09-NUMERICAL METHODS AND TRANSFORM TECHNIQUES

7(a)	Using convolution theorem, evaluate $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$	5M	CO3	L3
(b)	Solve $(D^2 + 4D + 3)y = e^{-t}$ given that $y(0) = y'(0) = 1$ at $t = 0$ by using Laplace transform.	5M	CO3	L3
8(a)	Find the half range cosine series of $f(x) = x, 0 < x < \pi$	5M	CO5	L3
(b)	Find the Fourier coefficient 'a ₀ ' in the Fourier series expansion of $f(x) = \cos x , -\pi < x < \pi$.	5M	CO4	L2
(OR)				
9(a)	If $f(x) = x \sin x$ for $0 < x < 2\pi$ then find the Fourier coefficient b_n .	5M	CO4	L3
(b)	Find the Fourier series expansion of $f(x) = x^2$ on the interval $-\pi < x < \pi$.	5M	CO4	L3
10(a)	Find the Fourier transform of $f(x) = \begin{cases} 1 & \text{if } x < 1 \\ 0 & \text{if } x > 1 \end{cases}$	5M	CO5	L3
(b)	Find Fourier cosine transform of e^{-ax}	5M	CO5	L3
(OR)				
11(a)	Express $f(x) = \begin{cases} 1 & \text{if } 0 \leq x \leq \pi \\ 0 & \text{if } x > \pi \end{cases}$ as a Fourier sine integral.	5M	CO5	L3
(b)	Find the finite Fourier sine transformation of $f(x) = 2x$ if $0 < x < 4$.	5M	CO4	L3

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23FE08-NUMERICAL TECHNIQUES AND STATISTICAL METHODS

(CE)

Time : 3 hours

Max. Marks : 70

60/100
21/11/25

Q.No	Compulsory Question	Marks	CO	BL					
1(a)	Give an examples for algebraic and transcendental equations.	2M	CO1	L1					
(b)	Find the interval of existence of the root of the equation $\tan x = x$	2M	CO1	L1					
(c)	Evaluate $\int_0^1 x^3 dx$ by Trapezoidal rule taking $h = 0.25$.	2M	CO2	L3					
(d)	Write the formula to derive approximations in R-K method of 2 nd order.	2M	CO2	L1					
(e)	Define conditional probability and give one example.	2M	CO3	L2					
(f)	A variate X has the following distribution ,Find E(X)	2M	CO3	L3					
	<table border="1"> <tr> <td>x</td> <td>-3</td> <td>6</td> <td>9</td> </tr> <tr> <td>P(x)</td> <td>$\frac{1}{6}$</td> <td>$\frac{1}{2}$</td> <td>$\frac{1}{3}$</td> </tr> </table>				x	-3	6	9	P(x)
x	-3	6	9						
P(x)	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$						
(g)	Define Population and sample.	2M	CO4	L1					
(h)	State central limit Theorem.	2M	CO4	L1					
(i)	Explain One Tailed and Two tailed tests.	2M	CO5	L1					
(j)	Recall the formula for test of significance of one mean for large and small samples.	2M	CO5	L1					

Q.No	All questions carry equal marks	Marks	CO	BL							
2(a)	Find the real root of an equation $2x - \log_{10} x = 7$ using Regula Falsi method.	5M	CO1	L3							
(b)	Find Lagrange's interpolating polynomial from the following data	5M	CO1	L3							
	<table border="1"> <tr> <td>X</td> <td>0</td> <td>1</td> <td>4</td> <td>5</td> </tr> <tr> <td>y=f(x)</td> <td>4</td> <td>3</td> <td>24</td> <td>39</td> </tr> </table>				X	0	1	4	5	y=f(x)	4
X	0	1	4	5							
y=f(x)	4	3	24	39							

(OR)

3(a)	Using Secant method find approximate root of the equation $x^4 - x - 9 = 0$.	5M	CO1	L3							
(b)	Find y(0.5) from the following data using Newton's forward interpolation formula.	5M	CO1	L3							
	<table border="1"> <tr> <td>X:</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td>Y:</td> <td>10</td> <td>5</td> <td>8</td> <td>10</td> </tr> </table>				X:	-1	0	1	2	Y:	10
X:	-1	0	1	2							
Y:	10	5	8	10							

4(a)	Evaluate $\int_0^1 \frac{1}{1+x} dx$ by i) Trapezoidal rule ii) Simpson's 1/3 rule.	5M	CO2	L3
(b)	Find y(0.1) by RK method of 2 nd order, if $\frac{dy}{dx} = 1 - 2xy^2, y(0) = 1$	5M	CO2	L3

(OR)

5(a)	Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by Simpson's 3/8 th rule and compare with actual integration.	5M	CO2	L3
(b)	Using Taylor's series method, evaluate y(0.1) for $\frac{dy}{dx} = x^2 - y^2, y(0) = 1$	5M	CO2	L3

23FE08-NUMERICAL TECHNIQUES AND STATISTICAL METHODS

6(a)	A business man goes to hotels X, YZ, 20%, 50%, and 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that business man's room have faulty plumbing is assigned to hotel X?	5M	CO3	L3																						
(b)	Suppose the weights of 800 male students are normally distributed with mean $\mu = 140$ pounds and S.D 10 pounds. Find the number of students whose weights are (i) between 138 and 148 pounds (ii) more than 152 pounds.	5M	CO3	L3																						
(OR)																										
7(a)	A random variable X has the following probability distribution <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>$P(x)$</td> <td>k</td> <td>3k</td> <td>5k</td> <td>7k</td> <td>9k</td> <td>11k</td> </tr> </table> Determine (i) k (ii) $P(1 < x < 5)$ (iii) mean.	x	1	2	3	4	5	6	$P(x)$	k	3k	5k	7k	9k	11k	5M	CO3	L3								
x	1	2	3	4	5	6																				
$P(x)$	k	3k	5k	7k	9k	11k																				
(b)	If 2% bulbs are defective then find (i) $P(X \geq 1)$ (ii) $P(1 < X < 4)$ in a sample of 50.	5M	CO3	L3																						
8.	A Population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size two which can be drawn without replacement from this population. Find (i) The mean of the population (ii) The standard deviation of the population (iii) Mean of the sampling distribution of means and (iv) The standard deviation of the sampling distribution of means.	10M	CO4	L3																						
(OR)																										
9(a)	Define estimation and write different types of estimations.	5M	CO4	L2																						
(b)	A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation Rs.48. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502.	5M	CO4	L3																						
10(a)	A Sample of 400 items is taken from a population whose standard deviation is a 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38.	5M	CO5	L4																						
(b)	Explain the chi-square test for good ness fit in detail.	5M	CO5	L2																						
(OR)																										
11.	Two independent samples of 10 items respectively had the following values. <table border="1" style="margin-left: 20px;"> <tr> <td>Sample I</td> <td>67</td> <td>24</td> <td>57</td> <td>55</td> <td>63</td> <td>54</td> <td>56</td> <td>68</td> <td>33</td> <td>43</td> </tr> <tr> <td>Sample II</td> <td>70</td> <td>38</td> <td>58</td> <td>58</td> <td>56</td> <td>67</td> <td>68</td> <td>75</td> <td>42</td> <td>38</td> </tr> </table> Can it be said two samples can from same normal population. Test at 5% level.	Sample I	67	24	57	55	63	54	56	68	33	43	Sample II	70	38	58	58	56	67	68	75	42	38	10M	CO5	L4
Sample I	67	24	57	55	63	54	56	68	33	43																
Sample II	70	38	58	58	56	67	68	75	42	38																

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23FE12-PROBABILITY THEORY AND STOCHASTIC PROCESS
(ECE)

100/100
21/11/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	In a simultaneous throw of a pair of dice, find the probability of getting a total more than 7.	2M	CO1	L3
(b)	Write the mathematical expression for Rayleigh distribution and density function.	2M	CO1	L1
(c)	List out any four properties of joint density function.	2M	CO1	L2
(d)	Obtain the Covariance between two random variables X and Y having means 4 and 3 respectively correlation 20.	2M	CO2	L3
(e)	What is a random process?	2M	CO1	L2
(f)	Mention the mathematical representation of autocorrelation of system response.	2M	CO2	L1
(g)	Verify whether given power spectral density $S_{XX}(\omega) = e^{-(\omega-1)^2}$ is valid or not.	2M	CO2	L3
(h)	Find the autocorrelation function of system response having power spectral density $S_{XX}(\omega) = \frac{10}{25+\omega^2}$.	2M	CO3	L3
(i)	Define Source Coding.	2M	CO4	L2
(j)	Obtain the entropy of the source having three symbols A,B and C with probabilities 0.5,0.3 and 0.2 respectively.	2M	CO4	L3

Q.No	All questions carry equal marks	Marks	CO	BL														
2(a)	Discuss about Probability, Joint probability and conditional probability.	5M	CO1	L2														
(b)	In a box there are 100 resistors having resistances and tolerances as in the table given below. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th rowspan="2">Resistance(Ω)</th> <th colspan="2">Tolerance</th> </tr> <tr> <th>5%</th> <th>10%</th> </tr> </thead> <tbody> <tr> <td>22</td> <td>10</td> <td>14</td> </tr> <tr> <td>47</td> <td>28</td> <td>16</td> </tr> <tr> <td>100</td> <td>24</td> <td>8</td> </tr> </tbody> </table> <p>Let there be three events, A as drawing 47 Ω resistor, B be the drawing a resistor with 5% tolerance and C be drawing 100 Ω resistor. Determine individual, joint and conditional probabilities.</p>	Resistance(Ω)	Tolerance		5%	10%	22	10	14	47	28	16	100	24	8	5M	CO1	L3
Resistance(Ω)	Tolerance																	
	5%	10%																
22	10	14																
47	28	16																
100	24	8																

(OR)

3(a)	Discuss about the classification of random variables with relevant examples.	5M	CO1	L2
(b)	Evaluate the density function of a random variable X, given the distribution function, $F_X(x) = u(x) \left(1 - e^{-\frac{x^2}{b}} \right)$, where $b > 0$ is a constant.	5M	CO1	L3

4.	State and prove the properties of joint density function.	10M	CO1	L2
----	---	-----	-----	----

(OR)

5(a)	Examine the following properties of joint distribution function. (i) $F_{X,Y}(-\infty, -\infty) = 0$ (ii) $F_{X,Y}(\infty, \infty) = 1$ (iii) $F_X(x) = F_{X,Y}(x, \infty)$	5M	CO1	L2
------	--	----	-----	----

23FE12-PROBABILITY THEORY AND STOCHASTIC PROCESS

(b)	Two statistically independent random variables X and Y have means $E[X]=2$, $E[Y]=4$, and second moments $E[X^2]=8$, $E[Y^2]=25$. For a new random variable $W=3X-Y$, Find (i)Mean, $E[W]$ (ii)Second moment, $E[W^2]$ (iii)Variance, σ_w^2 .	5M	CO2	L3																
6(a)	Summarize the distribution and density functions of random processes.	5M	CO1	L2																
(b)	A random process is described by $X(t) = A$, where A is a continuous random variable and is uniformly distributed on (0,1). Show that X(t) is wide sense stationary.	5M	CO2	L3																
(OR)																				
7(a)	Obtain the expression for autocorrelation function of system response.	5M	CO3	L2																
(b)	A stationary stochastic process X(t) has a power spectrum $S_{XX}(\omega)$ with a mean of 5 and a new stochastic process Y(t) is defined by $Y(t)=2+3X(t)$. Evaluate (i)Autocorrelation function, $R_{YY}(\tau)$. (ii)Power spectral density, $S_{YY}(\omega)$.	5M	CO3	L3																
8(a)	Justify the statement that Power spectral density and time average of auto correlation function form a Fourier Transform pair.	5M	CO3	L4																
(b)	Evaluate the autocorrelation function $R_{XX}(\tau)$ corresponds to the power spectral density $S_{XX}(\omega) = \frac{157 + 12\omega^2}{(16 + \omega^2)(9 + \omega^2)}$	5M	CO3	L3																
(OR)																				
9(a)	Verify the following properties of cross power spectral density. (i) $S_{XY}(\omega) = 0$ if X(t) and Y(t) are orthogonal (ii) $S_{XY}(\omega) = 2\pi\bar{X}\bar{Y}\delta(\omega)$ when X(t) and Y(t) are uncorrelated and having constant means \bar{X} and \bar{Y} .	5M	CO3	L2																
(b)	A wide-sense stochastic process X(t), with mean value '5' and power spectral density $S_{XX}(\omega) = 50\pi\delta(\omega) + \frac{3}{1 + \left(\frac{\omega}{2}\right)^2}$ Is applied to a system with impulse response, $h(t) = 4e^{-4 t }$ (i)Evaluate the transfer function H(ω) of the system. (ii)Evaluate the mean value of response Y(t). (iii)Evaluate the output power spectral density, $S_{YY}(\omega)$.	5M	CO3	L3																
10(a)	Discuss about effective input noise temperature with relevant mathematical expressions.	5M	CO4	L2																
(b)	Construct the Huffman coding table for the given message 'COMMITTEE'.	5M	CO4	L3																
(OR)																				
11(a)	Obtain the expression for average noise figure.	5M	CO4	L2																
(b)	Construct the Shanon-Fano coding table for the symbols having following probabilities. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>p(x₁)</td> <td>p(x₂)</td> <td>p(x₃)</td> <td>p(x₄)</td> <td>p(x₅)</td> <td>p(x₆)</td> <td>p(x₇)</td> <td>p(x₈)</td> </tr> <tr> <td>1/4</td> <td>1/8</td> <td>1/16</td> <td>1/16</td> <td>1/16</td> <td>1/4</td> <td>1/16</td> <td>1/8</td> </tr> </table>	p(x ₁)	p(x ₂)	p(x ₃)	p(x ₄)	p(x ₅)	p(x ₆)	p(x ₇)	p(x ₈)	1/4	1/8	1/16	1/16	1/16	1/4	1/16	1/8	5M	CO4	L3
p(x ₁)	p(x ₂)	p(x ₃)	p(x ₄)	p(x ₅)	p(x ₆)	p(x ₇)	p(x ₈)													
1/4	1/8	1/16	1/16	1/16	1/4	1/16	1/8													

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23FE07-COMPLEX VARIABLES AND NUMERICAL METHODS

(EEE)

Time : 3 hours

Max. Marks: 70

Q.No	Compulsory Question	Marks	CO	BL												
1(a)	Find the first approximate root of the equation $x^3 - x - 4 = 0$ using bisection method that lies in the interval (1,2).	2M	CO1	L3												
(b)	Write Newton backward interpolation formula.	2M	CO1	L1												
(c)	If $y = f(x)$ is given below <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>0.5</td> <td>1</td> </tr> <tr> <td>y</td> <td>1</td> <td>0.8</td> <td>0.5</td> </tr> </table> Then find $\int_0^1 y dx$, using Trapezoidal rule.	x	0	0.5	1	y	1	0.8	0.5	2M	CO2	L2				
x	0	0.5	1													
y	1	0.8	0.5													
(d)	Using Runge Kutta fourth order method find y_1 given $k_1 = 0.2, k_2 = 0.202, k_3 = 0.202, k_4 = 0.208, y_0 = 0$.	2M	CO2	L3												
(e)	Show that e^z is an entire function.	2M	CO3	L2												
(f)	State Cauchy's Integral Formula.	2M	CO3	L1												
(g)	State Residue theorem.	2M	CO4	L1												
(h)	Find the Taylor series of $\sin 2z$ about $z = \frac{\pi}{4}$.	2M	CO4	L3												
(i)	Find the fixed points of the transformation $Z = \frac{1}{Z}$.	2M	CO5	L3												
(j)	Explain Conformal Mapping.	2M	CO5	L1												
(OR)																
Q.No	All questions carry equal marks	Marks	CO	BL												
2(a)	Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position.	5M	CO1	L3												
(b)	Using Newton Raphson method, find a root of the equation $e^x - 3x = 0$.	5M	CO1	L3												
(OR)																
3(a)	Construct the forward difference table and hence find the value of $f(32)$ from the following table <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>30</td> <td>35</td> <td>40</td> <td>45</td> <td>50</td> </tr> <tr> <td>f(x)</td> <td>15.9</td> <td>14.9</td> <td>14.1</td> <td>13.3</td> <td>12.5</td> </tr> </table>	x	30	35	40	45	50	f(x)	15.9	14.9	14.1	13.3	12.5	5M	CO1	L3
x	30	35	40	45	50											
f(x)	15.9	14.9	14.1	13.3	12.5											
(b)	Determine the value of y at $x = 10$ using Lagrange's interpolation formula from the following values of x and y <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>5</td> <td>6</td> <td>9</td> <td>11</td> </tr> <tr> <td>y = f(x)</td> <td>12</td> <td>13</td> <td>14</td> <td>16</td> </tr> </table>	x	5	6	9	11	y = f(x)	12	13	14	16	5M	CO1	L3		
x	5	6	9	11												
y = f(x)	12	13	14	16												
4.	Evaluate the definite integral $\int_0^6 \frac{1}{1+x^2} dx$ using (i) Trapezoidal rule (ii) Simpson's 1/3 rule (iii) Simpson's 3/8 rule.	10M	CO2	L3												
(OR)																
5(a)	Given that $y' = 2y + 3e^x, y(0) = 0$ find an approximate value of y at $x = 0.2$ using Taylor's series method.	5M	CO2	L3												
(b)	Use Milne's predictor-corrector method to obtain the solution of the equation $y' = x - y^2$ at $x = 0.8$ given that $y(0) = 0, y(0.2) = 0.02, y(0.4) = 0.0795, y(0.6) = 0.1762$.	5M	CO2	L3												

23FE07 - COMPLEX VARIABLES AND NUMERICAL METHODS

6(a)	Apply Milne's - Thompson method to construct an Analytic function whose real part is $x^2 - y^2 - x$.	5M	CO3	L3
(b)	If $F(a) = \int_C \frac{3z^2 + 7z + 1}{z - a} dz$, where C is the circle $ z = 2$, find the values of $F(1), F(3), F'(1 - i), F''(1 - i)$.	5M	CO3	L3
(OR)				
7(a)	Find an Analytic function whose imaginary part is $V = e^x \text{Siny}$.	5M	CO3	L3
(b)	Using Cauchy's integral formula evaluate $\int_C \frac{z^3 - 2z + 1}{(z - i)^2} dz$ where C is the circle $ z = 2$.	5M	CO3	L3
8.	Evaluate $\int_{-\infty}^{\infty} \frac{1}{1 + x^4} dx$	10M	CO4	L3
(OR)				
9(a)	Expand by Taylor's theorem the function $f(z) = \frac{z - 1}{z + 1}$ about the point $z = 0$ and $z = 1$	5M	CO4	L3
(b)	Apply Residue theorem to evaluate $\oint_C \frac{z - 3}{z^2 + 2z + 5} dz$ around the circle $C: z + 1 + i = 2$	5M	CO4	L3
10(a)	Plot the image of triangular region with vertices $(0,0), (1,0), (0,1)$ under the transformation $w = (1 - i)z + 3$.	5M	CO5	L3
(b)	Find the bilinear transformation that maps the points $-i, 0, i$ into the points $-1, i, 1$ respectively.	5M	CO5	L3
11(a)	Discuss the transformation $w = \sin Z$.	5M	CO5	L2
(b)	Find the bilinear transformation that maps the points $(-1, i, 1)$ onto the points $(0, i, \infty)$ respectively.	5M	CO5	L3

24 NOV 2025

R23

H.T.No

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

**23CS03-DATABASE MANAGEMENT SYSTEMS
(AI&DS)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Database Management System.	2M	CO1	L1
(b)	Draw the diagram for the client/server architecture.	2M	CO1	L1
(c)	Describe the terms Tuple, Degree, Cardinality in Relational model.	2M	CO2	L2
(d)	Differentiate between super type and sub type.	2M	CO2	L2
(e)	Explain the Alter and update commands in SQL with example.	2M	CO3	L1
(f)	Write any two functions of Date and Time in SQL.	2M	CO3	L1
(g)	What is meant by Normalization in DBMS?	2M	CO4	L1
(h)	Explain about the fully functional dependency.	2M	CO4	L1
(i)	What is Dirty-Read and Blind-Write?	2M	CO5	L1
(j)	What is Bucket and Hash Function in Hash Organization?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Differentiate between File system and DBMS.	5M	CO1	L2
(b)	What are the advantages and disadvantages of DBMS.	5M	CO1	L1
	(OR)			
3(a)	Discuss in detail about database users.	5M	CO2	L2
(b)	Explain the 2-tier and 3-tier architecture of DBMS.	5M	CO2	L2
4.	What are the key constraints in DBMS? Explain with examples.	10M	CO3	L3
	(OR)			
5(a)	Explain the Dr. E.F CODD rules in DBMS.	5M	CO2	L2
(b)	Write about the Cartesian product, intersection and division operations in Relational Algebra.	5M	CO2	L2
6(a)	Write SQL queries for following set of tables: EMPLOYEE (EmpNo, Name, DoB, Address, Gender, Salary, DNumber) DEPARTMENT (DNumber, DName, Manager EmpNo, Manager Start Date). (i) Display the age of 'male' employees (ii) Display all the employees in Department named 'Marketing' (iii) Display the name of highest salary paid 'female' employee.	5M	CO2	L3
(b)	How to create and alter the tables in detail?	5M	CO3	L3
	(OR)			
7(a)	Explain about the Group by clause and Where clause.	5M	CO2	L2
(b)	Explain in brief about the different types joins in SQL.	5M	CO2	L2
8(a)	Discuss about the Need of Normalization and its advantages and disadvantages.	5M	CO4	L1
(b)	Write about the following (i) Surrogate key (ii) Super key (iii) spurious tuples with an example.	5M	CO4	L2
	(OR)			
9.	Compute the closure of the following set F of functional dependencies for relation schema R=(A,B,C,D,E). A->BC CD->E B->D E->A List the primitive, non-primitive attributes and candidate keys for R.	10M	CO4	L4
10(a)	Explain the following with an example (i) Write-Read (WR) Conflict (ii) Read-Write (RW) Conflict (iii) Write-Write (WW) Conflict.	5M	CO5	L2
(b)	Explain about Shadow Paging technique for recovery management.	5M	CO5	L2
	(OR)			
11(a)	Illustrate the Conflict and View Serializability. Explain with an example.	5M	CO5	L4
(b)	Write in brief about primary, secondary and cluster indexes in DBMS.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23AE01-INTRODUCTION TO AEROSPACE ENGINEERING (ASE)

7/22

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Classify the types of heavier than air aircraft.	2M	CO1	L1
(b)	State the laws of gravitation.	2M	CO1	L1
(c)	What are the differences between symmetrical and cambered airfoils?	2M	CO2	L1
(d)	What is 'centre of pressure' and what is the need to find it?	2M	CO2	L1
(e)	What is rocket staging?	2M	CO3	L1
(f)	Difference between jet engine and IC engine.	2M	CO3	L1
(g)	Explain about nozzle and types with a neat sketch.	2M	CO3	L1
(h)	Write a brief about components of jet engine.	2M	CO3	L1
(i)	Write the difference between composite and alloy.	2M	CO4	L1
(j)	Explain in brief about missile and launch vehicle.	2M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the different layers of atmosphere with a graph showing the temperature and pressure variation.	5M	CO1	L2
(b)	Explain few points regarding the first aircraft in the history by Wright brothers.	5M	CO1	L2
(OR)				
3(a)	What is an airfoil and explain its nomenclature of cambered airfoil with neat sketch?	5M	CO1	L2
(b)	Discuss few points on the history of aviation.	5M	CO1	L2
4.	Explain lift on an airfoil in the context of Bernoulli's equation. State all assumptions. Does an airfoil create lift because there is circulation over the airfoil.	10M	CO2	L2
(OR)				
5(a)	Explain the aerodynamic forces on wing. How the lift generated for wing?	5M	CO2	L2
(b)	Explain the control surfaces of an aircraft.	5M	CO2	L2
6.	How does a turbofan work? What are the advantages having multi spools in a turbofan engine?	10M	CO3	L2
(OR)				
7(a)	Write a detailed note on working of Turbojet engine.	5M	CO3	L2
(b)	Explain the difference between rocket engine and jet engine.	5M	CO3	L2
8(a)	What alloys are commonly used in aircraft structures? Why?	5M	CO3	L2
(b)	Write the differences between the spars and longerons in aircraft structures.	5M	CO3	L1
(OR)				
9.	What are the main structures of an aircraft explain with neat sketches?	10M	CO3	L2
10(a)	Describe the various life support systems available on a spacecraft.	5M	CO4	L2
(b)	State Kepler's law of planetary motion.	5M	CO4	L2
(OR)				
11(a)	Describe the Satellite subsystems.	5M	CO4	L2
(b)	Describe the advantages and applications of carrying out interplanetary missions for mankind.	5M	CO4	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23CE01-SURVEYING

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What do you understand by the term "Orientation of plane table"?	2M	CO1	L1
(b)	What is the dip of a magnetic needle in compass?	2M	CO1	L1
(c)	Enumerate the various methods of computation of areas.	2M	CO2	L2
(d)	What is Profile leveling?	2M	CO2	L1
(e)	Define the terms Face right and face left observations.	2M	CO3	L1
(f)	What do you mean by trigonometric levelling?	2M	CO3	L1
(g)	How the compound curve is setting out?	2M	CO4	L1
(h)	List out the types of EDM.	2M	CO4	L1
(i)	Define Aerial Photogrammetry.	2M	CO5	L1
(j)	Define Photo theodolite.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Describe with sketches the indirect method of chaining on a sloping ground.	5 M	CO1	L2
(b)	Discuss the advantages and disadvantages of plane table surveying over other methods.	5 M	CO1	L2
(OR)				
3(a)	Enumerate the difference between a prismatic compass and surveyors compass.	5 M	CO1	L2
(b)	The following are the interior angles of a closed traverse ABCDE; $\angle A = 78^\circ 15'$, $\angle B = 168^\circ 30'$, $\angle C = 84^\circ 30'$, $\angle D = 115^\circ 45'$ and $\angle E = 93^\circ 00'$. If the observed bearing of AB is $135^\circ 00'$, and the traverse having been run anti-clockwise, determine the bearings of the remaining sides.	5 M	CO1	L3
4.	The following consecutive readings were taken with a dumpy level: 3.865, 3.345, 2.935, 1.950, 0.855, 3.795, 2.630, 1.545, 1.935, 0.865, 0.665. The level was shifted after the fifth and eighth readings. The first reading was taken on a bench mark of 150.00. Calculate the R.L.s of the change points and the difference in level between the first and last points.	10 M	CO2	L3
(OR)				
5(a)	Distinguish between Simpson's rule and the trapezoidal rule with respect to accuracy.	5M	CO2	L2
(b)	A Series of offsets were taken from a chain line to a curved boundary line at intervals of 10 m in order as: 0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85m. Compute the area between the chain line, the curved boundary and the end offsets by (i) average ordinate rule, (ii) trapezoidal rule, and (iii) Simpson's rule.	5M	CO2	L3
6(a)	Explain how you would measure with a theodolite the horizontal angle by repetition method.	5M	CO3	L2
(b)	List out the temporary and permanent adjustments of theodolite.	5M	CO3	L2
(OR)				

7(a)	Explain about the Bowditch's rule.	5M	CO3	L2															
(b)	The following are lengths and bearings of the sides of a closed traverse ABCD. <table border="1"> <thead> <tr> <th>Line</th> <th>Length (in meters)</th> <th>Bearing</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td>76.80</td> <td>140°12'</td> </tr> <tr> <td>BC</td> <td>195.60</td> <td>36°24'</td> </tr> <tr> <td>CD</td> <td>37.20</td> <td>338°48'</td> </tr> <tr> <td>DA</td> <td>?</td> <td>?</td> </tr> </tbody> </table> <p>Compute the length and bearing of line DA.</p>	Line	Length (in meters)	Bearing	AB	76.80	140°12'	BC	195.60	36°24'	CD	37.20	338°48'	DA	?	?	5M	CO3	L3
Line	Length (in meters)	Bearing																	
AB	76.80	140°12'																	
BC	195.60	36°24'																	
CD	37.20	338°48'																	
DA	?	?																	
8(a)	Explain the terms 'Compound curves' and 'Reverse curves' with salient features.	5M	CO4	L2															
(b)	Describe the function and operation of total station.	5M	CO4	L2															
(OR)																			
9.	(i) Explain the advantages of total station over conventional surveying instruments (ii) Describe the required steps for the initial setting of a total station for a field work.	10M	CO4	L2															
10(a)	What is photogrammetric surveying? Discuss types of photogrammetry and types of aerial Photographs.	5M	CO5	L2															
(b)	Discuss in detail about perspective geometry of aerial photograph.	5M	CO5	L2															
(OR)																			
11(a)	Explain the flight planning and what factors depend on the scale of photography.	5M	CO5	L2															
(b)	Explain the classifications of photogrammetry.	5M	CO5	L2															

24 NOV 2025

R23

H.T.No

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23IT01-DIGITAL LOGIC & COMPUTER ORGANIZATION
(CSE&IT)

9.22

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is Combinational Circuit?	2M	CO1	L1
(b)	What are the Universal Logic Gates?	2M	CO1	L1
(c)	Discuss the basic functional units of computer.	2M	CO2	L1
(d)	What is Shift Registers?	2M	CO2	L1
(e)	What is Hardwired Control?	2M	CO3	L1
(f)	What is Multiprocessor?	2M	CO3	L1
(g)	Define System Software and Application Software.	2M	CO4	L1
(h)	Differentiate RAM with ROM.	2M	CO4	L1
(i)	What is the purpose of Secondary storage devices?	2M	CO5	L1
(j)	What is interface Circuits?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain Complements in Number System.	5M	CO1	L2
(b)	Explain Signed Numbers and Unsigned Numbers.	5M	CO1	L2
	(OR)			
3(a)	Explain basic logic gates.	5M	CO1	L2
(b)	Explain Different types of Decoders.	5M	CO1	L2
4(a)	What is Flip-Flop? Explain different types of Flip-Flops.	5M	CO2	L2
(b)	Design a 4 bit shift registers and explains the difference between left shift and right shift operations.	5M	CO2	L2
	(OR)			
5(a)	Explain Conversion of SR Flip-Flop into JK Flip-Flop.	5M	CO2	L2
(b)	Explain the Von Neumann architecture with help of a diagram.	5M	CO2	L2
6(a)	Explain in detail Booth's Multiplication algorithm with a neat flowchart.	5M	CO3	L2
(b)	Explain the phases of instruction Cycle.	5M	CO3	L2
	(OR)			
7(a)	Explain in detail about Micro programmed control unit.	5M	CO3	L2
(b)	What is hardwired control unit? Explain its design and operation.	5M	CO3	L2
8(a)	What is Cache memory? Explain its importance in computer system.	5M	CO4	L2
(b)	Describe the Difference between Static RAM(SRAM)and Dynamic Ram(DRAM).	5M	CO4	L2
	(OR)			
9(a)	Explain hierarchy of computer memory.	5M	CO4	L2
(b)	What is page replacement Mechanism? Discuss about LRU with example.	5M	CO4	L2
10(a)	Explain Programmed I/O and Interrupts I/O.	5M	CO5	L2
(b)	Differentiate between isolated I/O and Memory Mapped I/O.	5M	CO5	L2
	(OR)			
11(a)	Explain synchronous bus and asynchronous bus.	5M	CO5	L2
(b)	Explain in detail about Direct Memory Access in Computer System.	5M	CO5	L2

24 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations**23AD02-ARTIFICIAL INTELLIGENCE****(CSE(AI&ML))****Time : 3 hours****Max. Marks : 70**

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Artificial Intelligence and describe its key areas of application.	2M	CO1	L1
(b)	Explain the role of problem-solving agents in AI.	2M	CO1	L1
(c)	List the differences between breadth-first and depth-first search.	2M	CO2	L1
(d)	Describe the heuristic search and its importance in AI problem-solving.	2M	CO2	L1
(e)	Discuss the concept of knowledge representation in AI.	2M	CO3	L1
(f)	Define semantic networks and their use in knowledge representation.	2M	CO3	L1
(g)	Explain propositional logic.	2M	CO4	L1
(h)	Describe backward chaining in logic programming.	2M	CO4	L1
(i)	List and describe any two expert systems and their functions.	2M	CO5	L1
(j)	Define rule-based expert systems and give an example.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the concept of rationality in AI and its importance.	5M	CO1	L2
(b)	Discuss different types of environments in which AI agents operate.	5M	CO1	L2
(OR)				
3(a)	Describe A* algorithm and its role in search strategies.	5M	CO1	L2
(b)	List the difference between uninformed and informed search strategies.	5M	CO2	L1
4.	Define adversarial search and describe the mini-max algorithm with an example.	10M	CO2	L2
(OR)				
5(a)	Explain the concept of problem reduction in AI search.	5M	CO2	L2
(b)	Define evaluation functions and their importance in game-playing.	5M	CO2	L2
6(a)	Discuss constraint propagation and provide examples of its applications.	5M	CO3	L2
(b)	Explain Bayes' theorem and its role in probabilistic reasoning.	5M	CO3	L2
(OR)				
7(a)	Describe the role of rules in knowledge representation and deduction.	5M	CO3	L2
(b)	What is semantic net? Illustrate with an example.	5M	CO3	L2
8(a)	Define First-order logic and differentiate it from propositional logic.	5M	CO4	L2
(b)	Explain the concept of forward chaining with an example.	5M	CO4	L2
(OR)				
9.	Analyze the various methods of inductive learning and evaluate their effectiveness in different AI applications.	10M	CO4	L3
10(a)	Describe the architecture of expert systems and their components.	5M	CO5	L2
(b)	Explain knowledge acquisition methods in expert systems.	5M	CO5	L2
(OR)				
11(a)	What is MYCIN? Describe its role as an expert system.	5M	CO5	L2
(b)	Explain the role of statistical learning methods in AI.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23EC02-SIGNALS AND SYSTEMS
(ECE)

g. 2/2 ✓

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Continuous time unit impulse and unit step.	2M	CO1	L1
(b)	Define a linear system.	2M	CO1	L1
(c)	State Parseval's theorem of Fourier series.	2M	CO2	L1
(d)	Find the Fourier transform of unit step function.	2M	CO2	L1
(e)	What is the impulse response of two LTI systems connected in parallel?	2M	CO3	L1
(f)	Define system and signal bandwidth.	2M	CO3	L1
(g)	What is the effect of under sampling? How it can be reduced?	2M	CO1	L1
(h)	Define flat top sampling.	2M	CO1	L1
(i)	What is the condition for Laplace transform to exist?	2M	CO4	L1
(j)	State the time shifting property of Z-Transform.	2M	CO4	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Prove the following: (i) The power of the energy signal is zero over infinite time. (ii) The energy of the power signal is infinite over infinite time.	5 M	CO1	L3
(b)	Determine whether the following function is periodic or not. If so find the period. $x(t)=3\sin 200\pi t + 4\cos 100\pi t$.	5 M	CO1	L3
(OR)				
3(a)	Find whether the following signals are even or odd : (i) e^{-3t} (ii) $u(t + 4) - u(t - 2)$	5 M	CO1	L3
(b)	Explain the analogy between vectors and signals.	5 M	CO1	L2
(OR)				
4.	Find the trigonometric Fourier series expansion of a Half wave rectified cosine function with fundamental time period of 2π .	10 M	CO4	L3
(OR)				
5(a)	Find the Fourier transform of signum function $x(t)=\text{sgn}(t)$. Also, sketch its magnitude and phase spectra.	5M	CO4	L3
(b)	Derive the relationship between trigonometric and exponential Fourier series.	5M	CO4	L3
(OR)				
6(a)	What is an LTI system? Derive an expression for the transfer function of an LTI system?	5M	CO3	L1
(b)	Write about Filter characteristics of linear system.	5M	CO3	L2
(OR)				
7(a)	Explain the concept of Paley-Wiener criterion for physical realizability using relevant expressions.	5M	CO3	L2
(b)	A system produces an output of $y(t)=e^{-t}u(t)$ for an input of $x(t)=e^{-2t}u(t)$. Determine the impulse response and frequency response of a system.	5M	CO3	L3
(OR)				
8(a)	Define power density spectrum and its properties.	5M	CO4	L1
(b)	State and prove sampling theorem for band limited signals.	5M	CO4	L1
(OR)				
9.	Compare various sampling methods.	10M	CO1	L3
(OR)				
10(a)	Find the Laplace transform of $\cos \omega t$.	5M	CO4	L2
(b)	Find the Z Transform of $x[n] = na^{n-1} u[n]$.	5M	CO4	L3
(OR)				
11(a)	State and prove the time shifting property of Laplace transform.	5M	CO4	L2
(b)	Find the Z-Transform of the following sequence $x(n)=a^n u(n)$.	5M	CO4	L3

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations
23EE03-ELECTROMAGNETIC FIELD THEORY
(EEE)

92/4

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List the various types of charge distribution.	2M	CO1	L1
(b)	A point charge 2nC is located at origin. What is the potential at (1,0,0)?	2M	CO1	L2
(c)	What are boundary conditions?	2M	CO2	L1
(d)	Define relaxation time.	2M	CO2	L1
(e)	State Gauss law for magnetic field.	2M	CO3	L2
(f)	Define Magnetic dipole.	2M	CO3	L1
(g)	Write an expression for self-inductance of a toroid.	2M	CO4	L2
(h)	A current of 3A flowing through an inductor of 100mH. Interpret the energy stored in the inductor?	2M	CO4	L2
(i)	Give the equation of transformer emf.	2M	CO5	L2
(j)	Write the expression for displacement current.	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Obtain the vector form Coulomb's law.	5M	CO1	L2
(b)	Transform the point P(3, 2,1) in cartesian coordinate system in to spherical coordinate System.	5M	CO1	L3
(OR)				
3(a)	Justify the Gauss's law of electro statics.	5M	CO1	L2
(b)	Determine the electric field intensity due to charged Circular ring.	5M	CO1	L2
4(a)	Derive an expression for Potential due to dipole.	5M	CO2	L2
(b)	Develop current continuity equation and prove that its point form is equal to $\nabla \cdot J = -\frac{\partial \rho_v}{\partial t}$	5M	CO2	L2
(OR)				
5(a)	Obtain an expression for the capacitance of a spherical capacitor consisting of two concentric spheres of radius a & b.	5M	CO2	L2
(b)	The point charges -1nC, 4nC and 7nC are located at (0,0,0), (0,0,1) and(1,0,0) respectively. Find the energy in the system.	5M	CO2	L3
6(a)	Illustrate about the Biot-Savart's law.	5M	CO3	L2
(b)	Determine the force on a current element $I d\vec{l}$ of a current-carrying conductor due to magnetic field \vec{B} .	5M	CO3	L3
(OR)				
7(a)	Determine the field intensity H due to infinite sheet of current using Ampere's Circuit law.	5M	CO3	L2
(b)	A current carrying circular wire of radius 'a' is centered on the origin in the plane z = 0. Obtain an expression for magnetic field intensity on the axis of the wire at (0,0,2).	5M	CO3	L3
8(a)	Derive an expression for self-inductance of a coaxial cable with a neat sketch.	5M	CO4	L2
(b)	Find inductance per unit length of a co-axial cable if radius of inner and outer conductors are 1 mm and 3 mm respectively. Assume relative permeability unity.	5M	CO4	L3
(OR)				
9(a)	Illustrate about the mutual inductance.	5M	CO4	L2
(b)	Calculate the inductance of a solenoid of 200 turns wound tightly on a cylindrical tube of 6cm diameter .The length of the tube is 60cm and the solenoid is air.	5M	CO4	L3
10(a)	Derive the EMF equation for moving loop in time-varying B field.	5M	CO5	L2
(b)	Write the Maxwell's equations for time-varying fields in differential and integral forms .	5M	CO5	L2
(OR)				
11	Enumerate Poynting's theorem and write its significance.	10M	CO5	L2

24 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23ME03-THERMODYNAMICS

(ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are intensive and extensive properties?	2M	CO1	L1
(b)	List out the various temperature measuring devices.	2M	CO1	L1
(c)	State limitations of first law of thermodynamics.	2M	CO2	L1
(d)	What is a steady flow process?	2M	CO2	L1
(e)	Define COP of a refrigerator.	2M	CO3	L1
(f)	State Clausius theorem.	2M	CO3	L1
(g)	State Dalton's law of partial pressures.	2M	CO4	L1
(h)	Why do the isobars on Mollier diagram diverge from one another?	2M	CO4	L1
(i)	Explain the vapour compression cycle.	2M	CO5	L1
(j)	State the four processes of the Diesel cycle.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	What is the concept of continuum? How will you define density using this concept?	5M	CO1	L1
(b)	Explain the advantages of gas thermometer over liquid thermometer.	5M	CO1	L2
(OR)				
3(a)	What is thermodynamic system? What is the difference between a closed system and an open system?	5M	CO1	L2
(b)	State and explain Zeroth law of thermodynamics.	5M	CO1	L2
(OR)				
4.	Derive the steady flow energy equation and also list the assumptions made in the analysis.	10M	CO2	L3
(OR)				
5(a)	A stationary mass of gas is compressed without friction from an initial state of 0.3 m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa , the pressure remaining constant during the process. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?	5M	CO2	L3
(b)	In a diffuser, air entering at 100 kPa and 300 K with a velocity of 200 m/s . The inlet cross-sectional area of the diffuser is 100 mm^2 . At the exit, the area is 860 mm^2 , and the exit velocity is 20 m/s . Determine the exit pressure and temperature of the air.	5M	CO2	L3
(OR)				
6(a)	Establish the equivalence of Kelvin -plank and Clausius statements	5M	CO3	L3
(b)	A heat pump working on the Carnot cycle takes in heat from a reservoir at 5°C and delivers heat to a reservoir at 60°C . The heat pump is driven by a reversible heat engine which takes in heat from a reservoir at 840°C and rejects heat to a reservoir at 60°C . The reversible heat engine also drives a machine that absorbs 30 kW . If the heat pump extracts 17 kJ/s from the 5°C reservoir, determine (i) The rate of heat supply sink from the 840°C source (ii) The rate of heat rejection to the 60°C sink.	5M	CO3	L3
(OR)				
7(a)	State and explain increase of entropy principle.	5M	CO3	L2

(b)	A heat engine is used to drive a heat pump. The heat transfers from the heat engine and from the heat pump are used to heat the water circulating through the radiators of a building. The efficiency of the heat engine is 27% and the COP of the heat pump is 4. Evaluate the ratio of the heat transfer to the circulating water to the heat transfer to the heat engine.	5M	CO3	L3
8(a)	Derive Maxwell's relations.	5M	CO4	L3
(b)	State and explain Avagadro's law. Show that the product of gas constant and molecular mass has the same value for all the gases.	5M	CO4	L2
(OR)				
9(a)	Draw the phase-equilibrium diagram on T-s co-ordinates for a pure substance.	5M	CO4	L1
(b)	A quantity of gas occupying 0.14 m ³ at a pressure of 1400 kPa and 300°C is expanded isentropically to 280 kPa. Calculate (i) mass of gas, (ii) final temperature (iii) work transfer and (iv) change in entropy. Take Cp= 1.04 kJ/kg.K and Cv= 0.74 kJ/kg.K.	5M	CO4	L3
10(a)	Derive an expression for the air standard efficiency of a Diesel cycle.	5M	CO5	L3
(b)	In air standard diesel cycle, the compression ratio is 15, and at the beginning of compression the working fluid is at 1 bar and 290 K. The heat addition equals 850 kJ/kg, determine (i) maximum temperature and pressure of the cycle, (ii) work done and mean effective pressure, and (iii) thermal efficiency.	5M	CO5	L3
(OR)				
11(a)	A steam turbine plant operates on Rankine cycle with steam entering turbine at 30 bar, 400°C and leaving at 0.04 bar. Steam leaving turbine condenses to saturated liquid inside condenser. Feed pump, pumps saturated liquid into boiler. Determine the network per kg of steam and the cycle efficiency assuming all processes to be ideal.	5M	CO5	L3
(b)	Explain the Bell-Coleman Cycle with neat sketch.	5M	CO5	L2

26 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23CS04-ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS
(AI&DS,CSE,CSE(AI&ML)&IT)

Handwritten signature and date: 26/11/2025

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Algorithm Analysis.	2M	CO1	L1
(b)	List the applications of AVL Trees.	2 M	CO1	L1
(c)	What is quick sort?	2 M	CO2	L1
(d)	Define Graph.	2 M	CO2	L1
(e)	What is greedy method?	2 M	CO3	L1
(f)	Define minimum cost spanning tree.	2 M	CO3	L1
(g)	What is Dynamic Programming (DP)?	2 M	CO4	L1
(h)	What is the "knapsack problem," and how can Dynamic Programming be used to solve it?	2 M	CO4	L1
(i)	What is graph coloring?	2 M	CO5	L1
(j)	What is n-Queens problem?	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain in detail about Space and Time complexity analysis.	5M	CO1	L2
(b)	Explain the deletion process in a B-tree.	5M	CO1	L2
(OR)				
3(a)	Describe the process of insertion and deletion in an AVL tree.	5M	CO1	L2
(b)	Describe the process of creating a B-tree.	5M	CO1	L2
4.	Explain in detail about connected components and Biconnected components.	10M	CO2	L2
(OR)				
5(a)	Discuss the process of merge sort with example.	5M	CO2	L3
(b)	Outline the applications of Heap trees.	5M	CO2	L2
6(a)	Describe Prim's algorithm for finding an MST with example.	5M	CO3	L2
(b)	Explain Dijkstra's algorithm, which solves the Single Source Shortest Path problem.	5M	CO3	L2
(OR)				
7(a)	Discuss the concept of optimal storage on tapes.	5M	CO3	L2
(b)	Explain in detail about Huffman coding.	5M	CO3	L2
8(a)	Explain the Bellman-Ford algorithm for solving the Single-Source Shortest Path problem.	5M	CO4	L2
(b)	How does Dynamic Programming help in solving the All-Pairs Shortest Path problem?	5M	CO4	L1
(OR)				
9.	Explain in detail about optimal binary search Trees with example.	10M	CO4	L2
10(a)	Discuss the Branch and Bound algorithmic techniques.	5M	CO5	L2
(b)	Discuss the relationship between these two classes, the significance of the P vs NP problem.	5M	CO5	L2
(OR)				
11.	Apply the backtracking process, Illustrate the importance of N-queens problem. Draw State space tree for 4-queens problem.	10M	CO5	L3

26 NOV 2025

R23

H.T.No

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.
B.Tech. (III Semester) Regular/Supplementary Examinations
23AE02-ENGINEERING FLUID MECHANICS
(ASE)

2025
24/11/2025

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is viscosity of a fluid?	2M	CO1	L1
(b)	State pascal law.	2M	CO1	L1
(c)	What is Euler's equation of motion?	2M	CO2	L1
(d)	What is momentum equation? What are its applications?	2M	CO2	L1
(e)	Define dimensional homogeneity.	2M	CO3	L1
(f)	Write the uses of dimension analysis.	2M	CO3	L1
(g)	What is an reaction turbine? Give an example.	2M	CO4	L1
(h)	What is the purpose of notch in Pelton wheel bucket?	2M	CO4	L1
(i)	What is priming of a centrifugal pump?	2M	CO5	L1
(j)	How the centrifugal pumps are classified?	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Two parallel plates, one moving at 4 m/s and the other fixed, are separated by a 5 mm thick layer of oil of specific gravity 0.80 and kinematic viscosity $1.25 \times 10^{-4} \text{ m}^2/\text{s}$. What is the average shear stress in the oil?	5M	CO1	L3
(b)	Deduce an expression for the force exerted on a submerged vertical plane by the static liquid and locate the center of pressure.	5M	CO1	L3
(OR)				
3(a)	State and explain the Newton's law of viscosity. Deduce the expression for the dynamic viscosity.	5M	CO1	L2
(b)	Calculate specific weight, density and specific gravity of two liters of a liquid which weigh 15 N.	5M	CO1	L3
(OR)				
4(a)	Distinguish between (i) Steady flow and unsteady flow (ii) Uniform and Non uniform flow (iii) Compressible and incompressible flow (iv) laminar and turbulent flow.	5M	CO2	L2
(b)	State law of conservation of mass. Obtain an expression for continuity equation in rectangular coordinates for two dimensional in compressible flow.	5M	CO2	L3
(OR)				
5(a)	What is a venturimeter and orificemeter?	5M	CO2	L2
(b)	What are the advantages and limitations of Bernoulli's equation?	5M	CO2	L2
(OR)				
6(a)	The Reynolds number for flow in a circular pipe is $Re_d = 500$. For flow through a 15 cm diameter pipe, at what velocity will this occur at 20°C for (i) airflow with viscosity $1.8 \times 10^{-5} \text{ kg/m-s}$ and (ii) water flow with viscosity 0.001 kg/m-s .	5M	CO3	L3
(b)	Find the dimension of (i) Force (ii) Angular velocity (iii) Discharge (iv) Torque (v) Density and (vi) Viscosity.	5M	CO3	L2
(OR)				
7(a)	State Buckingham n theorem. What do you mean by repeating variables? How are the repeating variables selected in dimensional analysis?	5M	CO3	L2
(b)	The pressure difference Δp in a pipe of diameter D and length l due to turbulent flow depends on the velocity V, density (ρ), viscosity of the fluid (μ) and roughness K. Using Buckingham n theorem obtain an expression for Δp .	5M	CO3	L3
(OR)				
8(a)	Illustrate the working principle of a pelton wheel turbine with a neat sketch.	5M	CO4	L2
(b)	What do you mean by gross head, net head and efficiency of turbine? Explain the different types of efficiencies of a turbine.	5M	CO4	L2
(OR)				
9.	Outline a general layout of a hydroelectric power plant using a reaction turbine.	10M	CO4	L2
(OR)				
10(a)	Discuss the primary difference between a positive displacement turbomachine and a dynamic turbomachine. Give an example of each for both pumps and turbines.	5M	CO5	L2
(b)	What are the primary differences between fans, blowers, and compressors? Discuss in terms of pressure rise and volume flow rate.	5M	CO5	L2
(OR)				
11(a)	With a neat sketch, explain the principle and working of a single stage centrifugal pump.	5M	CO5	L2
(b)	Draw and discuss the velocity triangles of centrifugal pump.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations
23CE02-STRENGTH OF MATERIALS
(CE)

Handwritten signature and date: 26/11/2025

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define elasticity and plasticity.	2M	CO1	L1
(b)	State Hooke's law.	2M	CO1	L1
(c)	Explain factor of safety.	2M	CO2	L2
(d)	What is Poisson's ratio?	2M	CO2	L2
(e)	Differentiate between shear force and bending moment.	2M	CO3	L1
(f)	Explain the concept of a neutral axis.	2M	CO3	L1
(g)	State the double integration method for deflection of beams.	2M	CO4	L1
(h)	Define slenderness ratio.	2M	CO4	L1
(i)	Explain hoop and longitudinal stresses in thin cylinders.	2M	CO5	L1
(j)	What is Lamé's theory for thick cylinders?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Derive the expression for Young's modulus.	5M	CO1	L2
(b)	A steel rod with a cross-sectional area of 300 mm ² and length 2m is subjected to a tensile load of 60kN. Calculate the stress, strain, and elongation of the rod. Assume Young's modulus for steel, E=200GPa.	5M	CO1	L3
(OR)				
3(a)	Explain stress distribution in composite bars.	5M	CO1	L2
(b)	A steel rod with an original length L=500 mm and diameter d=20 mm is subjected to a tensile load that causes it to elongate by 0.25 mm and its diameter to reduce by 0.01 mm. Calculate Poisson's ratio for the material.	5M	CO1	L3
4.	A cantilever beam of length L=4 m is fixed at one end (point A) and subjected to a point load P=20 kN at the free end (point B). Determine the shear force and bending moment at 1/4 th and 3/4 th points of the beam length, and draw the S.F. and B.M. diagrams.	10M	CO2	L3
(OR)				
5(a)	Define point of contraflexure and its significance in beams.	5M	CO2	L2
(b)	A rectangular beam cross-section has a width b=100mm and a height h=200 mm. Calculate the section modulus for bending about its horizontal neutral axis.	5M	CO3	L3
6(a)	Derive the bending equation for simple bending of beams.	5M	CO3	L2
(b)	Consider an I-section with the following properties: <ul style="list-style-type: none"> • Top and bottom flange width = b=150 mm • Flange thickness = tf=20 mm • Web thickness = tw=10 mm • Overall height = h=300 mm The I-section is subjected to a bending moment of M=50 kNm. Calculate the bending stress at the outermost fiber.	5M	CO3	L3
(OR)				
7(a)	Derive shear stress distribution in a rectangular section.	5M	CO3	L2
(b)	A solid circular steel shaft of diameter D=30 mm and length L= 2m is subjected to a torque of T=500 Nm. If the shear modulus GGG of the steel material is 75GPa, calculate the following: (i) The maximum shear stress in the shaft. (ii) The angle of twist over the shaft's length.	5M	CO3	L3
8(a)	Calculate the deflection of an Cantilever beam using moment-area method.	5M	CO4	L2
(b)	A simply supported beam of length L=10m carries a uniformly distributed load (UDL) of =15kN/m over its entire length. Determine the slope and deflection at the midpoint of the beam using the double integration method. Assume that the modulus of elasticity E=200GPa and the moment of inertia I=50×10 ⁶ mm ⁴ .	5M	CO4	L3
(OR)				
9.	A simply supported beam AB of length = 10 m is subjected to the following loads: (i) A point load of 20 kN at 3m from the left end A. (ii) A uniformly distributed load (UDL) of 15 kN/m over a 6m span starting from x=4 m to x= 10 m. Calculate the deflection at a point x=6m from the left end using Macaulay's method.	10M	CO4	L3
10(a)	Derive the Rankine formula for columns with eccentric loading.	5M	CO5	L2
(b)	Discuss the Secant formula for columns under axial load.	5M	CO5	L2
(OR)				
11(a)	Derive the expressions for volumetric strains in thin cylinders.	5M	CO5	L2
(b)	Explain the distribution of hoop and radial stresses in thick cylinders.	5M	CO5	L2

26 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations**23EC03-ELECTRONIC DEVICES AND CIRCUITS
(ECE)**

Time : 3 hours

Max. Marks : 70

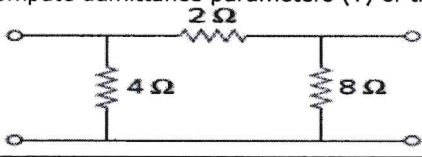
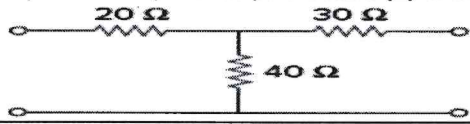
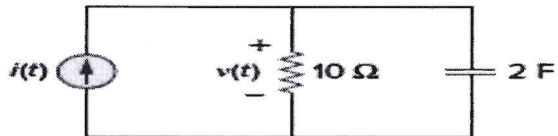
Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define conductivity.	2M	CO1	L1
(b)	What is the use of dynamic resistance?	2M	CO1	L1
(c)	Define PIV.	2M	CO2	L2
(d)	Define regulation.	2M	CO2	L2
(e)	What is the use of operating point?	2M	CO2	L1
(f)	Define stability.	2M	CO2	L1
(g)	Define amplifier.	2M	CO2	L1
(h)	Define output admittance.	2M	CO2	L1
(i)	Explain the JFET small signal model.	2M	CO2	L1
(j)	When FET acts as a voltage variable resistor?	2M	CO2	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Briefly explain the VI characteristics of PN junction diode.	5M	CO1	L2
(b)	Discuss the operation of varactor diode.	5M	CO1	L2
(OR)				
3(a)	Discuss the construction of SCR.	5M	CO1	L2
(b)	Describe the operation of tunnel diode.	5M	CO1	L2
4.	Discuss the operation of half wave rectifier with wave forms.	10M	CO2	L2
(OR)				
5(a)	Briefly explain the operation of bridge rectifier.	5M	CO2	L2
(b)	Briefly explain the operation of clamper circuit.	5M	CO2	L2
6(a)	Briefly explain the characteristics of transistor in CB mode.	5M	CO3	L2
(b)	Write short notes on thermistor compensation techniques.	5M	CO3	L2
(OR)				
7(a)	Draw the circuit diagram of fixed bias and derive stability factor derivation.	5M	CO3	L2
(b)	Write short notes on thermal runaway.	5M	CO3	L2
8(a)	Determine the current gain, voltage gain, input resistance, and output resistance for a simplified common-emitter hybrid model circuit.	5M	CO4	L3
(b)	Draw the two port network diagram and derive the necessary equations.	5M	CO4	L3
(OR)				
9.	Derive the current gain, voltage gain, input resistance, and output resistance for a simplified CC hybrid model circuit.	10M	CO4	L3
10(a)	Discuss the operation of MOSFET.	5M	CO2	L2
(b)	A FET follows the relation $I_D = I_{DSS}[1 - V_{GS}/V_p]^2$. What are the values of I_D and g_m for $V_{GS} = -1.5$ V if I_{DSS} and V_p are given as 8.4 mA and -3V.	5M	CO4	L3
(OR)				
11(a)	Draw and explain the small signal current source for FET.	5M	CO2	L2
(b)	Briefly explain the operation of CS amplifier.	5M	CO2	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.
B.Tech. (III Semester) Regular/Supplementary Examinations
23EE04-ELECTRICAL CIRCUIT ANALYSIS-II
(EEE)

Handwritten signature and date: 26/11/2025

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain the difference between star and delta connections in a three-phase system.	2M	CO1	L2
(b)	What is meant by unbalanced loads in a three-phase system, and how do they affect the system performance?	2M	CO1	L2
(c)	Define Laplace transform .	2M	CO2	L2
(d)	Define the time constant of an R-C circuit. How is it related to the circuit's response?	2M	CO2	L2
(e)	Write the ABCD parameters of a Two port equations.	2M	CO3	L2
(f)	List the conditions for Symmetry and Reciprocal in terms of Z parameters.	2M	CO3	L2
(g)	Define Fourier series of periodic wave forms.	2M	CO4	L2
(h)	Compute RMS value of $i(t) = 2 + 10 \cos(t + 10^\circ) + 6 \cos(3t+35^\circ)$ A.	2M	CO4	L2
(i)	What is the difference between high-pass and band-pass filters?	2M	CO5	L2
(j)	Write the design equations of a simple low-pass filter.	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the different types of three-phase load configurations (balanced and unbalanced) and their impact on the system's performance.	5M	CO1	L2
(b)	A three-phase system supplies a balanced load with a line voltage of 400V. Calculate the Active, Reactive & Apparent power consumed by the load if the current in each phase is 10A&P.F is 0.8	5M	CO1	L3
(OR)				
3(a)	What are the methods of measuring active and reactive power in a three-phase system? Explain the two-wattmeter method.	5M	CO2	L2
(b)	A balanced Δ -connected load having an impedance $10+j5\Omega$ is connected to a Δ -connected generator having $V_{ab} = 330 \angle 10^\circ$ V. Calculate the phase and line currents of the load	5M	CO2	L3
4.	For an R-L circuit with $R = 10\Omega$ and $L = 0.1H$, calculate the time constant and solve for the transient current if the supply voltage is 10V.	10M	CO2	L3
(OR)				
5.	Solve the transient response of an R-C circuit for a 10V input voltage. Given $R = 2\Omega$ and $C = 1\mu F$.	10M	CO2	L3
6(a)	Derive the relation between Impedance (Z) and Transmission parameters (ABCD) parameters.	5M	CO 3	L2
(b)	Compute admittance parameters (Y) of the given circuit. 	5M	CO 3	L3
(OR)				
7(a)	Illustrate the series connection of two port networks.	5M	CO 3	L2
(b)	Compute the Impedance parameters (Z) of the given circuit. 	5M	CO 3	L3
8 .	Given a square periodic voltage signal with a period of 2ms & magnitude of 10V calculate the Fourier series representation of the signal.	10M	CO4	L3
(OR)				
9.	Determine the average power supplied to the circuit is $i(t) = 2 + 10\cos(t + 10^\circ) + 6 \cos(3t + 35^\circ)$ A. 	10M	CO4	L3
10(a)	Discuss the importance of filter design in electrical circuits. What parameters affect the filter performance?	5M	CO 5	L2
(b)	Design a low-pass filter with a cutoff frequency of 1kHz using a resistor and capacitor. Calculate the required component values.	5M	CO 5	L3
(OR)				
11(a)	Design a constant-k low pass filter with cut-off frequency of 1 MHz, and the characteristic impedance of 100 Ohm.	5M	CO 5	L3
(b)	Given a high-pass filter with a capacitor value of 10nF and a resistance of 100 Ω , calculate the cutoff frequency.	5M	CO 5	L3

26 NOV 2025

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23ME04-MECHANICS OF SOLIDS
(ME)

23/11/2025
26/11/2025

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Write the relation between the three elastic constants E, G and K.	2M	CO1	L1
(b)	Write the significance of Mohr's circle and its uses.	2M	CO1	L1
(c)	A cantilever beam of length 'L' is subjected to a couple 'M' at its free end. Draw SFD and BMD.	2M	CO2	L2
(d)	Write the relation between intensity of loading, shear force and bending moment.	2M	CO2	L2
(e)	State the four assumptions made in theory of simple torsion.	2M	CO3	L1
(f)	Define the term moment of resistance.	2M	CO3	L1
(g)	Draw the shear stress distribution diagram across the depth of a circular section of diameter 'd' and express the maximum shear stress in terms of average shear stress.	2M	CO4	L2
(h)	Write the two moment area theorems for finding slope and deflection at a section.	2M	CO4	L1
(i)	Sketch the radial stress and hoop stress distribution across the section of a thick cylinder.	2M	CO5	L2
(j)	What is meant by crippling load?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	A bar of brass 25mm diameter is enclosed in a steel tube of 50mm external diameter and 25mm internal diameter. The bar and the tube are both initially 1.5m long and are rigidly fastened at both ends using 20mm diameter pins. Find the stresses in the two materials when the temperature rises from 30°C to 100°C. Take $E_s = 200 \text{ kN/mm}^2$, $E_b = 100 \text{ kN/mm}^2$, $\alpha_s = 11.6 \times 10^{-6}/^\circ\text{C}$, $\alpha_b = 18.7 \times 10^{-6}/^\circ\text{C}$.	5M	CO1	L3
(b)	A steel bar 150 mm ² of cross section elongates 0.05 mm over a 50 mm gauge length under an axial load of 30kN. Determine its strain energy.	5M	CO1	L3
(OR)				
3(a)	An element has a tensile stress of 500 MN/m ² and a compressive stress of 400 MN/m ² acting on two mutually perpendicular planes. It also has two shear stress of 200 MN/m ² on these planes. Determine (i) the magnitude and direction of the principal stresses and (ii) the magnitude and direction of the maximum shear stress.	5M	CO1	L3
(b)	Sketch and explain salient points of the stress-strain curve of mild steel specimen in tensile test.	5M	CO1	L2
4.	Draw the Bending moment diagram and shear force diagram for the beam loaded of shown below and indicate point of contraflexure if any.	10M	CO2	L3

(OR)

23ME04-MECHANICS OF SOLIDS

5.	A simply supported beam AB, 8m long carrying a point load 3kN at 2m from A and a point load 2kN at 5m from A and a uniform distributed load of 2kN/m between the point loads. Determine the position and magnitude of maximum bending moment. Draw the shear force and bending moment diagrams.	10M	CO2	L3
6(a)	A rectangular beam of 200 mm width and 300 mm depth is simply supported over a span of 8m. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120 N/mm ² .	5M	CO3	L3
(b)	The average torque transmitted by a shaft is 2250 N-m. The maximum torque exceeds the mean torque by 40%. If the allowable shear stress in the shaft material is 45 MPa, determine the diameter of the shaft.	5M	CO3	L3
(OR)				
7(a)	A 250mm deep and 150mm wide rectangular beam is subjected to a maximum bending moment of 250kN.m. Determine the maximum stress produced in the beam and the radius of curvature for the portion of the beam where bending is maximum. $E=2 \times 10^5$ N/mm ² .	5M	CO3	L3
(b)	Determine the diameter of a solid shaft which will transmit 330kW at 300 r.p.m. The angle of twist must not exceed one degree in a 2 metre length nor the maximum shear stress 40 MN/m ² Modules of rigidity, $G = 84$ GN/m ² .	5M	CO3	L3
8(a)	Explain, by mathematical expression, that the shear stress abruptly changes at the junction of the flange and web of an I-section and T-section.	5M	CO4	L2
(b)	Prove that the maximum shear stress for a rectangular section is 1.5 times the average shear stress.	5M	CO4	L3
(OR)				
9.	A horizontal cylinder of steel having uniform section is 14 meters long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80 kN at two points 3 meters and 4.5 meters from the two ends respectively. I for the section of the section is 16×10^8 mm ⁴ and $E_s = 210$ kN/mm ² . Calculate the deflections of the cylinder at points under the two loads. Find also the maximum deflection.	10M	CO4	L3
10(a)	A thick cylindrical pipe of outside diameter 300mm and thickness of metal 50mm is subjected to an internal fluid pressure of 40N/mm ² and an external pressure of 2.5 N/mm ² . Calculate the maximum and minimum intensities of circumferential and radial stresses in the pipe section.	5M	CO5	L3
(b)	How do you distinguish between thin and thick pressure shells?	5M	CO5	L2
(OR)				
11(a)	Define slenderness ratio of a column. What is its importance.	5M	CO5	L2
(b)	A 4 m long fixed end hollow cast iron column supports an axial load of 1MN. The external diameter of the column is 200 mm. Determine the thickness of the column by using Rankine formula taking a constant of 1/6400 and working stress as 80MPa.	5M	CO5	L3

H.T.No

28 NOV 2025

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

**23CS05-OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(AI&DS, CSE, CSE(AI&ML) and IT)**

Power
27/11/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is a command line argument?	2M	CO1	L1
(b)	Define the term 'Portability'.	2M	CO1	L1
(c)	Write the syntax for restricting the access to a variable.	2M	CO2	L2
(d)	What is the advantage of using String Buffer class over a String class?	2M	CO2	L2
(e)	Write the Syntax for the declaration of a double dimensional array.	2M	CO3	L1
(f)	List any two advantages of a Vector class.	2M	CO3	L1
(g)	What is a Wrapper Class?	2M	CO4	L1
(h)	What is the purpose of throws keyword?	2M	CO4	L1
(i)	How various Threads are given priority?	2M	CO5	L1
(j)	What is concurrent execution?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	How various datatypes are used in declaring variables? Explain the properties and constraints associated with each data type.	5M	CO1	L2
(b)	What is Scope of a variable? How it is applied to static variables?	5M	CO1	L2
(OR)				
3.	Write a Java program to print prime numbers in between two given numbers. (Input: 2 ,100 Output: all prime numbers in between 2 and 100)	10M	CO2	L3
4.	Illustrate the concept of method overloading with a suitable java program.	10M	CO2	L3
(OR)				
5(a)	What is Recursion? Explain its working with a suitable example.	5M	CO2	L2
(b)	How values are passed in call by value parameter passing mechanism? Explain with a suitable example.	5M	CO2	L2
6(a)	Describe the process of inheritance in Java and its types.	5M	CO3	L2
(b)	Illustrate method overriding with an example in the context of inheritance.	5M	CO3	L2
(OR)				
7(a)	What is an Interface? With a suitable example explain its importance.	5M	CO3	L2
(b)	Write a java program to implement the concept of inheritance and static methods on interfaces.	5M	CO3	L3
8(a)	Apply exception handling in a Java to manage division by zero errors and Array index out of range.	5M	CO4	L3
(b)	Explain the purpose and usage of the Math class in Java.	5M	CO4	L2
(OR)				
9.	Explain the process involved in the creation of a package with a suitable example.	10M	CO4	L2
10(a)	Explain multithreading in Java. How does it improve the performance of a Java application?	5M	CO5	L2
(b)	Describe the lifecycle of a thread in Java.	5M	CO5	L2
(OR)				
11(a)	Define collections in Java. Explain the difference between Set and Map interfaces with examples.	5M	CO5	L2
(b)	What is the purpose of the Iterator interface in Java collections? Provide an example of using an iterator.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

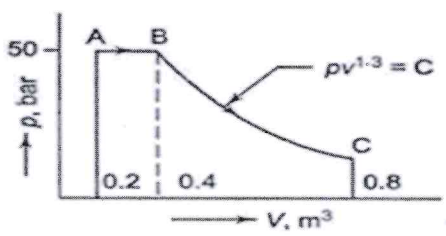
23AE03-ENGINEERING THERMODYNAMICS

(ASE)

Time : 3 hours

Max. Marks : 70

600004
27/11/25

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Give the expression for Gibbs phase rule.	2M	CO1	L1
(b)	State thermodynamic cycle.	2M	CO1	L1
(c)	List different steady flow devices.	2M	CO2	L1
(d)	Define enthalpy.	2M	CO2	L1
(e)	State Second Law of Thermodynamics.	2M	CO3	L1
(f)	Define source.	2M	CO3	L1
(g)	Define saturated state.	2M	CO4	L1
(h)	Define triple point.	2M	CO4	L1
(i)	List the merits of IC engine.	2M	CO5	L1
(j)	What is Brake Power?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	A new scale 'N' on which the temperature is divided such that the freezing point and boiling point is 100°N and 400°N, respectively. What is the temperature on this new scale that corresponds to the temperature 150°C. At what temperature both the Celsius and new temperature scale reading would be same?	5M	CO1	L3
(b)	What do you know about Ideal gas temperature scale?	5M	CO1	L2
(OR)				
3(a)	Derive the expression for work in constant pressure process.	5M	CO1	L3
(b)	Determine the total work done by a gas system following an expansion process as shown in Figure. 	5M	CO1	L3
4.	At the inlet of a nozzle, the enthalpy of the fluid is 3000 kJ/kg and the velocity is 60 m/s. At the outlet the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat transfer across its boundary. Calculate (i) Velocity at the exit of nozzle (ii) If the nozzle inlet area is 0.1 m ² & the specific volume at inlet is 0.187 m ³ /kg, find the mass flow rate (iii) If the specific volume at nozzle exit is 0.498 m ³ /kg, find exit area of nozzle.	10M	CO2	L3
(OR)				
5(a)	Apply the SFEE to the given systems Turbine & compressor.	5M	CO2	L3
(b)	A gas of mass 4 kg is contained by a piston cylinder machine. The gas undergoes a process for which $PV^{1.5} = \text{Constant}$. The initial pressure is 3 bar and the volume is 0.1 m ³ . The final volume is 0.2m ³ . The specific internal energy of the gas is decreased by 4.6KJ/Kg. There are no significant changes in P.E and K.E. Determine the heat transfer for the process.	5M	CO2	L3

23AE03-ENGINEERING THERMODYNAMICS

6(a)	Derive the thermal efficiency for Heat engine.	5M	CO2	L2
(b)	Establish the Clausius inequality.	5M	CO2	L2
(OR)				
7(a)	Complete the demonstration of equivalence among the Kelvin-Planck and Clausius statements of second law of thermodynamics by showing that violation of Kelvin-Planck statement implies a violation of Clausius statement.	5M	CO2	L2
(b)	Two Kg of water at 80 ^o c is mixed adiabatically with 3 Kg of water at 30 ^o c in a constant pressure process of 1 atm. Calculate the increase in entropy for total mass of water due to mixing process. Take c_p of water as 4.187 kJ/kg-k.	5M	CO3	L3
(OR)				
8(a)	Derive the equation for air-standard efficiency of Otto cycle.	5M	CO4	L2
(b)	In a gas turbine plant working on the Brayton cycle, the air at the inlet is at 27°C, 0.1 MPa. The pressure ratio is 6.25 and the maximum temperature is 800°C. Find (i) the compressor work per kg of air, (ii) the turbine work per kg of air.	5M	CO4	L3
(OR)				
9.	An air-standard Otto cycle has a compression ratio of 8.5. At the beginning of compression, $P_1 = 100$ kPa and $T_1 = 300$ K. The heat addition per unit mass of air is 1400 kJ/kg. Determine (i) the net work, in kJ per kg of air. (ii) the thermal efficiency of the cycle	10M	CO4	L3
(OR)				
10(a)	What is the working principle of two-stroke engines?	5M	CO5	L2
(b)	With a neat sketch explain the working principle of a simple carburetor.	5M	CO5	L2
(OR)				
11(a)	What do you know about port timing diagram explain with neat sketch?	5M	CO5	L2
(b)	Compare four-stroke and two-stroke cycle engines.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23CE03-FLUID MECHANICS
(CE)

Booool
27/11/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain the difference between density and specific weight in fluid mechanics.	2M	CO1	L1
(b)	Describe the capillary effect and its significance.	2M	CO1	L1
(c)	State and explain Pascal's law with a practical example.	2M	CO2	L1
(d)	Define center of pressure and its importance in fluid statics.	2M	CO2	L1
(e)	What is meant by incompressible and compressible flows?	2M	CO3	L1
(f)	Explain the importance of the stream function in fluid kinematics.	2M	CO3	L1
(g)	List the assumptions of Bernoulli's theorem.	2M	CO4	L1
(h)	Differentiate between the total energy line and hydraulic grade line.	2M	CO4	L1
(i)	What is Mach number? How is it useful in fluid mechanics?	2M	CO5	L1
(j)	Describe the concept of equivalent length in a pipeline.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss the effect of temperature and pressure on fluid properties.	5M	CO1	L2
(b)	Explain the concept of surface tension and its applications in engineering.	5M	CO1	L2
(OR)				
3(a)	Define Newton's law of viscosity and classify the fluids based on Newton's law of viscosity.	5 M	CO1	L2
(b)	Explain how a piezometer works and its applications in fluid mechanics.	5M	CO2	L2
4.	Derive the hydrostatic equation and discuss its application in calculating pressure in fluids.	10M	CO2	L2
(OR)				
5(a)	Define stability of floating bodies and derive conditions for equilibrium.	5M	CO2	L2
(b)	Explain the center of buoyancy and how it affects stability in floating bodies.	5M	CO2	L2
6(a)	Explain compressible and incompressible flow, and provide examples of each.	5M	CO3	L2
(b)	Derive the continuity equation for one dimensional incompressible flow.	5M	CO3	L2
(OR)				
7(a)	Describe applications of Bernoulli's equation in a Venturimeter and derive the governing equations.	5M	CO4	L2
(b)	Derive Euler's equation for an ideal fluid and discuss its assumptions.	5M	CO4	L2
8(a)	Explain the momentum principle and its application in fluid flow for pipe bends.	5M	CO4	L2
(b)	An oil of sp.gr 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Determine the discharge of oil through the horizontal venturimeter. Take Cd=0.98.	5M	CO4	L3
(OR)				
9 (a)	Differentiate between rotational and irrotational flow with practical examples	5M	CO4	L2
(b)	The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 litres/s. The section 1 is 6 m above datum line and section 2 is 4 m above the datum. If the pressure at section 1 is 39.24 N/cm ² , determine the intensity of pressure at section 2.	5M	CO4	L3
10(a)	Explain Weber number and its applications in fluid mechanics.	5M	CO5	L2
(b)	Describe Mach number and its importance in compressible fluid flow.	5M	CO5	L2
(OR)				
11(a)	Explain pipes in series and parallel, and derive the equivalent length for complex systems.	5M	CO5	L2
(b)	Describe the importance of the hydraulic grade line and total energy line in fluid flow analysis.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations
23EC04-SWITCHING THEORY AND LOGIC DESIGN
(ECE)

Answered
22/11/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL																																												
1(a)	Is parity is error detection code or error correction code. Justify the answer with example.	2M	CO1	L2																																												
(b)	What are universal gates? Why are they called so? Give their truth tables.	2M	CO2	L1																																												
(c)	What do you mean by K-map? List its advantages and disadvantages.	2M	CO2	L1																																												
(d)	Draw the 4-bit adder subtractor circuit.	2M	CO3	L2																																												
(e)	What are the advantages of priority Encoder over Encoder?	2M	CO3	L2																																												
(f)	Compare PROM & PAL.	2M	CO3	L1																																												
(g)	Why a gated D latch is called a transparent latch?	2M	CO3	L2																																												
(h)	Draw the block diagram of sequential circuit using combinational circuit and memory unit.	2M	CO3	L1																																												
(i)	Mention the components used in Finite state machines.	2M	CO4	L1																																												
(j)	List the capabilities and limitations of Finite state machines.	2M	CO4	L1																																												
Q.No	All questions carry equal marks	Marks	CO	BL																																												
2(a)	Convert the following numbers with the given radix to decimal. (i) $(4433)_5$ (ii) $(1199)_{12}$ (iii) $(5654)_7$	5M	CO1	L3																																												
(b)	Simplify the following Boolean expressions to minimum no. of literals. (i) $(AB' + AC')(BC + BC')(ABC)$ (ii) $x'z + x'y + xy'z + yz$	5M	CO2	L2																																												
(OR)																																																
3(a)	Generate Hamming code for the given 4 bit message 1010 and rewrite the entire message with even parity Hamming code.	5M	CO2	L3																																												
(b)	Derive Boolean expression for a 2 input Ex-OR gate to realize with 2 input NAND gates without using complemented variables and draw the circuit.	5M	CO2	L2																																												
4.	Implement the BCD code to Excess-3 code converter and draw the circuit.	10M	CO2	L2																																												
(OR)																																																
5(a)	Minimize following function using K-map minimization. $F(A, B, C, D) = m(6, 7, 8, 9) + d(10, 11, 12, 13, 14, 15)$.	5M	CO2	L3																																												
(b)	Realize Full Adder Using two half adders and logic gates.	5M	CO3	L2																																												
6(a)	Design a combinational circuit that accepts a 3-bit number and generates an output binary number equal to the square of the input number.	5M	CO3	L3																																												
(b)	Implement Full adder circuit using ROM and verify the working.	5M	CO3	L2																																												
(OR)																																																
7(a)	Show how a 4 x 16 decoder can be constructed with two 3 x 8 decoders.	5M	CO3	L2																																												
(b)	Implement the following function using a multiplexer of proper size. $F(w,x,y,z) = m(0, 1, 2, 3, 4, 9, 13, 14, 15)$.	5M	CO3	L3																																												
8(a)	Draw the logic diagram of a JK flip flop and using excitation table, explain its operation.	5M	CO3	L3																																												
(b)	Design modulo-6 ripple counter using Jk-Flip-Flops	5M	CO3	L3																																												
(OR)																																																
9(a)	Draw the logic diagram of 4-bit serial in parallel out shift register using JK flip flop and explain its working.	5M	CO3	L2																																												
(b)	Draw the circuit diagram of 4 bit ring counter using D flip-flops and explain its operation with the help of bit pattern.	5M	CO3	L3																																												
10.	A clocked sequential circuit is provided with a single input x and single output Z. Whenever the input produce a string of pulses 111 or 000 and at the end of the sequence it produce an output Z = 1 and overlapping is also allowed? (i) Obtain State - Diagram (ii) Also obtain state - Table (iii) Find equivalence classes using partition method & design the circuit using D flip-flops.	10M	CO4	L3																																												
(OR)																																																
11(a)	Determine a minimal - state equivalent to the state table given below: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Present state q^n</th> <th colspan="2">Next State</th> <th colspan="2">Output (Z)</th> </tr> <tr> <th>x=0</th> <th>x=1</th> <th>x=0</th> <th>x=1</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>2</td> <td>1</td> <td>6</td> <td>1</td> <td>1</td> </tr> <tr> <td>3</td> <td>4</td> <td>5</td> <td>0</td> <td>0</td> </tr> <tr> <td>4</td> <td>1</td> <td>7</td> <td>1</td> <td>0</td> </tr> <tr> <td>5</td> <td>2</td> <td>3</td> <td>0</td> <td>0</td> </tr> <tr> <td>6</td> <td>4</td> <td>5</td> <td>0</td> <td>0</td> </tr> <tr> <td>7</td> <td>2</td> <td>3</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Present state q^n	Next State		Output (Z)		x=0	x=1	x=0	x=1	1	1	1	0	0	2	1	6	1	1	3	4	5	0	0	4	1	7	1	0	5	2	3	0	0	6	4	5	0	0	7	2	3	0	0	5M	CO4	L3
Present state q^n	Next State		Output (Z)																																													
	x=0	x=1	x=0	x=1																																												
1	1	1	0	0																																												
2	1	6	1	1																																												
3	4	5	0	0																																												
4	1	7	1	0																																												
5	2	3	0	0																																												
6	4	5	0	0																																												
7	2	3	0	0																																												
(b)	Design the circuit using D - Flip- Flops for the above minimal state table.	5M	CO4	L3																																												

H.T.No

28 NOV 2025

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23EE05-DC MACHINES & TRANSFORMERS

(EEE)

Booney
27/11/24

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the purpose of using laminated cores in DC machines?	2M	CO1	L1
(b)	Define torque equation in a DC motor.	2M	CO1	L1
(c)	What is the difference between a 3-point starter and a 4-point starter?	2M	CO2	L2
(d)	Mention two methods of testing DC machines.	2M	CO2	L2
(e)	What is the function of a transformer?	2M	CO3	L1
(f)	Define voltage regulation of a transformer.	2M	CO3	L1
(g)	Why is a short-circuit test performed on a transformer?	2M	CO4	L1
(h)	What are the conditions for parallel operation of transformers?	2M	CO4	L1
(i)	Explain the significance of transient analysis in the switching of three-phase transformers.	2M	CO5	L1
(j)	What are the conditions necessary for the parallel operation of three-phase transformers?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Determine the torque developed by a DC motor if it draws an armature current of 30 A with a back EMF of 220 V and speed of 1000 RPM.	5M	CO1	L3
(b)	Explain the construction and working principle of a DC generator.	5M	CO1	L2
(OR)				
3(a)	A DC generator delivers 50 A at a terminal voltage of 230 V. The armature resistance is 0.2 Ω. Calculate the generated EMF.	5M	CO2	L3
(b)	Derive the EMF equation of a DC generator.	5M	CO2	L2
4.	A 250 V DC shunt motor has a field resistance of 125 Ω and an armature resistance of 0.3 Ω. It takes a current of 50 A. Find the back EMF.	10M	CO2	L3
(OR)				
5(a)	Describe the necessity of starters for DC motors.	5M	CO2	L2
(b)	A 5 HP DC motor running at 1500 rpm takes a current of 25 A at 240V. Calculate the efficiency if the losses are 500 W.	5M	CO2	L3
6(a)	Calculate the turns ratio of a transformer if the primary winding has 1000 turns and the secondary winding has 250 turns.	5M	CO3	L3
(b)	Discuss the losses in a transformer and their effect on efficiency.	5M	CO3	L2
(OR)				
7(a)	A 10 kVA transformer operates at full load with 4% voltage regulation. Calculate the secondary voltage when the primary voltage is 220 V.	5M	CO3	L3
(b)	Explain the concept of voltage regulation in transformers.	5M	CO3	L2
8(a)	In a short-circuit test, a transformer draws 10 A at 200 V. The power input is 1000 W. Calculate the equivalent impedance.	5M	CO4	L3
(b)	Explain the open circuit and short circuit tests of a transformer.	5M	CO4	L2
(OR)				
9(a)	A transformer has a no-load loss of 50 W and a full-load copper loss of 200 W. Calculate its efficiency at half-load.	5M	CO4	L3
(b)	Discuss the advantages of an autotransformer over a two-winding transformer.	5M	CO4	L2
10(a)	Calculate the turns ratio for a three-phase transformer with a primary voltage of 6.6 kV and a secondary voltage of 440 V.	5M	CO5	L3
(b)	Discuss the impact of third harmonics on phase voltages in three-phase transformers.	5M	CO5	L2
(OR)				
11(a)	A Δ/Δ-connected transformer is delivering 100 kW at a power factor of 0.9 lagging. Calculate the line currents on both primary and secondary sides if the line voltage is 400 V on both sides.	5M	CO5	L3
(b)	Explain the concept and applications of the Scott connection in three-phase transformers.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

23ME05-MATERIAL SCIENCE AND METALLURGY
(ME)

Pass
27/11/25

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Differentiate between amorphous and crystalline solids.	2M	CO1	L2
(b)	How the properties are affected by grain boundaries?	2M	CO1	L1
(c)	List the applications of eutectic alloy.	2M	CO2	L1
(d)	Draw the cooling curve of pure metal and alloy.	2M	CO2	L2
(e)	List out the applications of Grey Cast Iron.	2M	CO3	L1
(f)	List the classification of steels.	2M	CO3	L1
(g)	Write the advantages of cold working process.	2M	CO4	L1
(h)	Distinguish between hardening and surface hardening.	2M	CO4	L2
(i)	Define ceramic material	2M	CO5	L1
(j)	What is the difference between alloy and composite material?	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	What do you mean by intermediate alloy phase? Explain any one type of intermediate alloy phase with suitable example.	5M	CO1	L1
(b)	Define unit cell. Explain about the calculation of Atomic packaging factor for BCC structure.	5M	CO1	L2
(OR)				
3(a)	List and explain the types of solid solutions with diagrams briefly.	5M	CO1	L1
(b)	List and explain the grain size measurement methods with diagrams.	5M	CO1	L1
4(a)	Draw and Explain the Bi-Cd phase diagram from the given data Melting Point of Bi = 271°C Melting Point of Cd = 321°C Eutectic Temperature = 144°C Eutectic Composition = 39.7%Cd	5M	CO2	L2
(b)	Explain coring and miscibility briefly with a diagram.	5M	CO2	L1
(OR)				
5(a)	Write short notes on (i) Phase rule (ii) Lever rule.	5M	CO2	L1
(b)	Explain procedure for construction isomorphous phase diagram.	5M	CO2	L2
6(a)	What are the types of Tool steels? Explain them.	5M	CO3	L1
(b)	Draw the micro structure of the following cast irons (i) Grey cast iron (ii) Malleable cast iron (iii) White cast iron.	5M	CO3	L1
(OR)				
7(a)	Explain the properties and Applications of Copper and its Alloys.	5M	CO3	L2
(b)	List the characteristics of cast iron.	5M	CO3	L1
8(a)	Describe the principle of flame hardening and induction hardening with neat sketch.	5M	CO4	L2
(b)	What is strain hardening? Explain in detail.	5M	CO4	L1
(OR)				
9.	Define Hardenability. Describe Jominy end quench test stating its purpose.	10M	CO4	L 2
10(a)	Classify the composite materials.	5M	CO5	L1
(b)	List the characteristics of ceramic materials.	5M	CO5	L1
(OR)				
11 (a)	Write short notes on the following (i) CCC's (ii) Particle reinforced composite materials.	5M	CO5	L2
(b)	Explain any three methods that are used to manufacture the Fibre Reinforced Composite (FRC).	5M	CO5	L2