



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 (Supplementary) June 2026

TIME TABLE

R23

Time : 10.00 AM to 01.00 PM

A.Y. : 2025-26

Branch	02-06-2026 (Tuesday)	03-06-2026 (Wednesday)	04-06-2026 (Thursday)	05-06-2026 (Friday)	06-06-2026 (Saturday)	08-06-2026 (Monday)
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: 16 MAY 2026


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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)
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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)	Explain the Importance/need/role of human values.	2M	CO1	L2
(b)	What is value education?	2M	CO1	L1
(c)	Needs of Self (I) and body.	2M	CO2	L1
(d)	What is self discipline?	2M	CO2	L1
(e)	Need of harmony in family.	2M	CO3	L2
(f)	Define the Trust and respect.	2M	CO3	L2
(g)	Define the harmony in nature.	2M	CO4	L1
(h)	What is Self regulation?	2M	CO4	L1
(i)	Different strategies for transition.	2M	CO5	L4
(j)	Concept of holistic purpose of harmony.	2M	CO5	L4
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	What is natural Acceptance? Explain the characteristic of Natural Acceptance?	5M	CO1	L1
(b)	Explain the process/Phases/formulation of self-exploration with a diagram.	5M	CO1	L2
(OR)				
3(a)	What do you mean by human value? Explain the Importance/need/role of human values.	5M	CO1	L1
(b)	What is value education? Explain the basic guide lines for value education.	5M	CO1	L1
(OR)				
4.	What is our present attitude towards the body and its consequences?	10M	CO2	L1
(OR)				
5(a)	Explain the basic principles' of understanding the body as an instrument of 'i'.	5M	CO2	L2
(b)	Disuses Human being is co-existence of self and body true or false.	5M	CO2	L4
(OR)				
6(a)	Explain the need of harmony in family and society.	5M	CO3	L2
(b)	What are the universal values for human relationships?	5M	CO3	L1
(OR)				
7(a)	State the concept of Respect. Why is Giving Respect Important?	5M	CO3	L2
(b)	Explain program for its fulfillment to ensure mutual happiness.	5M	CO3	L2
(OR)				
8(a)	Explain different orders of harmony in nature.	5M	CO4	L1
(b)	Describe components of recyclability in nature.	5M	CO4	L4
(OR)				
9.	Briefly explain interconnectedness and mutual fulfillment among the four orders of nature.	10M	CO4	L2
(OR)				
10(a)	What do you mean by definitiveness of ethical human conduct? How can it be ensured?	5M	CO5	L1
(b)	Explain the basis for Humanistic human order.	5M	CO5	L2
(OR)				
11(a)	Explain the role of engineers in responsible socially and ecologically.	5M	CO5	L2
(b)	How to evaluate the holistic technology for production system?	5M	CO5	L1

04 JUN 2026

H.T.No

R23

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

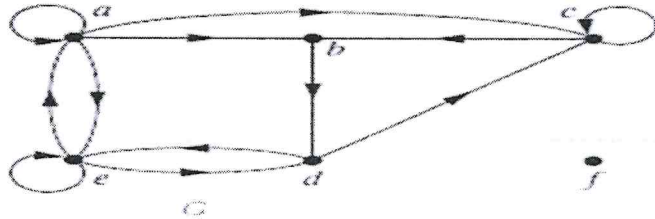
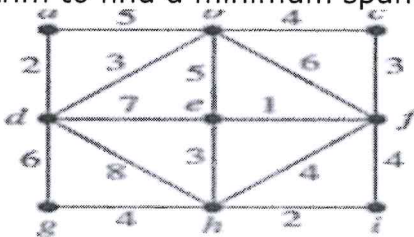
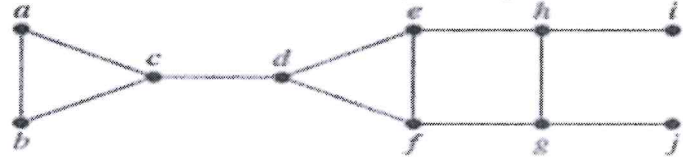
23FE11-DISCRETE MATHEMATICS & GRAPH THEORY
(AI&DS,CSE,CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain the law of duality with a case study.	2M	CO1	L2
(b)	Express the following statements using quantifiers. Then construct the negation of the statement. i) Every bird can fly ii) Some birds can sing.	2M	CO1	L2
(c)	Let the Relation R be $R = \{(1,2), (2,3), (3,4)\}$ on the set $A = \{1,2,3,4\}$. What is the Transitive Closure of R?	2M	CO2	L1
(d)	Determine whether the function $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 2 & 5 & 7 & 8 & 6 & 1 & 4 & 3 \end{pmatrix}$ is even or odd permutation.	2M	CO2	L3
(e)	How many permutations of the letters PQRSTUV contain the string TS?	2M	CO3	L1
(f)	Describe Recurrence relations with example.	2M	CO3	L1
(g)	Define graph and give an example.	2M	CO4	L1
(h)	Define path, trail and circuit.	2M	CO4	L1
(i)	Give an example of complete bipartite graph.	2M	CO5	L1
(j)	Define Minimum Spanning tree.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Construct the truth tables for the compound propositions. $(q \rightarrow \neg p) \leftrightarrow (p \leftrightarrow q)$ (ii) $(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg p)$	5M	CO1	L1
(b)	Translate the given statement into propositional logic using the propositions provided. You can see the movie only if you are over 18 years old or you have the permission of a parent. Express your answer in terms of m : "You can see the movie," e : "You are over 18 years old," and p : "You have the permission of a parent."	5M	CO1	L2
(OR)				
3(a)	Show that $[(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$ is a tautology, by constructing a truth table.	5M	CO1	L3
(b)	Show that the premises "If you send me an e-mail message, then I will finish writing the program," "If you do not send me an e-mail message, then I will go to sleep early," and "If I go to sleep early, then I will wake up feeling refreshed" lead to the conclusion "If I do not finish writing the program, then I will wake up feeling refreshed."	5M	CO1	L3
4(a)	Given $S = \{1,2,3,\dots,10\}$ and a relation R on S where $R = \{<x, y> / x+y=10\}$, what are the properties of the relation R? Explain.	5M	CO2	L2
(b)	Prove that $(S, \leq)$ is a Lattice, where $S = \{1,2,3,6\}$ and $\leq$ is for divisibility. Prove that it is also a Distributive Lattice.	5M	CO2	L3
(OR)				
5(a)	Let g be the function from the set $\{a, b, c\}$ to itself such that $g(a) = b$, $g(b) = c$ and $g(c) = a$. Let f be the function from the set $\{a, b, c\}$ to the set $\{1, 2, 3\}$ such that $f(a) = 3$, $f(b) = 2$ and $f(c) = 1$. What is the composition of f and g , and what is the composition of g and f ?	5M	CO2	L1

23FE11-DISCRETE MATHEMATICS & GRAPH THEORY

(b)	Let $A = \{1, 2, 3, 4\}$ and $P = \{\{1, 2, 3\}, \{4\}\}$ be a partition of A . Find the equivalence relation determined by P .	5M	CO2	L3
6(a)	Explain the Multinomial theorems with an example.	5M	CO3	L2
(b)	Solve the recurrence relation $a_n - 3a_{n-1} + 2a_{n-2} = 3^n$	5M	CO3	L3
(OR)				
7(a)	A group of 8 scientists is composed of 5-psychologists and 3-sociologists, in how many ways can a committee of 5 be formed that has 3- psychologists and 2-sociologists.	5M	CO3	L3
(b)	Solve the following recurrence relation using generating function $a_n - 3a_{n-2} + 2a_{n-3} = 0$ for $n \geq 3$, $a_0=1$, $a_1=0$, $a_2=0$.	5M	CO3	L3
8(a)	How many edges does a graph have if it has vertices of degree 4,3,3,2,2? Draw such a graph.	5M	CO4	L3
(b)	Explain about the adjacency matrix representation of graphs. Illustrate with an example.	5M	CO4	L2
(OR)				
9(a)	Find the in-degree and out-degree of each vertex in the graph G with directed edges.	5M	CO4	L3
				
(b)	Explain the difference between Eulerian graph and Hamiltonian graph with an example each.	5M	CO4	L2
10(a)	State and explain graph coloring problem. Give its applications.	5M	CO5	L2
(b)	Use Prim's algorithm to find a minimum spanning tree in the graph.	5M	CO5	L3
				
(OR)				
11(a)	Prove that complete graph of 5 vertices is non planar.	5M	CO5	L3
(b)	Use depth-first search to find a spanning tree for the graph G .	5M	CO5	L3
				

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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)	Define and give examples for algebraic and transcendental equations.	2M	CO1	L1												
(b)	Write the sufficient condition for Simultaneous equations, $f(x,y) = 0$ and $g(x,y) = 0$ in Newton-Raphson Method with (x_0, y_0) as initial approximation.	2M	CO1	L2												
(c)	Write Simpson's 3/8 th rule.	2M	CO2	L1												
(d)	Write the formula to derive approximations in Taylor's method.	2M	CO2	L1												
(e)	Find the Laplace transform of $\sin 2t \cos 3t$.	2M	CO3	L3												
(f)	Find $L^{-1}\left(\frac{1}{(s+1)^3}\right)$	2M	CO3	L3												
(g)	Explain about Dirichlet's conditions for Fourier series expansion.	2M	CO4	L1												
(h)	If $f(x) = x$ in $-\pi < x < \pi$, then find b_n .	2M	CO4	L3												
(i)	Write Change of scale property and Shifting property of Fourier transform.	2M	CO5	L1												
(j)	Find Fourier Sine transform of $\frac{x}{1+x^2}$	2M	CO5	L2												
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 $y(10)$ for the data $y(3) = 2.7, y(4) = 6.4, y(5) = 12.5, y(6) = 21.6, y(7) = 34.3, y(8) = 51.2, y(9) = 72.9$ using Newton's backward interpolation formula.	5M	CO1	L3												
(OR)																
3(a)	Solve the system of equations $x^2 - y^2 = 3$ and $x^2 + y^2 = 13$ using Newton-Raphson method for simultaneous equations.	5M	CO1	L3												
(b)	Evaluate $y(2)$ from the following table. <table><tr><td>x</td><td>1</td><td>3</td><td>5</td><td>6</td><td>8</td></tr><tr><td>y</td><td>2</td><td>1.5</td><td>2.4</td><td>4</td><td>5.6</td></tr></table>	x	1	3	5	6	8	y	2	1.5	2.4	4	5.6	5M	CO1	L3
x	1	3	5	6	8											
y	2	1.5	2.4	4	5.6											
4(a)	Evaluate $\int_0^{\frac{\pi}{2}} \frac{\cos x}{1+x} dx$ by Simpson's $\frac{3^{th}}{8}$ rule.	5M	CO2	L3												
(b)	Evaluate $y(0.1)$ using RK method of fourth order for $\frac{dy}{dx} = y + xe^x, y(0) = 1$	5M	CO2	L3												
(OR)																
5(a)	Evaluate $\int_0^{\pi} x \sin x$ using i) Trapezoidal rule ii) Simpson's $\frac{1^{rd}}{3}$ rule.	5M	CO2	L3												
(b)	Evaluate $y(0.1)$ by Euler's method for $\frac{dy}{dx} = \frac{x+y}{x-y}, y(0) = 1$.	5M	CO2	L3												
6(a)	Find $L\left(\int_0^t te^{-t} \sin 2t dt\right)$.	5M	CO3	L3												

23FE09-NUMERICAL METHODS AND TRANSFORM TECHNIQUES

(b)	Find the inverse Laplace transform of $\frac{s^2}{(s^2+1)(s^2+9)}$	5M	CO3	L3
(OR)				
7(a)	Show that $\int_0^\infty t^2 e^{-4t} \sin 2t dt = \frac{11}{500}$.	5M	CO3	L3
(b)	Solve the D.E $\frac{d^2x}{dt^2} + 9x = \sin t$ using Laplace transforms given that $x(0) = 1, x'(0) = 1$	5M	CO3	L3
8(a)	Find the Fourier series for the function $f(x) = e^{ax}$ in $(0, 2\pi)$.	5M	CO4	L3
(b)	Find the Fourier series of $f(x) = x^2 - 2$, in $(-2, 2)$.	5M	CO4	L3
(OR)				
9(a)	Find Fourier series expansion of $f(x) = x \sin x$ in $(-\pi, \pi)$	5M	CO4	L3
(b)	Find the half range cosine series of $f(x) = \begin{cases} 1, & 0 < x < 1 \\ -1, & 1 < x < 2 \end{cases}$	5M	CO4	L3
10(a)	Using Fourier Integral show that; $e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x}{(\lambda^2 + a^2)^2 (\lambda^2 + b^2)^2} d\lambda \quad ; a, b > 0$	5M	CO5	L3
(b)	Find the Fourier transform of $f(x) = e^{-\frac{x^2}{2}}, -\infty < x < \infty$.	5M	CO5	L3
(OR)				
11(a)	Find the finite Fourier Sine transform of $f(x)$ defined by $f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$	5M	CO5	L3
(b)	Find the Inverse Fourier Sine transform of $e^{\frac{-ap}{p}}$	5M	CO5	L3

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

23FE08-NUMERICAL TECHNIQUES AND STATISTICAL METHODS

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define iteration.	2M	CO1	L1
(b)	Write the iterative formula to find the root in secant method.	2M	CO1	L1
(c)	Write Simpson's $\frac{3}{8}$ th rule.	2M	CO2	L2
(d)	Write the demerits of Taylor's series method.	2M	CO2	L2
(e)	Define continuous random variable.	2M	CO3	L1
(f)	Write two properties of normal distribution.	2M	CO3	L1
(g)	State central limit theorem.	2M	CO4	L1
(h)	Define interval estimation.	2M	CO4	L1
(i)	Write about right tail test.	2M	CO5	L1
(j)	Define Null hypothesis.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Find a real root of $x \log_{10} x = 1.2$ using the Method of false position.	5M	CO1	L3
(b)	Find the square root of 5, using the Newton-Raphson method.	5M	CO1	L2
(OR)				
3(a)	Using Lagrange's theorem express the function $\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a partial fractions.	5M	CO1	L3
(b)	Find the cubic polynomial which takes the following values using Newton's forward interpolation formula. $\begin{array}{cccc} x: & 4 & 6 & 8 & 10 \\ f(x): & 1 & 3 & 8 & 16 \end{array}$	5M	CO1	L2
4.	Use Milne's method, to find a solution of the differential equation $\frac{dy}{dx} = x - y^2$ in the range $0 \leq x \leq 1$ for the boundary condition $y(0) = 0$.	10M	CO2	L3
(OR)				
5(a)	Evaluate $\int_0^1 x^3 dx$ with five sub-intervals by using Trapezoidal rule.	5M	CO2	L3
(b)	Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by using Simpson's $\frac{1}{3}$ rd rule taking $h = \frac{1}{4}$	5M	CO2	L2
6(a)	Let X denote the maximum of the two numbers that appear when a pair of dice is thrown once. Then find the mean and variance of X .	5M	CO3	L3
(b)	A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B .	5M	CO3	L2
(OR)				
7(a)	In a Normal distribution, 7% of the items are under 35 and 89% of the under 63. Determine the mean and variance of the distribution.	5M	CO3	L3
(b)	In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution is normal, find (i) how many students score between 12 and 15 (ii) how many score above 18	5M	CO3	L2

23FE08-NUMERICAL TECHNIQUES AND STATISTICAL METHODS

8(a)	When a sample is taken from an infinite population, what happen to the standard error of the mean if the sample size is decreased from 800 to 200.	5M	CO4	L3
(b)	How many different samples of size 2 can be chosen, from a finite population of size 25. Also find the value of correction factor	5M	CO4	L2
(OR)				
9.	A population consists of five numbers 2,3,6,8,11. Consider all possible samples of size 2 that can be drawn with out replacement from this population. Find (i) The mean of the population (ii) The standard deviation of the population (iii) The mean of the sampling distribution of means and (iv) The standard deviation of the sampling distribution of means.	10M	CO4	L3
10(a)	It is claimed that a random sample of 49 tyres has a mean life of 15,200 km. This sample was drawn from a population whose mean is 15,150 kms and a standard deviation of 1,200 km. Test the significance at 0.05 level.	5M	CO5	L3
(b)	In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance.	5M	CO5	L2
(OR)				
11.	In a survey of buying habits, 400 women shoppers are chosen at random in super market "A" located in a certain section of the city. Their average weekly food expenditure is Rs.250 with a S.D of Rs.40. For 400 women shoppers chosen at random in super market B in another section of the city, the average weekly food expenditure is Rs.220 with a S.D of Rs.55. Test at 10% level of significance whether the average weekly food expenditure of the two populations of shoppers are equal.	10M	CO5	L2

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations**23FE12-PROBABILITY THEORY AND STOCHASTIC PROCESS
(ECE)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define a sample space with an example.	2M	CO1	L1
(b)	Discuss the importance of independent events in probability.	2M	CO1	L1
(c)	Discuss the importance of the Central Limit Theorem in statistics.	2M	CO2	L2
(d)	What is a characteristic function, and what is its purpose?	2M	CO2	L2
(e)	Define a random process.	2M	CO3	L1
(f)	Differentiate between autocorrelation and cross-correlation functions.	2M	CO3	L1
(g)	Explain the relationship between the power spectrum and the autocorrelation function	2M	CO4	L1
(h)	State the properties of the cross-correlation function.	2M	CO4	L1
(i)	State the formula for the noise figure of a cascaded system.	2M	CO5	L1
(j)	Differentiate between narrowband noise and white noise.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain and derive Bayes' Theorem. Give an example of how it can be used in real-world probability applications.	5M	CO1	L3
(b)	Describe and derive the conditions for a function to qualify as a random variable.	5M	CO1	L2
(OR)				
3(a)	For a given experiment, illustrate and differentiate between discrete, continuous, and mixed random variables. Provide examples for each type.	5M	CO2	L3
(b)	Compare the probability density functions of the Gaussian and Exponential distributions. Describe situations where each is applicable.	5M	CO2	L2
4.	Discuss the significance of the Central Limit Theorem (CLT). How does the CLT apply to sums of random variables in practical contexts?	10M	CO2	L2
(OR)				
5(a)	Explain the concept of the expected value of a random variable and illustrate it with an example involving a discrete random variable.	5M	CO3	L1
(b)	Calculate the variance and skewness for a given random variable. Explain how these metrics help characterize the distribution of the variable.	5M	CO3	L3
6(a)	Differentiate Between Deterministic and Non-deterministic Processes. Provide Examples.	5M	CO3	L2
(b)	Explain the Concept of First-Order and Second-Order Stationary Processes.	5M	CO3	L3
(OR)				
7(a)	Describe Ergodicity and Explain Its Importance in Random Processes.	5M	CO3	L3
(b)	Explain the Properties of Autocorrelation and Cross-Correlation Functions.	5M	CO3	L2
8(a)	Describe the Properties of Cross-Power Density Spectrum and Its Importance in Signal Processing.	5M	CO4	L2
(b)	Explain How Power Spectrum is Used to Characterize System Responses in the Frequency Domain.	5M	CO4	L2
(OR)				
9.	Given a system with input and output processes, discuss how cross-power density can provide insights into the system's frequency response.	10M	CO4	L3
10(a)	Calculate Entropy for a Given Probability Distribution in a Communication Channel.	5M	CO5	L3
(b)	Explain the Concept of Mutual Information and Its Significance in Information Theory.	5M	CO5	L2
(OR)				
11(a)	Describe How Quadrature Representation of Narrow Band Noise Affects Signal Processing.	5M	CO5	L2
(b)	Explain Noise Equivalent Bandwidth and Its Application in Communication Systems.	5M	CO5	L2

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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)	Explain transcendental equation.	2M	CO1	L1										
(b)	Evaluate $\Delta\left(\frac{1}{x^2}\right)$	2M	CO1	L1										
(c)	Write Simpson's 1/3 rd formula.	2M	CO2	L2										
(d)	Write merits and demerits of Modified Euler's method.	2M	CO2	L2										
(e)	Find Harmonic conjugate of $e^x \sin y$.	2M	CO3	L1										
(f)	Explain Cauchy Riemann equations.	2M	CO3	L1										
(g)	State Cauchy Integral theorem.	2M	CO4	L1										
(h)	Demonstrate Laurent series expansion in power series.	2M	CO4	L1										
(i)	Find the bilinear transformation of $z = 1, 0, -1$ onto $w = 0, i, 1$.	2M	CO5	L1										
(j)	Define rotation in mapping.	2M	CO5	L1										
Q.No	All questions carry equal marks	Marks	CO	BL										
2(a)	Evaluate $\sqrt[3]{54}$ using Newton's iteration method correct up to 4 decimal places.	5M	CO1	L3										
(b)	Using Lagrange's method to find the value of $x=10$ from the given data. <table border="1"> <tr> <td>x</td><td>5</td><td>6</td><td>9</td><td>11</td></tr> <tr> <td>f(x)</td><td>12</td><td>13</td><td>14</td><td>16</td></tr> </table>	x	5	6	9	11	f(x)	12	13	14	16	5M	CO1	L2
x	5	6	9	11										
f(x)	12	13	14	16										
(OR)														
3(a)	Find a real root of $x \log_{10} x = 1.2$ which lies between 2 and 3 by bisection method.	5M	CO2	L3										
(b)	Compute the real root of the equation $e^x \sin x = 1$ by the method of false position.	5M	CO2	L2										
4.	Solve Using Taylor's series, find y at $x = 0.1$ given $\frac{dy}{dx} = y^2 + x$, $y(0) = 1$	10M	CO2	L3										
(OR)														
5(a)	Given that $y' = 3x^2 + y$, $y(0) = 4$ compute $y(0.25)$ using Euler's method.	5M	CO2	L3										
(b)	Evaluate $\int_0^2 e^{-x^2} dx$ using Simpson's $\frac{3}{8}$ rule taking $h = \frac{1}{3}$	5M	CO2	L2										
6(a)	Find the analytic function whose real part is $x^2 - y^2 + \frac{x}{(x^2 + y^2)}$	5M	CO3	L3										

23FE07-COMPLEX VARIABLES AND NUMERICAL METHODS

(b)	Evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$, where c is the circle $ z =3$ using Cauchy's Integral formula.	5M	CO3	L2
(OR)				
7(a)	Show that the function $u = 2 \log(x^2 + y^2)$ is harmonic function.	5M	CO3	L3
(b)	Evaluate $\int_0^{1+i} (x^2 - iy) dz$ along the paths $y = x^2$	5M	CO3	L2
(OR)				
8(a)	Expand $\cos z$ as a Taylor's series about $z = \frac{\pi}{2}$	5M	CO4	L3
(b)	Write Laurent's series expansion of $f(z) = \frac{1}{(z^2 - 4z + 3)}$ in powers of 'z' for (i) $ z < 1$ (ii) $1 < z < 3$	5M	CO4	L2
(OR)				
9(a)	Evaluate $\int_0^\pi \frac{d\theta}{1 + a \cos \theta}$, $0 < a < 1$ by residue theorem.	5M	CO4	L3
(b)	Evaluate $\int_C \frac{dz}{(z^2 + 4)^2}$ where $C: z-i =2$, by residue theorem.	5M	CO4	L2
(OR)				
10(a)	Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $w = i, 0, -i$.	5M	CO5	L3
(b)	Find the fixed points of the transformation $w = \frac{2i - 6z}{iz - 3}$	5M	CO5	L2
(OR)				
11(a)	Obtain the bilinear transformation which maps the points $(-1, 0, 1)$ into the points $(0, i, 3i)$.	5M	CO5	L3
(b)	Find the image of the triangular region in z -plane bounded by the lines $x = 0, y = 0$ and $x + y = 1$ under the transformation $w = 2z$.	5M	CO5	L2

05 JUN 2026

H.T.No

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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)	List out the data models.	2M	CO1	L2
(b)	What are the drawbacks of DBMS?	2M	CO1	L2
(c)	Define entity with example.	2M	CO2	L2
(d)	What is inheritance with respect to super class & sub class?	2M	CO2	L2
(e)	Define View with example.	2M	CO3	L3
(f)	List out different SQL Functions.	2M	CO3	L3
(g)	What is multi valued dependency?	2M	CO4	L3
(h)	Define surrogate key.	2M	CO4	L3
(i)	What is Time stamp protocol?	2M	CO5	L2
(j)	Define Indexing.	2M	CO5	L2
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Compare Characteristics of Database vs File System.	5M	CO1	L2
(b)	Define the following terms with suitable examples. (i) Generalization (ii) Aggregation.	5M	CO1	L2
(OR)				
3(a)	Discuss data independence with neat diagram.	5M	CO1	L2
(b)	Describe the structure of Database with neat diagram.	5M	CO1	L2
4.	Illustrate various fundamental operations in the relational algebra and elaborate them with suitable examples.	10M	CO2	L3
(OR)				
5(a)	Draw the ER diagram of library management system.	5M	CO2	L3
(b)	Differences between Relational algebra and relational calculus.	5M	CO2	L3
6(a)	Discuss different types of database Languages.	5M	CO3	L3
(b)	Elaborate the following concepts (i) Nested Query (ii) Aggregation functions.	5M	CO3	L3
(OR)				
7(a)	Differentiate different types of joins with example.	5M	CO3	L3
(b)	What is View? elaborate with example.	5M	CO3	L3
8(a)	Demonstrate the 1NF and 2NF with example.	5M	CO4	L3
(b)	Demonstrate the Lossy and Lossless join	5M	CO4	L3
(OR)				
9.	Demonstrate the 3NF and BCNF with example.	10M	CO4	L3
10(a)	Discuss Two Phase Locking Techniques	5M	CO5	L2
(b)	Discuss about Hash based Indexing.	5M	CO5	L2
(OR)				
11(a)	Discuss Serializability and concurrent Executions.	5M	CO5	L2
(b)	Discuss the concept of ARIES Algorithm along with phases.	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)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Differentiate between troposphere and stratosphere.	2M	CO1	L1
(b)	Enlist different types of altitudes.	2M	CO1	L1
(c)	Draw a wing profile and mention its components.	2M	CO2	L1
(d)	Define lift, drag, pressure and moment coefficient.	2M	CO2	L1
(e)	Write thrust equation of jet engine and mention its components.	2M	CO3	L1
(f)	Draw the rocket engine schematic diagram.	2M	CO3	L1
(g)	List out applications of composites in aerospace sector.	2M	CO1	L1
(h)	State the applications of titanium in aerospace sector.	2M	CO1	L1
(i)	Enlist different kinds of re-entry.	2M	CO4	L1
(j)	Define polar orbit.	2M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Derive the expression of pressure and density in stratosphere.	5M	CO1	L3
(b)	At 12 km in the standard atmosphere, the pressure, density, and temperature are 1.9399×10^4 N/m ² , 3.1194×10^{-1} kg/m ³ , and 216.66K. Calculate the pressure, density, and temperature at an altitude of 17 km from the standard sea level.	5M	CO1	L3
(OR)				
3(a)	Discuss the role of Otto Lilienthal in aviation history.	5M	CO1	L2
(b)	Differentiate between primary and secondary control surface.	5M	CO1	L2
4.	A model wing of constant chord length is placed in a low-speed subsonic wind tunnel, spanning the test section. The wing has an NACA 2412 airfoil and a chord length of 1.3 m. The flow in the test section is at a velocity of 50 m/s at standard sea-level conditions. If the wing is at a 4° angle of attack, calculate (i) Lift Coefficient (ii) Lift Force (iii) Reynolds number.	10M	CO2	L3
(OR)				
5(a)	Differentiate between induced drag and form drag.	5M	CO2	L2
(b)	Contrast the lift curves for cambered and symmetrical airfoils using neat sketch.	5M	CO2	L2
6(a)	Discuss about the types of propellants used in rocket engines.	5M	CO3	L2
(b)	State the advantages and disadvantages of solid propellants over liquid propellant rocket engines.	5M	CO3	L2
(OR)				
7(a)	Derive the fundamental thrust equation for jet propulsion.	5M	CO3	L3
(b)	Explain the working of turboprop engine with schematic diagram.	5M	CO3	L2
8(a)	Differentiate between monocoque and semi-monocoque structures.	5M	CO1	L2
(b)	List out applications of stainless steel and titanium in aircraft.	5M	CO1	L2
(OR)				
9.	Illustrate the major structural stresses acting on the aircraft during flight.	10M	CO1	L2
10(a)	Discuss about geostationary, geosynchronous and lower earth orbit.	5M	CO4	L2
(b)	Paraphrase Reusable launch vehicle and its significance.	5M	CO4	L2
(OR)				
11.	Discuss various milestones of Chandrayaan mission by ISRO.	10M	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

Answered
5/6/26

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the fundamental difference between surveying and leveling?	2 M	CO1	L1
(b)	What is the principle of compass surveying?	2 M	CO1	L1
(c)	What is datum surface?	2 M	CO2	L1
(d)	What is the procedure of leveling by foot screws?	2 M	CO2	L1
(e)	What is the temporary adjustment of theodolite?	2 M	CO3	L1
(f)	What are the methods of traversing by theodolite?	2 M	CO3	L1
(g)	What are the different types of horizontal curves?	2 M	CO4	L1
(h)	What do you mean by drone and LiDAR survey?	2 M	CO4	L1
(i)	What do you mean by terrestrial photogrammetry?	2 M	CO5	L1
(j)	What do you mean by radial triangulation?	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	List different methods of making linear measurements? Explain the principle on which chain survey is based.	5M	CO1	L2
(b)	Define surveying and explain its importance in various fields. Highlight the key objectives of surveying.	5M	CO1	L2
(OR)				
3(a)	Define the term surveying and describe classifications of surveying based on purpose.	5M	CO1	L1
(b)	To measure a base line, a steel tape 30m long standardized at 35°C with a pull of 500N was used. Find the correction per tape length, if the temperature at the time of measurement was 20°C and the pull exerted was 160N. Weight of 1 cubic cm of steel is 0.0786N. Weight of the tape=8N, $E=2.1 \times 10^5 \text{ kg/sq.cm}$. Coefficient of expansion of the tape per 1°C = 7.1×10^{-7}	5M	CO1	L3
4(a)	Explain the concept of leveling in surveying. Differentiate between temporary and permanent adjustments in leveling, and why are they necessary in the field?	5M	CO2	L2
(b)	The following readings were successively taken with an instrument in levelling work: 0.3, 0.53, 0.62, 1.78, 1.91, 2.35, 1.71, 0.35, 0.69, 1.20 and 0.98m. The position of the instrument was changed after 3 rd , 7 th & 9 th readings. Draw out the form of a level book and enter the above readings properly. Assume the R.L of the 1 st point as 81.53m. Calculate R.L of the all points by rise and fall method and apply usual checks.	5M	CO2	L3
(OR)				
5(a)	Elaborate on the concept of refraction in leveling surveys. Why is refraction correction important, and how is it applied in the field?	5M	CO2	L2
(b)	The following offsets were taken at 10m intervals from a survey line to irregular boundary line 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65 m. Compute the area between the survey line and the irregular boundary line by Average- ordinate rule.	5M	CO2	L3

23CE01-SURVEYING

6(a)	Explain the process of trigonometric leveling when the base is inaccessible and provide examples of situations where this method is useful.	5M	CO3	L2																		
(b)	Compute the latitude, departure and closing error for the following traverse. Calculate the corrected values using Bowditch's rule. <table><tr><td>Line</td><td>Distance(m)</td><td>Whole Circle Bearing</td></tr><tr><td>AB</td><td>189.31</td><td>45°10'</td></tr><tr><td>BC</td><td>119.76</td><td>72°5'</td></tr><tr><td>CD</td><td>151.18</td><td>161°52'</td></tr><tr><td>DE</td><td>159.1</td><td>228°43'</td></tr><tr><td>EA</td><td>232.26</td><td>320°42'</td></tr></table>	Line	Distance(m)	Whole Circle Bearing	AB	189.31	45°10'	BC	119.76	72°5'	CD	151.18	161°52'	DE	159.1	228°43'	EA	232.26	320°42'	5M	CO3	L3
Line	Distance(m)	Whole Circle Bearing																				
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CD	151.18	161°52'																				
DE	159.1	228°43'																				
EA	232.26	320°42'																				
(OR)																						
7(a)	Describe the purpose of using total station in surveying. List out the surveying operations that can be performed using total station. Describe the advantages of total station.	5M	CO3	L2																		
(b)	Two roads meet at an angle of 227°30'. Calculate the necessary data for setting out a curve of 25 chains to connect two straight portions of the road if it is intended to set out the curve by chain and offsets only. Assume the length of chain as 20meters.	5M	CO3	L3																		
(OR)																						
8(a)	Define a simple curve and discuss the classification of curves.	5M	CO4	L2																		
(b)	Explain the advantages of global position system.	5M	CO4	L2																		
(OR)																						
9.	Determine the gradient from a point A and to a point B from the following observations made with a fixed hair tacheometer fitted with an anallatic lens, the constants of the instruments being 100. <table><tr><td>Station</td><td>Bearing</td><td>Reading of stadia hairs</td><td>Reading of axial hair</td><td>Vertical angle</td></tr><tr><td>To A</td><td>345°</td><td>0.750, 2.120</td><td>1.435</td><td>+15°</td></tr><tr><td>To B</td><td>75°</td><td>0.625, 3.050</td><td>1.835</td><td>+10°</td></tr></table>	Station	Bearing	Reading of stadia hairs	Reading of axial hair	Vertical angle	To A	345°	0.750, 2.120	1.435	+15°	To B	75°	0.625, 3.050	1.835	+10°	10M	CO4	L3			
Station	Bearing	Reading of stadia hairs	Reading of axial hair	Vertical angle																		
To A	345°	0.750, 2.120	1.435	+15°																		
To B	75°	0.625, 3.050	1.835	+10°																		
(OR)																						
10(a)	Define relief and tilt displacements in photogrammetry and discuss their significance in generating accurate 3D models from aerial imagery.	5M	CO5	L2																		
(b)	Explain the concept of map substitution and demonstrate how it can be applied to update an existing map with new aerial imagery.	5M	CO5	L2																		
(OR)																						
11(a)	Explain the critical factors and considerations in flight planning for aerial photogrammetry surveys, including the choice of flight altitude and overlap.	5M	CO5	L2																		
(b)	Provide an overview of the historical development of photogrammetry, highlighting key milestones and technological advancements.	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**23IT01-DIGITAL LOGIC & COMPUTER ORGANIZATION
(CSE&IT)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain about emitter coupled logic.	2M	CO1	L1
(b)	Explain about TTL logic family.	2M	CO1	L1
(c)	Define Implicant, Prime Implicant and Essential Prime Implicant.	2M	CO2	L2
(d)	What is multiplexer? Give the size of a multiplexer?	2M	CO2	L2
(e)	Explain about Instruction set architecture (ISA) design.	2M	CO3	L1
(f)	Explain about the data transfer instructions.	2M	CO3	L1
(g)	List the various types of semiconductor RAMs.	2M	CO4	L1
(h)	Define Random Access Memory and types of RAMs present.	2M	CO4	L1
(i)	Define virtual or logical address.	2M	CO5	L1
(j)	Discuss the multilevel hierarchy of storage devices.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Write the first 10 decimal digits in base 3 and base 16.	5M	CO1	L3
(b)	State and prove DE-Morgans and Consensus theorem.	5M	CO1	L2
(OR)				
3(a)	Explain and classify the weighted and unweighted codes.	5M	CO1	L3
(b)	Explain How the gray code is cyclic and reflective code.	5M	CO1	L2
4.	Realize the Boolean expression for half subtractor. Convert $A.B.C+A.D$ expression into standard SOP form.	10M	CO2	L3
(OR)				
5(a)	Implement a 64:1 MUX using 8:1 MUXs.	5M	CO2	L3
(b)	Convert $B(A+B)(B+C)$ expression into canonical POS.	5M	CO2	L2
6(a)	Discuss the principle operation of micro programmed control unit.	5M	CO3	L2
(b)	Describe registers selection circuit to select one of the four 4-bit registers content on to bus. Give fuller explanation.	5M	CO3	L3
(OR)				
7(a)	Define control memory unit and with a neat sketch explain the organization of a micro programmed control unit.	5M	CO3	L1
(b)	State the use of buffers? Explain about tri-state buffers. Explain about high impedance state.	5M	CO3	L2
8(a)	Explain DMA Controller with the block diagram.	5M	CO4	L2
(b)	Differentiate isolated I/O and memory mapped I/O.	5M	CO4	L3
(OR)				
9.	What is cache coherence and why is it important in shared memory Multiprocessor systems? How can the problem be solved with a snoopy cache controller?	10M	CO4	L3
10(a)	Discuss memory mapped I/O in computer organization.	5M	CO5	L3
(b)	Define the necessity and advantage of multiplexing the address and data bus.	5M	CO5	L2
(OR)				
11(a)	Define intra segment and inter segment program control transfer in computer organization.	5M	CO5	L1
(b)	Explain the performance consideration in pipeline format.	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**23AD02-ARTIFICIAL INTELLIGENCE
((CSE(AI&ML))**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Relate about Turing Test in the context of AI.	2 M	CO1	L1
(b)	List two major milestones in the history of AI.	2 M	CO1	L1
(c)	Define heuristic search.	2 M	CO2	L1
(d)	Define the term 'search strategy' in AI.	2 M	CO2	L1
(e)	What do you mean by uncertainty?	2 M	CO3	L1
(f)	Summarize about knowledge representation in AI.	2 M	CO3	L2
(g)	What is unification?	2 M	CO4	L1
(h)	Describe inductive learning.	2 M	CO4	L2
(i)	What is an expert system?	2 M	CO5	L1
(j)	What are the roles of an expert system?	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss categorization of intelligent systems.	5 M	CO1	L2
(b)	Discuss about the Foundations of AI.	5 M	CO1	L2
(OR)				
3(a)	Illustrate the role of learning agents in AI. How does a learning agent improve over time.	5 M	CO1	L4
(b)	Discuss the tic-tac-toe problem in detail and explain how it can be solved using AI techniques.	5 M	CO1	L2
4.	Illustrate the heuristic Hill climbing algorithm with an example.	10 M	CO2	L4
(OR)				
5(a)	Discuss the different components of a problem-solving agent and how they contribute to finding a solution.	5 M	CO2	L2
(b)	Explain the concept of problem reduction and how it is used in AI search. Provide an example.	5 M	CO2	L2
6(a)	Explain about Knowledge representation using Frames.	5 M	CO3	L2
(b)	Explain how Dempster-Shafer theory handles uncertainty and combines evidence from different sources.	5 M	CO3	L2
(OR)				
7(a)	Describe the Wumpus World problem and explain how it illustrates knowledge representation and logical reasoning.	5 M	CO3	L2
(b)	Represent the following knowledge using a semantic network [Dec/Jan-2022-23] Tom is a Cat, Tom caught a bird, Tom is owned by John, Tom is ginger in colour, Cats like cream, Cat is on the mat, A Cat is a Mammal, A Bird is an animal, All mammals are animals, Mammals have fur	5 M	CO3	L1
8(a)	Explain the syntax and semantics of propositional logic	5 M	CO4	L2
(b)	Consider the following sentences (i) John likes all kinds of Food (ii) Apple is Food (iii) Chicken is Food (iv) Anything anyone eats and is not killed by is Food (v) Bill eats Peanuts and is still Alive (vi) Sue eats Peanuts and is still Alive. (I) Translate the above sentences into Predicate Logic. (II) Convert the Above Formulas into Clause Form. (III) Using Resolution Prove that "John likes Peanuts".	5 M	CO4	L4
(OR)				
9	Explain first-order logic in detail. How does it differ from propositional logic in terms of expressiveness and applications?	10 M	CO4	L2
10(a)	Describe the concept of expert systems. How do they mimic human expertise in specific domains?	5 M	CO5	L2
(b)	List the characteristics of expert systems. Classify various Expert System shells and tools	5 M	CO5	L1
(OR)				
11(a)	Explain about MYCIN Expert system in detail.	5 M	CO5	L2
(b)	How is an expert system different from a traditional program?	5 M	CO5	L1

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)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the even parts of unit step signal $u(t)$?	2M	CO1	L2
(b)	What is Gibb's phenomena.	2M	CO2	L2
(c)	How to represent the coefficient C_n in terms of b_n and a_n ?	2M	CO4	L1
(d)	Find the Fourier transform of $x(t) = e^{-2 t }$	2M	CO4	L2
(e)	What is the relation between impulse response $h(t)$ and step response $s(t)$ of a LTI system?	2M	CO3	L1
(f)	List the four operations included in convolution operation.	2M	CO2	L1
(g)	What is aliasing effect?	2M	CO2	L1
(h)	What is the minimum sampling frequency required for the sampling process with no distortion? Given analog signal $x(t) = \cos(100\pi t) + 6\sin(180\pi t)$.	2M	CO1	L2
(i)	At what condition, the Laplace and Fourier Transforms are same?	2M	CO4	L1
(j)	Comment on the statement "z-plane is a circle".	2M	CO4	L2
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	What is a singularity signal? Discuss about impulse, step and signum signals with suitable graphical and mathematical representations.	5M	CO1	L2
(b)	Draw the graphical form of $x(t)$, $x(2t)$, $x(t/2)$, and $y(t) = x(t) + x(2t) + x(t/2)$, where $x(t) = u(t+2) - u(t-2)$.	5M	CO1	L3
(OR)				
3(a)	What is the orthogonality in complex signals? Explain.	5M	CO2	L2
(b)	Examine the complex signals $x(t) = e^{j\omega_0 t}$ and $g(t) = e^{-j\omega_0 t}$ for orthogonality over the interval $(0, 2\pi)$ for integer values of m and n , $m \neq n$.	5M	CO2	L3
(OR)				
4(a)	Discuss about complex Fourier Spectrum.	5M	CO4	L2
(b)	Determine the coefficient of exponential Fourier Series C_n for a periodic signal $x(t) = t$ over the range $0 < t < 1$ with a fundamental time period of $T = 1$, hence obtain the summation, $\sum_{n=1}^{\infty} \frac{1}{n^2}$.	5M	CO4	L4
(OR)				
5(a)	Discuss about Hilbert Transformation.	5M	CO4	L2
(b)	Find the Fourier Transform of a signal $x(t) = \text{Sgn}(t) = \begin{cases} Lt & a \rightarrow 0 \\ e^{-a t } \text{Sgn}(t), & a > 0. \end{cases}$	5M	CO4	L3
(OR)				
6(a)	When the signal transmission is said to be distortion-less? Explain its characteristics.	5M	CO3	L2
(b)	Test the continuous time system, $y(t) = 2x(t) + 3$ for linearity.	5M	CO3	L4
(OR)				
7(a)	What are the filter characteristics of linear systems? Discuss ideal and practical characteristics of LPF, HPF, BPF and BSF.	5M	CO3	L2
(b)	Draw a simple RC high pass filter circuit and determine, Transfer Function, Magnitude Response, Phase Response, and Impulse Response.	5M	CO3	L3
(OR)				
8(a)	Discuss about ESD and PSD.	5M	CO3	L2
(b)	Evaluate the Auto Correlation Function, $R_{xx}(\tau)$ and the Energy Spectral Density $\psi_{xx}(\omega)$ of aperiodic signal, $x(t) = 3e^{-2t}u(t)$.	5M	CO3	L3
(OR)				
9(a)	How to detect Periodic Signal in the presence of Noise by Correlation? Discuss.	5M	CO3	L3
(b)	Evaluate the output of a low pass filter, when the input message signal $m(t) = \cos(2\pi f_m t)$ with $f_m = 50\text{Hz}$ is sampled at sampling frequency $f_s = 40\text{Hz}$ is transmitted through low pass filter with cutoff frequency $f_c = 20\text{Hz}$.	5M	CO1	L4
(OR)				
10(a)	Discuss about bilateral and unilateral Laplace Transforms with relevant mathematical representations.	5M	CO4	L2
(b)	Determine the Laplace Transform and indicate poles, zeroes and ROC in s-plane of a signal, $x(t) = e^{-t}u(t) + e^{-3t}u(t)$	5M	CO4	L3
(OR)				
11(a)	What is ROC in z-domain? Discuss any FOUR properties of ROC.	5M	CO4	L2
(b)	Apply properties of Z-Transform and Evaluate the z-domain of $x(n) = n^n u(n)$.	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-ELECTRO MAGNETIC FIELD THEORY

(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Obtain the unit vector in the direction from the origin to the point P(3,-3,2).	2M	CO1	L3
(b)	Define absolute potential.	2M	CO1	L1
(c)	State the point form of Ohm's law.	2M	CO2	L2
(d)	Define dielectric strength.	2M	CO2	L1
(e)	State Biot –Savart's law.	2M	CO3	L1
(f)	Define magnetic dipole.	2M	CO3	L1
(g)	Write an expression for energy stored in an inductor.	2M	CO4	L2
(h)	Define mutual inductance.	2M	CO4	L1
(i)	State Faraday's law of electromagnetic induction.	2M	CO5	L1
(j)	Write down Maxwell's equation for time-varying fields derived from Ampere's law.	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Illustrate the spherical coordinate system with coordinates (r, θ , ϕ).	5M	CO1	L2
(b)	Find the Force and electric field at a point P(0,0,3) due to a point charge Q ₁ of 0.95 μ C placed at (0,2,0) and Q ₂ of -0.54 μ C placed at (8,0,0).	5M	CO1	L3
(OR)				
3(a)	Determine the field at a distance 'r' from an infinite line charge of strength of $+p_L$ C/m using Gauss's Law.	5M	CO1	L2
(b)	Obtain the Poisson's and Laplace's equation.	5M	CO1	L2
4(a)	Illustrate the behaviour of conductors in an electric field.	5M	CO2	L2
(b)	Derive the boundary conditions of the normal and tangential components of electric field at the interface of two media with different dielectrics.	5M	CO2	L3
(OR)				
5(a)	Obtain the expression of torque experienced by a dipole in a uniform field.	5M	CO2	L2
(b)	A parallel capacitor has an area of 0.4 m ² , separation of 0.2mm with a dielectric for which $\epsilon_r = 900$ and a field of 110 V/m. Calculate C and V.	5M	CO2	L3
6(a)	Derive the point form and integral form of Ampere's circuital law.	5M	CO3	L2
(b)	Find the expression for B at a point P along the axis of solenoid current carrying wire.	5M	CO3	L2
(OR)				
7(a)	Derive the Lorentz force equation.	5M	CO3	L2
(b)	Planes z =0 and z =4 carry current K= -10 a _x A/m and K= 10 a _x A/m, respectively. Determine H at (1, 1, 1).	5M	CO3	L3
8(a)	Derive an expression for self-inductance of a solenoid with a neat sketch.	5M	CO4	L2
(b)	Determine the inductance of solenoid has a 10cm length, 1000 turns and cross sectional radius of 1cm. Assume the relative permeability is 1500.	5M	CO4	L3
(OR)				
9(a)	Illustrate about the self inductance and mutual inductance.	5M	CO4	L1
(b)	Derive the mutual inductance between a straight long wire and a square loop wire in the same plane.	5M	CO4	L2
10(a)	Derive the transformer EMF equation for stationary loop in time-varying B field.	5M	CO5	L2
(b)	Deduce the detailed mathematical modeling of displacement current and justify the following equation: $\nabla \times H = J + \frac{\partial D}{\partial t}$	5M	CO5	L2
(OR)				
11.	Interpret the significance of "Poynting Vector" and Obtain expression for net power flowing from out of volume using "Poynting Theorem" with a neat diagram.	10M	CO5	L2

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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)	Define path function and point function.	2M	CO1	L1
(b)	Write a short note on reversible and irreversible process.	2M	CO1	L1
(c)	List out the limitations of first law of thermodynamics.	2M	CO2	L1
(d)	Illustrate different forms of energy.	2M	CO2	L2
(e)	Define Kelvin –Planck and Clausius statements.	2M	CO3	L2
(f)	What are the causes of entropy increase?	2M	CO3	L1
(g)	Write short notes on the "Mollier diagram". Why do isobars on the Mollier diagram diverge from one another?	2M	CO4	L1
(h)	Explain Avogadro's law.	2M	CO4	L2
(i)	Why is the COP of a gas cycle refrigeration system low?	2M	CO5	L2
(j)	Why is Carnot cycle not practicable for a steam power plant?	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the types of thermodynamic systems with neat sketches.	5M	CO1	L2
(b)	A mass of gas is compressed in a quasi-static process from 70 kPa, 0.25 m ³ to 0.45 MPa, 0.05 m ³ . Assuming that the pressure and volume are related by $p v^n = \text{constant}$. Find work done by the gas system.	5M	CO1	L3
(OR)				
3(a)	List out the advantages of gas thermometer over liquid thermometers.	5M	CO2	L2
(b)	Explain the following terms briefly: (i) Thermodynamic equilibrium (ii) Macroscopic approach, (iii) Microscopic approach, and (iv) Concept of Continuum.	5M	CO2	L2
4(a)	325 kJ of heat is supplied to a system at constant volume. The system rejects 365 kJ of heat at constant pressure and 100 kJ of work is done on it. The system is brought to its initial state by an adiabatic work. Calculate all values of internal energy at all end states if initial value is 400 J.	5M	CO2	L3
(b)	Define thermodynamic work. Write similarities & dissimilarities between Heat and Work.	5M	CO2	L2
(OR)				
5(a)	Derive the expression for work done in isothermal process.	5M	CO2	L4
(b)	An adiabatic diffuser is employed to reduce the velocity of stream of air from 238 m/s to 50.4 m/s. The inlet pressure is 1.02 bar and the inlet temperature is 394°C. Determine the final pressure and the required outlet area if the mass flow rate is 6.84 kg/s.	5M	CO2	L3
6(a)	Derive Maxwell Equations.	5M	CO3	L4
(b)	A reversible heat engine operates between two reservoirs at temperature of 600°C and 40°C. The engine drives a reversible refrigerator which operates between reservoirs at temperature of 40°C and -20°C. The heat transfer to the heat engine is 2000 kJ and the network output of the combined engine refrigerator plant is 360kJ. Evaluate the heat transfer to the refrigerant and the net heat transfer to the reservoir at 40°C.	5M	CO3	L3
(OR)				

7(a)	Show that the efficiency of a reversible engine operating between the two given constant temperatures is maximum.	5M	CO3	L2
(b)	2 kg of water at 80°C is mixed adiabatically with 3 kg of water at 30°C in a constant pressure process of 1 atmosphere. Find the increase in entropy at the total mass of water due to the mixing process. Take specific heat (C_p) of water has 4.187 kJ/kg-K.	5M	CO3	L3
8(a)	Explain the P - T diagram of a pure substance.	5M	CO4	L2
(b)	A gaseous mixture consists of 1 kg of oxygen and 2 kg of nitrogen at a pressure of 150 kPa and a temperature of 20°C. Determine the changes in internal energy, enthalpy and entropy of the mixture when the mixture is heated to a temperature of 100°C (i) at constant volume, and (ii) at constant pressure.	5M	CO4	L3
(OR)				
9(a)	Show that for an ideal gas, $C_p - C_v = R$. Where, C_p is specific heat at constant pressure and C_v is specific heat at constant volume.	5M	CO4	L2
(b)	A mass of wet steam at temperature 165°C is expanded at constant quality 0.8 to pressure 3 bar. It is then heated at constant pressure to a degree of superheat 65°C. Find the enthalpy and entropy changes during expansion and heating. Draw the T - s and h - s diagrams.	5M	CO4	L3
10(a)	Draw and explain the different processes of Carnot cycle on a T - s , p - v and h - s diagram.	5M	CO5	L2
(b)	In a simple Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 25 bar and the exhaust pressure is 0.3 bar. Determine, (i) The pump work (ii) Turbine work (iii) Rankine efficiency (iv) Condenser heat flow (v) Dryness fraction of expansion. Assume flow rate of 10 kg/s.	5M	CO5	L3
(OR)				
11(a)	Draw and explain the different processes of Bell-Coleman cycle on a T - s and p - v diagram.	5M	CO5	L2
(b)	In an engine working on a diesel cycle inlet pressure and temperature are 1 bar and 17 °C respectively. The pressure at the end of adiabatic compression is 35 bar. The ratio of expansion after constant pressure heat addition is 5. Calculate the heat addition, heat rejection, and efficiency of the cycle.	5M	CO5	L3

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B.Tech. (III Semester) Regular/Supplementary Examinations**23CS04-ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS****(AI&DS,CSE,CSE(AI&ML) and IT)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the purpose of maintaining the B-tree balanced?	2M	CO1	L1
(b)	What is the balance factor of a node in an AVL tree?	2M	CO1	L1
(c)	Define (i) Complete graph (ii) degree of the node.	2M	CO2	L1
(d)	What is the Time complexity of merge sort?	2M	CO3	L1
(e)	List the applications of greedy method.	2M	CO3	L1
(f)	What is minimum spanning tree?	2M	CO3	L1
(g)	Explain the general method of Dynamic programming.	2M	CO3	L2
(h)	State single source shortest path algorithm.	2M	CO3	L2
(i)	Define Satisfiability.	2M	CO5	L1
(j)	Give the statement of Sum of subsets problem.	2M	CO4	L2

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Define Time and Space Complexity, and calculate the time space complexity for addition of two matrices.	5M	CO1	L1
(b)	What is a B-Tree? Describe the construction of a B-Tree for the following elements 5, 2,16,9,23,7,3,5,1,12.	5M	CO1	L1

(OR)

3(a)	What are the features of an efficient algorithm? Explain with an example.	5M	CO1	L1
(b)	What do you mean by a balance factor in AVL tree and explain about LL & RR rotations with an example.	5M	CO1	L2

4.	Derive the Best, Worst and Average time complexities of Quick sorting technique. Show the result of running Quick sorting technique on the sequence 38,27,43,3,9,65,12,82, 10,56.	10M	CO3	L4
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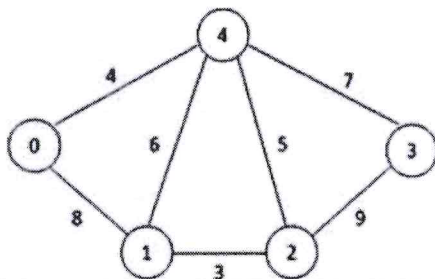
(OR)

5(a)	Write a short notes on connected components with an example graph.	5M	CO2	L1
(b)	Explain DFS Algorithm with an example.	5M	CO2	L1

6(a)	Write an algorithm for prim's method and find the minimum cost spanning tree for the following graph. 	5M	CO3	L1
(b)	What is the need of greedy method, explain with an example?	5M	CO3	L1

(OR)

23CS04-ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS

7(a)	Explain the process of encoding and decoding using Huffman Coding. How does the receiver decode the compressed message back into its original form?	5M	CO3	L1
(b)	Apply the greedy method to solve Knapsack problem for given instance Where $n=3$, $m=20$, $(p_1,p_2,p_3)=(25,24,15)$, and weight $(w_1,w_2,w_3)=(18,15,10)$.	5M	CO3	L3
8.	Use the function OBST to compute $w(i,j)$, $r(i,j)$, and $c(i,j)$, $0 \leq i < j \leq 4$, for the identifier set $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$ with $p(1 : 4) = (3, 3, 1, 1)$ and $q(0:4)=(2,3,1,1,1)$. Using the $r(i,j)$'s construct the optimal binary search tree.	10M	CO3	L3
(OR)				
9(a)	Calculate shortest distances using all pairs shortest path using Dynamics programming 	5M	CO3	L3
(b)	Discuss the time and space complexity of Dynamic Programming Traveling Sales Person algorithm.	5M	CO3	L4
10(a)	Use Backtracking technique, solve the following instance for the Subset sum problem, $s=(6,5,3,7)$ and $d=15$.	5M	CO4	L3
(b)	Write an algorithm for N-Queens problem.	5M	CO4	L1
(OR)				
11(a)	Explain the basic principle of Backtracking and list the applications of backtracking.	5M	CO4	L2
(b)	Explain the classes of NP and NP-Complete giving example problem for each.	5M	CO5	L2

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

23AE02-ENGINEERING FLUID MECHANICS

(ASE)

Time : 3 hours

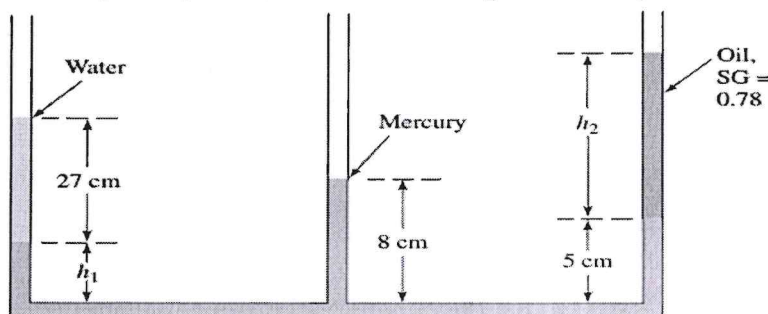
Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Mention the effect of increase in temperature on dynamic viscosity of water and air, at room temperature.	2M	CO1	L2
(b)	A pressure gauge reads air pressure in an automobile tire as 32 psi. The atmospheric pressure is 14.7 psi. Calculate the absolute pressure in the tire.	2M	CO1	L2
(c)	Flow field is described by $V = x^2y \mathbf{i} - xy^2 \mathbf{j}$, Is this flow irrotational?	2M	CO2	L2
(d)	What is the necessary condition for velocity potential of a two-dimensional flow field.	2M	CO2	L2
(e)	Define Mach number.	2M	CO3	L2
(f)	If there are 'm' physical quantities and 'n' fundamental dimensions in a particular process, the number of non-dimensional parameters is.	2M	CO3	L2
(g)	Give an example for impulse type hydraulic turbine	2M	CO4	L2
(h)	What is the purpose of notch in Pelton wheel bucket?	2M	CO4	L2
(i)	Define hydraulic efficiency of centrifugal pump.	2M	CO4	L2
(j)	What is the meaning of double acting reciprocating pump?	2M	CO4	L2

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)	Prove the statement "Pressure acting at point in a static fluid is same in all directions."	5M	CO1	L3

(OR)

3.	For the three-liquid system as shown in figure. Compute h_1 and h_2 .	10M	CO1	L3
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4	Derive the expression for conservation of mass in rectangular coordinates.	10M	CO2	L3
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(OR)

5(a)	For the velocity components in a fluid flow given by $u = 2xy$, $v = a^2 + x^2 - y^2$. Show that the flow is possible. Obtain the relevant stream function.	5M	CO2	L3
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23AE02-ENGINEERING FLUID MECHANICS

(b)	Enlist the various applications of Bernoulli's Principle.	5M	CO2	L2
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 1.8×10^{-5} kg/m-s and (ii) water flow with viscosity 0.001 kg/m-s.	5M	CO3	L3
(b)	For a steady laminar flow in a horizontal circular pipe derive expression for velocity at any radial distance from the axis.	5M	CO3	L3
(OR)				
7(a)	Derive the relation between friction factor 'f' and Reynolds number 'Re' for laminar flow thorough pipe.	5M	CO3	L3
(b)	Distinguish between (i) viscous and non-viscous flow (ii) laminar and turbulent flow.	5M	CO3	L2
8(a)	A Pelton turbine has peripheral speed of the bucket 'u', absolute velocity of the jet V_1 , blade outlet angle ϕ and blade velocity coefficient 'K'. Determine the condition for maximum hydraulic efficiency (η_h).	5M	CO4	L3
(b)	Draw the inlet and outlet velocity triangles of Francis turbine. Consider the discharge at outlet is radial.	5M	CO4	L3
(OR)				
9.	Show that the Draft Tube decreases the pressure at the exit of reaction turbine less than the atmospheric pressure.	10M	CO4	L3
10(a)	Derive the expression for Discharge and Power input to single acting reciprocating pump.	5M	CO4	L3
(b)	Compare and comment on the effect of backward curved vane, forward curved vane and radial vane on the operation of centrifugal pump impeller. Explain the comparisons by drawing the velocity triangles.	5M	CO4	L2
(OR)				
11(a)	A centrifugal pump is running at 1000rpm. The outlet vane angle of impeller is 45° and velocity of flow at outlet is 2.5 m/s, when the pump is working against a total head of 20m. If the manometric efficiency of the pump is 80%, determine diameter of impeller at the outlet.	5M	CO4	L3
(b)	A 5kW electric motor is used for pumping water from a well with a depth of 30 m. Find the overall efficiency of the centrifugal pump, if discharge from the pump is 1.25 litre/s.	5M	CO4	L3

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

Original
6/6/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define different types of stresses.	2M	CO1	L1
(b)	Explain the concept of strain.	2M	CO1	L1
(c)	What is the factor of safety?	2M	CO2	L2
(d)	Describe elastic constants briefly.	2M	CO2	L2
(e)	Define beam and its types.	2M	CO3	L1
(f)	Explain section modulus for rectangular sections.	2M	CO3	L1
(g)	Describe the Macaulay's method for deflection.	2M	CO4	L1
(h)	What is meant by Euler's critical load?	2M	CO4	L1
(i)	State the formula for hoop stress.	2M	CO5	L1
(j)	Describe Lamé's formula for thick cylinders.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the relationship between stress and strain.	5M	CO1	L3
(b)	A composite bar is subjected to a load of 20 kN. Calculate the stress if the bar sections vary in area.	5M	CO1	L2
(OR)				
3(a)	Explain stresses in bars of varying section.	5M	CO2	L3
(b)	Describe the importance of composite bars.	5M	CO2	L2
4.	Draw and explain shear force and bending moment diagrams for a simply supported beam under a uniformly distributed loads.	10M	CO3	L3
(OR)				
5(a)	Explain the effect of point loads on S.F. and B.M. in beams.	5M	CO3	L2
(b)	A simply supported beam of length $L=6$ meters carries a uniformly distributed load of $w=3$ kN/m over its entire length. Calculate the maximum bending moment in the beam.	5M	CO3	L2
6(a)	Derive the equation for flexural stress in beams.	5M	CO3	L3
(b)	Calculate the section modulus for a circular hollow section with an outer diameter $D=100$ mm and an inner diameter $d=80$ mm.	5M	CO3	L2
(OR)				
7(a)	Explain shear stress distribution across circular sections.	5M	CO3	L3
(b)	A solid circular steel shaft of diameter $D=50$ mm and length $L=1.5$ m is subjected to a torque of $T=500$ Nm. If the shear modulus GGG of the steel material is 80 GPa, calculate the following: (i) The maximum shear stress in the shaft. (ii) The angle of twist over the shaft's length.	5M	CO3	L2
8(a)	State and explain Mohr's theorems for deflection.	5M	CO4	L2
(b)	A simply supported beam of length $L=6$ m carries a uniformly distributed load (UDL) of $=10$ kN/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 $E=200$ GPa and the moment of inertia $I=50 \times 10^6$ mm ⁴ .	5M	CO4	L3
(OR)				
9.	A simply supported beam AB of length = 12 m is subjected to the following loads: (i) A point load of 24 kN at 4m from the left end A. (ii) A uniformly distributed load (UDL) of 10 kN/m over a 7m span starting from $x=5$ m to $x=12$ m. Calculate the deflection at a point $x=8$ m from the left end using Macaulay's method.	10M	CO4	L3
10(a)	Derive Euler's formula for critical load on columns.	5M	CO5	L3
(b)	Discuss the limitations of Euler's theory.	5M	CO5	L2
(OR)				
11(a)	Explain the Rankine-Gordon formula for columns.	5M	CO5	L2
(b)	Derive expressions for circumferential and longitudinal stresses in thin cylinders.	5M	CO5	L3

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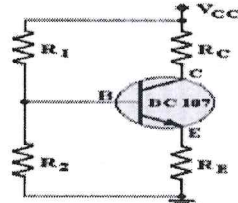
B.Tech. (III Semester) Regular/Supplementary Examinations

23EC03-ELECTRONIC DEVICES AND CIRCUITS

(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Name different types of Extrinsic semiconductors.	2M	CO1	L1
(b)	Recall the Energy band diagram of conductor, semiconductor and Insulator.	2M	CO1	L1
(c)	Define ripple factor in Rectifiers.	2M	CO3	L1
(d)	Show the output waveform of a negative clipper for sine wave input.	2M	CO3	L1
(e)	Define Stability factor S , S' .	2M	CO2	L1
(f)	Show the output Characteristics of a Common Base configuration.	2M	CO2	L1
(g)	Show the two port network with parameters.	2M	CO4	L1
(h)	Recall the h-parameter expressions for A_I , A_v in CE amplifier.	2M	CO4	L1
(i)	Define amplification factor μ , trans conductance g_m .	2M	CO3	L1
(j)	Identify the symbols of N-channel JFET, NMOSFET.	2M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Summarize the V-I characteristics of PN junction diode and define various resistances offered by the diode.	5M	CO2	L2
(b)	Describe the operation and characteristics of Silicon Control Rectifier.	5M	CO2	L2
(OR)				
3(a)	Illustrate the characteristics of UJT and Intrinsic standoff ratio η .	5M	CO1	L3
(b)	For the circuit shown below find the maximum and minimum values of Zener diode currents.	5M	CO2	L4
				
4.	Differentiate Half wave and full wave rectifiers with all parameters.	10M	CO3	L3
(OR)				
5(a)	For the negative series clipper shown in Figure. Draw the peak output voltage from the circuit.	5M	CO3	L4
				
(b)	Discuss about two independent level clipper circuit,	5M	CO3	L3
6(a)	Summarize the operation of transistor using Common Emitter configuration with its input and output characteristics	5M	CO4	L3
(b)	Discuss about relation between α , β and γ in Transistor.	5M	CO1	L2
(OR)				
7(a)	Design a voltage divider bias circuit shown in figure with $I_{CQ}=1\text{mA}$, $V_{CEQ}=6.0\text{V}$, $V_{CC}=12.0\text{V}$, $R_C=4.7\text{K}$, $S=10$, $V_{BE}=0.65\text{V}$, $h_{FE}=300$.	5M	CO2	L4
				
(b)	Discuss about the diode compensation technique for V_{BE} to have good stability of operation of BJT	5M	CO3	L2
8(a)	Discuss about DC load line and operating point.	5M	CO2	L2
(b)	Determine the expression for Stability factor 'S' for collector to base biasing circuit.	5M	CO2	L2
(OR)				
9.	Illustrate the diode bias compensation circuits against variations in V_{BE} , I_C used in transistor bias stabilization.	10M	CO2	L3
10(a)	Interpret the small signal model of MOS FET and parameters.	5M	CO3	L3
(b)	Discuss about the working and characteristics of JFET.	5M	CO3	L3
(OR)				
11(a)	Determine the V-I relation of a MOSFET at Non-saturation and Saturation regions.	5M	CO4	L3
(b)	Illustrate CMOS construction and characteristics.	5M	CO4	L3

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

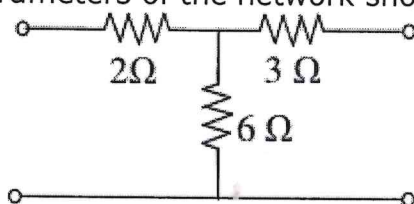
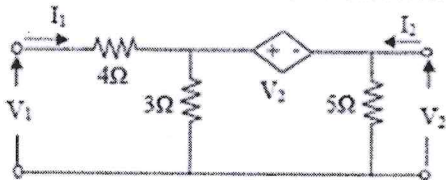
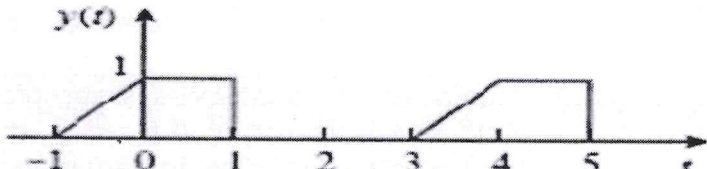
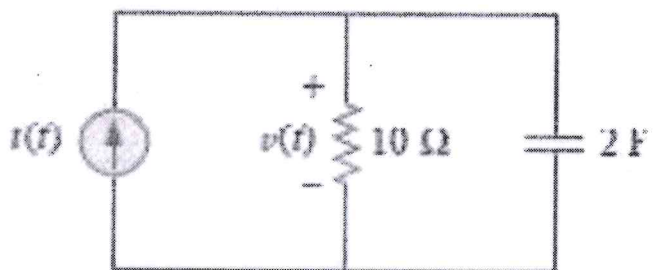
23EE04-ELECTRICAL CIRCUIT ANALYSIS-II
(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are the reasons for unbalance of phases in a 3-phase system?	2M	CO1	L1
(b)	A balanced star connected load of $(8-j4)$ ohms per phase is connected to a 3-phase, 400 V, 50 Hz supply. Find line current, power factor and active power.	2M	CO1	L1
(c)	What is the difference between steady state and transient response?	2M	CO2	L2
(d)	Find the Laplace Transform of the function: $f(t) = 8t^3 + 2t^2 - 6t + 1$.	2M	CO2	L2
(e)	Give the expressions for symmetry and reciprocity in case of Z-parameters.	2M	CO3	L1
(f)	What are the applications of hybrid parameters and ABCD parameters?	2M	CO3	L1
(g)	Define Port and Two-port network.	2M	CO4	L1
(h)	Express Z-parameters in terms of ABCD parameters.	2M	CO4	L2
(i)	What is the function of a band elimination filter?	2M	CO5	L1
(j)	List out the disadvantages of constant - k filters.	2M	CO5	L2
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Draw phasor diagram of currents for a balanced delta-connected supply system and establish relation between line currents and phase currents.	5M	CO1	L3
(b)	A balanced delta-connected three-phase load absorbs a complex power of 100 kVA with a lagging power factor of 0.8 when the r.m.s line to line voltage is 2400 V. Calculate the impedance of each arm of the delta-connected load.	5M	CO1	L2
(OR)				
3(a)	Show that in two-wattmeter method, the sum of the meter readings equals total power dissipated in the load, whether the load is balanced or unbalanced, star - connected or delta - connected.	5M	CO1	L3
(b)	Derive the relationship between the line and phase voltages, currents in a star connected balanced circuit.	5M	CO1	L2
(OR)				
4.	A sinusoidal voltage $V(t) = V_m \sin(\omega t + \theta)$ is applied to a R-L circuit at time $t = 0$. Find the complete solution for the current in the circuit using Laplace transform method and differential equations.	10M	CO2	L2
(OR)				
5(a)	Determine the transient and steady state currents through a series R-C circuit when it is connected to a sinusoidal voltage source.	5M	CO2	L3
(b)	In a series RLC circuit $L=0.3$ H, and $C=4$ F. A DC voltage of 50 V is applied at $t=0$. Obtain an expression for current $i(t)$ in the circuit, when (i) $R=5\ \Omega$ (ii) $R=6\ \Omega$.	5M	CO2	L3

23EE04-ELECTRICAL CIRCUIT ANALYSIS-II

6(a)	Express hybrid parameters as a function of transmission parameters.	5M	CO3	L2
(b)	Find the hybrid parameters of the network shown in Figure. 	5M	CO3	L2
(OR)				
7.	Find Y and Z parameters of the network shown. 	10M	CO3	L3
8(a)	State and explain the properties of Fourier transform.	5M	CO4	L2
(b)	A series RL circuit in which $R = 5 \Omega$ and $L = 20 \text{ mH}$ has an applied voltage $v = 100 + 50 \sin \omega t + 25 \sin 3\omega t$ (V), with $\omega = 500 \text{ rad/s}$. Find the current and the average power.	5M	CO4	L3
(OR)				
9(a)	Obtain the exponential Fourier series for the signal shown in figure. 	5M	CO4	L2
(b)	Determine the average power supplied to the circuit if $i(t) = 2 + 10\cos(t + 100) + 6\cos(3t + 350)$ A. 	5M	CO4	L3
10.	Derive the equations to find the inductances and capacitances of a constant K high pass filter.	10M	CO4	L4
(OR)				
11(a)	Explain low pass filters.	5M	CO4	L2
(b)	Discuss the design considerations of K type-low pass filters.	5M	CO4	L3

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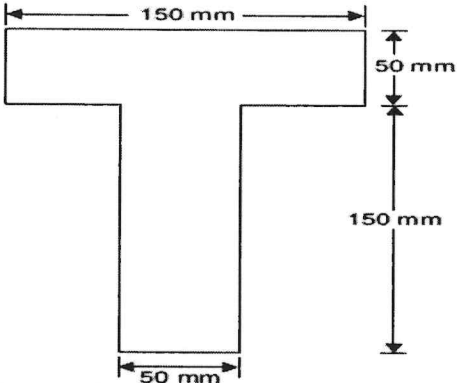
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B.Tech. (III Semester) Regular/Supplementary Examinations**23ME04-MECHANICS OF SOLIDS
(ME)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define the term Poisson's ratio.	2M	CO1	L1
(b)	Define resilience and proof resilience.	2M	CO1	L1
(c)	What are the different types of beams?	2M	CO2	L1
(d)	Draw the S.F. and B.M. diagrams for a cantilever of length L carrying a point load W at the free end.	2M	CO2	L2
(e)	What do you mean by 'simple bending' or 'pure bending'?	2M	CO3	L1
(f)	Define the term 'Polar modulus'.	2M	CO3	L1
(g)	What do you mean by shear stresses in beams?	2M	CO4	L1
(h)	Write the deflection curve equation.	2M	CO4	L1
(i)	Differentiate between a thin cylinder and a thick cylinder.	2M	CO5	L1
(j)	Write the Lamé's equations for thick cylinder.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Determine the value of Young's modulus and Poisson's ratio of a metallic bar of length 25 cm, breadth 3 cm and depth 2 cm when the bar is subjected to an axial compressive load of 240 kN. The decrease in length is given as 0.05 cm and increase in breadth is 0.002.	5M	CO1	L3
(b)	A steel rod 5 cm diameter and 6 m long is connected to two grips and the rod is maintained at a temperature of 100°C. Determine the stress and pull exerted when the temperature falls to 20°C if (i) the ends do not yield, and (ii) the ends yield by 0.15 cm. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\alpha = 12 \times 10^{-6}/^\circ\text{C}$.	5M	CO1	L3
(OR)				
3(a)	The principal stresses at a point in a bar are 160 N/mm^2 (tensile) and 80 N/mm^2 (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 60° to the axis of the major principal stress. Also determine the maximum intensity of shear stress in the material at the point.	5M	CO1	L3
(b)	A rod 12.5 mm in diameter is stretched 3.2 mm under a steady load of 10 kN. What stress would be produced in the bar by a weight of 700 N, falling through 75 mm before commencing to stretch, the rod being initially unstressed? The value of E may be taken as $2.1 \times 10^5 \text{ N/mm}^2$.	5M	CO1	L3
4.	A beam of length 6 m is simply supported at the ends and carries a uniformly distributed load of 1.5 kN/m run and three concentrated loads of 1 kN, 2 kN and 3 kN acting at a distance of 1.5 m, 3 m and 4.5 m respectively from left end. Draw the S.F. and B.M. diagrams and determine the maximum bending moment.	10M	CO2	L3
(OR)				
5.	A simply supported beam of length 8 m rests on supports 5 m apart, the right hand end is overhanging by 2 m and the left hand end is overhanging by 1 m. The beam carries a uniformly distributed load of 5 kN/m over the entire length. It also carries two point loads of 4 kN and 6 kN at each end of the beam. The load of 4 kN is at the extreme left of the beams, Whereas the load of 6 kN is at the extreme right of the beam? Draw S.F. and B.M. diagrams for the beam and find the points of contraflexure.	10M	CO2	L3

6(a)	A cast iron cantilever of length 1.5 metre fails when a point load W is applied at the free end. If the section of the beam is $40\text{mm} \times 60\text{mm}$ and the stress at the failure is 120 N/mm^2 , find the point load applied.	5M	CO3	L3
(b)	A hollow shaft, having an internal diameter 50% of its external diameter transmits 600 kW at 150 r.p.m. Determine the external diameter of the shaft if the shear stress is not to exceed 65 N/mm^2 and the twist in a length of 3 m should not exceed 1.4 degrees. Assume maximum torque = 1.20 mean torque and modulus of rigidity = $1 \times 10^5 \text{ N/mm}^2$.	5M	CO3	L3
(OR)				
7(a)	A beam is of T-section as shown in Fig. The beam is simply supported over a span of 4 m and carries a uniformly distributed load of 1.7kN/m run over the entire span. Determine the maximum tensile and maximum compressive stress. 	5M	CO3	L3
(b)	A solid circular shaft is to transmit 375 kW at 150 r.p.m. Find the diameter of the shaft if the shear stress is not to exceed 65 N/mm^2 .	5M	CO3	L3
8.	A beam of I-section is having overall depth as 500 mm and overall width as 190 mm. The thickness of flanges is 25 mm whereas the thickness of the web is 15 mm. The moment of inertia about N.A. is given as $6.45 \times 10^8 \text{ mm}^4$. If the section carries a shear force of 40 kN, calculate the maximum shear stress. Also sketch the shear stress distribution across the section.	10M	CO4	L3
(OR)				
9.	Find the expression for the slope and deflection of a cantilever of length L which carries a uniformly distributed load over a length 'a' from the fixed end by (i) Double integration method and (ii) Moment area method.	10M	CO4	L3
10.	A compound cylinder is made by shrinking a cylinder of external diameter 200 mm and internal diameter 160 mm over another cylinder of external diameter 160 mm and internal diameter 120 mm. The radial pressure at the junction after shrinking is 8 N/mm^2 . Find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 60 N/mm^2 .	10M	CO5	L3
(OR)				
11.	A solid round bar 4 m long and 6 cm in diameter is used as a column with Determine the crippling load. Take $E = 2 \times 10^5 \text{ N/mm}^2$. (i) One end is fixed and other end is free (ii) Both the ends are fixed (iii) both ends hinged. (iv) One end is fixed and other is hinged.	10M	CO5	L3

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H.T.No

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B.Tech. (III Semester) Regular/Supplementary Examinations**23CS05-OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(AI&DS,CSE,CSE(AI&ML) and IT)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Distinguish between procedural language and OOP's.	2M	CO1	L1
(b)	What is Inheritance? List out different types of inheritance.	2M	CO1	L1
(c)	Describe run time polymorphism in java programming.	2M	CO2	L2
(d)	Explain in detail method overloading with suitable examples.	2M	CO2	L2
(e)	List out the types of packages in java.	2M	CO3	L1
(f)	With syntax, write an example program of interfaces.	2M	CO3	L1
(g)	Distinguish between class and a public class.	2M	CO4	L1
(h)	Define thread in java. List out the various ways of creating thread.	2M	CO4	L1
(i)	Distinguish between applet and application.	2M	CO5	L1
(j)	Describe applet security issues.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Describe in detail about OOP's concepts with a necessary examples.	5M	CO1	L3
(b)	Describe the primitive data types supported in java and write a java program to print first 100 Fibonacci numbers.	5M	CO1	L2
(OR)				
3(a)	Justify the statement "Java is a pure object oriented programming language".	5M	CO2	L3
(b)	Write a program in Java which enters five numbers in an array using command line arguments and print sum and average of the numbers.	5M	CO2	L2
(OR)				
4.	Differentiate "this" and "super" keywords usage in java. Illustrate the Use of "Super" keyword in method overriding with example.	10M	CO1	L3
(OR)				
5(a)	Describe about static method and static variable with an example.	5M	CO2	L3
(b)	Write Java Program to ask the user to enter two number i.e., the value of n and the value of r, to find its nCr and nPr, then display the result on the screen.	5M	CO2	L2
(OR)				
6(a)	Can we have two public classes in a Java file. Explain with an example.	5M	CO1	L3
(b)	Discuss in detail creating and importing package in java.	5M	CO1	L2
(OR)				
7(a)	Examine different ways to extending interfaces with an example.	5M	CO2	L3
(b)	Which keyword java compiler add before interface fields and methods.	5M	CO2	L2
(OR)				
8(a)	Describe the producer consumer problem with an example.	5M	CO1	L3
(b)	Explain with an example how java performs thread synchronization.	5M	CO1	L2
(OR)				
9.	Differentiate between multiprocessing and multithreading with a Program.	10M	CO1	L3
(OR)				
10(a)	Write in detail about Layout management. Write a program for handling a button clicks.	5M	CO1	L3
(b)	Write in detail about hierarchy for awt. Write a program for handling mouse events.	5M	CO1	L2
(OR)				
11(a)	Write in detail about hierarchy for swing. Write in detail about Events, Event sources and Event classes.	5M	CO2	L3
(b)	Write a program for passing parameters to applet.	5M	CO2	L2

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B.Tech. (III Semester) Regular/Supplementary Examinations**23AE03-ENGINEERING THERMODYNAMICS
(ASE)**Accepted
8/6/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State extensive property.	2M	CO1	L1
(b)	Define temperature in thermodynamic view.	2M	CO1	L1
(c)	Define internal energy.	2M	CO2	L1
(d)	Steady flow energy equation is derived based on which principle.	2M	CO2	L1
(e)	State the Coefficient of performance.	2M	CO3	L1
(f)	Define entropy.	2M	CO3	L1
(g)	What is pure substance?	2M	CO4	L1
(h)	List out the assumptions of Air-standard cycle.	2M	CO4	L1
(i)	Name the strokes in 2-stroke engine consist.	2M	CO5	L1
(j)	List out any four performance parameters of IC Engines.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Classify thermodynamic systems with an examples.	5M	CO1	L2
(b)	Explain the concept of thermodynamic equilibrium.	5M	CO1	L2
(OR)				
3(a)	Distinguish between path and point function.	5M	CO1	L2
(b)	A mass of gas is compressed in a quasi-static process from 80kPa, 0.1 m ³ to 0.4 MPa, 0.03 m ³ . Assuming that the pressure and volume are related by $p v^n = \text{constant}$, find the work done by the gas system.	5M	CO1	L3
4.	A fluid is confined in a cylinder by a spring loaded, frictionless piston so that the pressure in the fluid is a linear function of the volume $p = a + bV$. The internal energy of the fluid is given by $U = 34 + 3.15pV$. Where U is in kJ, p is in kPa and V in m ³ . If the fluid changes from an initial state of 170 kPa, 0.03 m ³ to a final state of 400 kPa, 0.06 m ³ , with no work other than done on the piston, find the direction and magnitude of the work and heat transfer.	10M	CO2	L3
(OR)				
5(a)	Apply steady flow energy equation to boiler and turbine.	5M	CO2	L3
(b)	A blower handles 1 kg/s of air at 20°C and consumes a power of 15 kW. The inlet and outlet velocities of air are 100 m/s and 150m/s respectively. Find the exit air temperature, assuming adiabatic conditions. Take c_p of air 1.005 kJ/kgK.	5M	CO2	L3
6(a)	Distinguish between heat pump and refrigerator and establish the relation between them.	5M	CO3	L2
(b)	A Carnot refrigerator operates between temperature -10°C and 30°C. Determine its coefficient of performance. Subsequently it is desired to change the temperatures so as to make the COP exactly equal to 7. The amount of increase in the higher temperature is equal to amount of decrease in lower temperature. Workout the new temperatures.	5M	CO3	L3
(OR)				

23AE03-ENGINEERING THERMODYNAMICS

7(a)	What do you understand by the entropy principle?	5M	CO3	L2
(b)	Derive Maxwell's relations from thermodynamic relations.	5M	CO3	L3
8(a)	Draw the phase equilibrium diagram for pure substance on h-s plot with relevant constant property lines and why the isobars lines are diverges from one another.	5M	CO4	L2
(b)	Steam initially at 1.5MPa, 300°C expands reversibly and adiabatically in a steam turbine to 40°C. Determine the ideal work output of the turbine/ kg of steam.	5M	CO4	L3
(OR)				
9.	In an air standard Otto cycle the compression ratio is 7, and compression begins at 35°C, 0.1MPa. The maximum temperature of the cycle is 1100°C. Find (i) the temperature and pressure at the cardinal point of the cycle (ii) the work done per kg of air (iii) the cycle efficiency and (iv) the m.e.p of the cycle.	10M	CO4	L3
10(a)	Classify IC engines in brief.	5M	CO5	L2
(b)	Explain working principle of four stroke CI engine with neat sketch.	5M	CO5	L2
(OR)				
11.	The following observations were recorded during a trial of four stroke, single cylinder oil engine. Duration of trial is 30 min, oil consumption is 4lt, C.V of oil is 43MJ/kg, specific gravity of the fuel 0.8, average area of indicator diagram 8.5cm ² , length of indicator diagram 8.5cm, spring constant 5.5 bar/cm, brake load 150kg, spring balance reading 20kg, effective brake wheel diameter 1.5m, speed 200rpm, cylinder diameter 30cm, stroke 45cm, jacket cooling water 10kg/min and temperature rise is 36°C. Calculate (i)IP(ii)BP(iii) mechanical efficiency (iv) b.s.f.c (v) indicated thermal efficiency	10M	CO5	L3

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

23CE03–FLUID MECHANICS

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define mass density and specific weight.	2M	CO1	L1
(b)	Sketch the relationship between absolute, atmospheric, and gauge pressures.	2M	CO1	L2
(c)	Define the terms Metacenter.	2M	CO1	L1
(d)	Determine the total pressure on a square plate of side 2 m which is placed vertically in water in such a way that the centroid of the plate is 4 m below the free surface of water.	2M	CO2	L3
(e)	Distinguish between rotational and irrotational flow.	2M	CO3	L2
(f)	The diameter of a pipe is 20 cm and velocity of water is 4 m/s determine the rate of flow in the pipe.	2M	CO4	L3
(g)	Define an orifice-meter and sketch it.	2M	CO3	L1
(h)	List out the different types of energy's present in Bernoulli's equation.	2M	CO3	L1
(i)	Define the total energy line.	2M	CO3	L1
(j)	Define the Froude's number.	2M	CO3	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	State and Prove the Hydrostatic law.	5M	CO1	L2
(b)	The capillary rise in the glass tube used for measuring water level is not to exceed 0.2 mm. Determine its minimum size, given that surface tension for water in contact with air = 0.0725 N/m.	5M	CO2	L3
(OR)				
3(a)	Explain Differential manometers with neat sketch.	5M	CO1	L2
(b)	A plate 0.025 mm distant from a fixed plate, moves at 60 cm/s and requires a force of 2 N per unit area i.e., 2 N/m ² to maintain this speed. Determine the fluid viscosity between the plates.	5M	CO2	L3
4(a)	A rectangular plane surface is 2 m wide and 3 m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and coincides with water surface.	5M	CO2	L3
(b)	Determine the total pressure on a circular plate of diameter 3 m which is placed vertically in water in such a way that centre of plate is 1.5 m below the free surface of water. Find the position of centre of pressure also.	5M	CO2	L3
(OR)				
5(a)	Discuss the conditions of equilibrium of a floating body.	5M	CO1	L2
(b)	A rectangular plane surface 3 m wide 4 m deep lies in water in such a way that its plane makes an angle of 60° with the free surface of water. Determine the total pressure force and position of centre of pressure, when the upper edge is 2 m below the free surface.	5M	CO2	L3
6.	Obtain an expression for continuity equation for a three-dimensional flow.	10M	CO3	L2
(OR)				

23CE03-FLUID MECHANICS

7(a)	The x and y components in a three dimensional flow are given by $u = x^2 + z^2$, $v = y^2 + z^2$. Determine the simplest z - component of velocity that satisfies the continuity equation.	5M	CO4	L3
(b)	The stream function for a two-dimensional flow is given by $\Psi = 2xy$. Determine the velocity potential function Φ .	5M	CO4	L3
8(a)	Derive Euler's equation of motion along a stream line for an ideal fluid.	5M	CO4	L2
(b)	Explain in brief the working of a pitot-tube. Calculate the velocity of flow of water in a pipe of diameter 300 mm at a point, where the stagnation pressure head is 5 m and static pressure head is 4m. Given the co-efficient of pitot-tube =0.97.	5M	CO5	L3
(OR)				
9(a)	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 $C_d=0.98$.	5M	CO5	L3
(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.	Obtain expression for head loss in a sudden expansion in the pipe.	10M	CO4	L2
(OR)				
11(a)	Define and derive expression for March's Number.	5M	CO4	L2
(b)	A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate of 300 litres per sec. determine the head loss due to friction for a length of 50 m of the pipe.	5M	CO5	L3

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

23EC04-SWITCHING THEORY AND LOGIC DESIGN

(ECE)

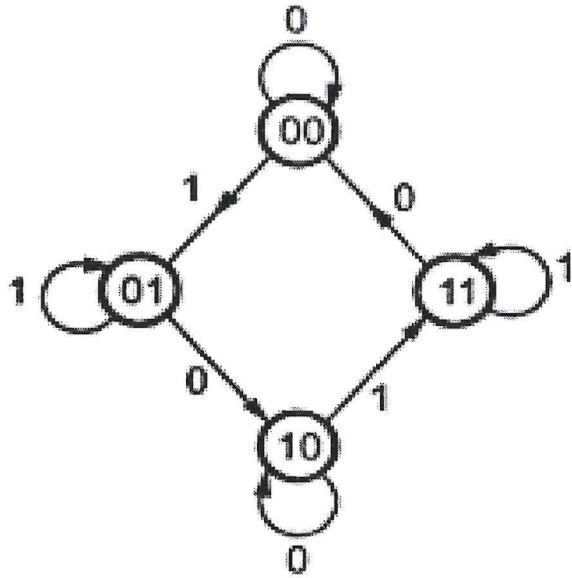
Time : 3 hours

Max. Marks : 70

130/100
8/6/26

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the hexadecimal equivalent of given $(25.23)_{10}$?	2M	CO1	L1
(b)	Use the NAND gates to realize NOR gate functionality.	2M	CO2	L3
(c)	State DeMorgn's theorem.	2M	CO2	L1
(d)	Model full adder digital module using two half adders.	2M	CO3	L3
(e)	Define Multiplexer.	2M	CO3	L1
(f)	Demonstrate the functionality of half adder using 2X4 decoder.	2M	CO3	L3
(g)	What is the characteristics equation of SR Flip Flop?	2M	CO3	L1
(h)	Illustrate 3 bit Serial-in serial-out shift register using D Flip Flops.	2M	CO3	L3
(i)	How many numbers of Flip Flops are required to realize 32 states counter?	2M	CO4	L2
(j)	Define Mealy machine.	2M	CO4	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Solve for the decimal equivalent of given hexadecimal number $(A0AF.BA)_{16}$	5M	CO1	L3
(b)	Calculate the subtraction $(11001)_2 - (10010)_2$ using 2's complement method.	5M	CO1	L3
(OR)				
3(a)	Use basic logic gates to realize the given Boolean expression. $F = (A + B)(\overline{A + C})[(A + \overline{B} + C) + (A + B)C]$.	5M	CO2	L3
(b)	Model the logic diagram for given Boolean expression using two input NAND gates only. $Z = (AB + \overline{A}\overline{B})(C\overline{D} + \overline{C}D)$.	5M	CO2	L3
(OR)				
4.	Determine the minimal Boolean expression for $Z = \sum m(1,2,3,5,6,7,8,9,12,13,15,21,31)$ using Quine-McCluskey method.	10M	CO2	L3
(OR)				
5(a)	Demonstrate the working of full subtractor and explain its operation in detail.	5M	CO3	L2
(b)	Model four bit ripple carry adder and explain its operation in detail.	5M	CO3	L3
(OR)				
6(a)	Use 2X4 Decoders and implement the 3X8 Decoder.	5M	CO3	L4
(b)	Illustrate the working of 4X1 multiplexer and explain its operation with logic diagram.	5M	CO3	L2
(OR)				
7(a)	Show the basic structures of PLA and explain their operations.	5M	CO3	L3
(b)	Use Programmable array logic to realize the given Boolean expressions $S1 = \overline{A}BC + \overline{A}\overline{B}C + A\overline{B}C$ $S2 = \overline{A}\overline{B}\overline{C} + ABC + AB$	5M	CO3	L3
(OR)				
8(a)	Explain the working of Jk-FlipFlop using its logic diagram and also draw its characteristic table.	5M	CO3	L2
(b)	Illustrate how to convert SR Flip-Flop into JK Flip-Flop.	5M	CO3	L3
(OR)				

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9.	Model 3-Bit up/Down binary ripple counter using Negative edge triggered JK-Flip-Flops.	10M	CO3	L3																											
10(a)	Obtain the state table, state equations and state machine using DFFs for the state diagram. 	5M	CO4	L3																											
(b)	Determine the state diagram and state table for a 2-bit up-down counter having mode control input (M). When M=1, Up counting and M=0, Down counting, and an indication of output 1 whenever the count becomes minimum or maximum.	5M	CO4	L4																											
(OR)																															
11(a)	Compare Mealy and Moore machines.	5M	CO4	L2																											
(b)	For the state tables of the machines given below, Determine the corresponding reduced machine table in standard form. <table><tr><td>PS</td><td>NS,Z X=0</td><td>NS,Z X=1</td></tr><tr><td>A</td><td>B,1</td><td>H,1</td></tr><tr><td>B</td><td>F,1</td><td>D,1</td></tr><tr><td>C</td><td>D,0</td><td>E,1</td></tr><tr><td>D</td><td>C,1</td><td>F,1</td></tr><tr><td>E</td><td>D,1</td><td>C,1</td></tr><tr><td>F</td><td>C,1</td><td>C,1</td></tr><tr><td>G</td><td>C,1</td><td>D,1</td></tr><tr><td>H</td><td>C,0</td><td>A,1</td></tr></table>	PS	NS,Z X=0	NS,Z X=1	A	B,1	H,1	B	F,1	D,1	C	D,0	E,1	D	C,1	F,1	E	D,1	C,1	F	C,1	C,1	G	C,1	D,1	H	C,0	A,1	5M	CO4	L3
PS	NS,Z X=0	NS,Z X=1																													
A	B,1	H,1																													
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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)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL																
1(a)	Draw the schematic diagram of a DC machine and mark it's different parts.	2M	CO1	L1																
(b)	Draw the characteristics of DC shunt generator.	2M	CO1	L1																
(c)	How the emf induced dynamically?	2M	CO2	L2																
(d)	Why a starter is necessary for a DC motor?	2M	CO2	L2																
(e)	What is ideal transformer?	2M	CO3	L1																
(f)	What happens if DC supply is applied to the transformer?	2M	CO3	L1																
(g)	Define voltage regulation of transformer.	2M	CO3	L1																
(h)	List out conditions for parallel operation of transformer.	2M	CO3	L1																
(i)	What are the advantages of single three phase transformer unit over a bank of single-phase transformers?	2M	CO4	L1																
(j)	What are the uses of Scott connection?	2M	CO4	L1																
Q.No	All questions carry equal marks	Marks	CO	BL																
2(a)	Describe the basic principle of operation of a DC Generator with a simple loop generator.	5M	CO1	L2																
(b)	Distinguish between self excited and separately exited DC Generators. Give the circuit diagrams of Self excited DC Generators and derive the voltage equations.	5M	CO1	L2																
(OR)																				
3(a)	Draw and discuss the internal and external characteristics of DC shunt generator with neat sketch.	5M	CO1	L2																
(b)	A 4-pole, 110V, 1000rpm, lap connected, shunt generator with 144 conductors has field resistance of 45Ω. Open circuit characteristics is given below. <table><tr><td>I_f (A)</td><td>0</td><td>0.5</td><td>1</td><td>1.5</td><td>2</td><td>2.5</td><td>3</td></tr><tr><td>V_{oc} (V)</td><td>5</td><td>50</td><td>85</td><td>102</td><td>112</td><td>116</td><td>120</td></tr></table> Find open circuit voltage and critical field resistance	I _f (A)	0	0.5	1	1.5	2	2.5	3	V _{oc} (V)	5	50	85	102	112	116	120	5M	CO1	L3
I _f (A)	0	0.5	1	1.5	2	2.5	3													
V _{oc} (V)	5	50	85	102	112	116	120													
4(a)	Draw the speed torque characteristics of dc shunt and series motor.	5M	CO2	L2																
(b)	The armature resistance of a 200V shunt motor is 0.4Ω and no load armature current is 2A. When loaded and taking an armature current of 50A, the speed is 1200 rpm. Find approximately the no load speed.	5M	CO2	L3																
(OR)																				
5(a)	Describe the 3 point starter with neat sketch.	5M	CO2	L2																
(b)	With a circuit describe how to obtain efficiency of dc motor by conducting swinburne's test.	5M	CO2	L2																
6(a)	Illustrate the operation of transformer at No-load and load conditions.	5M	CO3	L2																
(b)	A single phase 150 kVA transformer is required to step down the voltage from 1000V to 500 V at 50Hz. The cross-sectional area of the core is 625 cm ² and the maximum value of flux density is 1.25Wb/m ² . Determine (i) the number of HV and LV turns, (ii) the emf per turn and (iii) the primary and secondary full load current.	5M	CO3	L3																
(OR)																				
7(a)	Develop the equation for efficiency of a transformer and also derive the condition for maximum efficiency.	5M	CO3	L2																
(b)	Describe all day efficiency and explain how all day efficiency differs from power efficiency.	5M	CO3	L2																
8.	O.C and S.C tests conducted on a 10kVA, 500/2000V, 50Hz, 1Φ transformer gave the following readings O.C test on primary side:500V,120W, S.C test on primary side: 15V, 20A, 100W Determine (i) η on FL UPF (ii) secondary terminal voltage on FL 0.8 lagging and leading PF.	10M	CO3	L3																
(OR)																				
9(a)	Describe the parallel operation of the transformers with a neat sketch.	5M	CO3	L2																
(b)	Describe the back to back method of testing for two identical 1-Φ transformer.	5M	CO3	L3																
10(a)	Describe various types of 3-Φ transformer connections.	5M	CO4	L2																
(b)	What is the significance of Y-Y, Y-delta and Delta-Y, Delta-Delta connections in 3-phase transformers?	5M	CO4	L2																
(OR)																				
11(a)	Explain the effect of third harmonics in phase voltages of three phase transformers.	5M	CO4	L2																
(b)	A 3phase transformer bank consisting of three 1-phase transformers is used to step-down the voltage of a 3-phase, 6600V transmission line. If primary line current is 10Amp, calculate the secondary line voltage, line current and output KVA for the following connections. (i) Y/ Δ and (ii) Δ/Y. The turn's ratio is 12. Neglect losses.	5M	CO4	L3																

08 JUN 2026

H.T.No

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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)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define unit cell.	2M	CO1	L1
(b)	What is solid solution?	2M	CO1	L1
(c)	Define coring.	2M	CO2	L1
(d)	Enumerate the methods of drawing the equilibrium diagrams.	2M	CO2	L1
(e)	Define steel.	2M	CO3	L1
(f)	List any four properties of copper.	2M	CO3	L1
(g)	Define Mechanical Working.	2M	CO4	L1
(h)	Identify the stages in Heat Treatment.	2M	CO4	L1
(i)	What is an abrasive material?	2M	CO5	L1
(j)	What is rule of mixture?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Illustrate the mechanism of crystallization process in pure metals.	5M	CO1	L2
(b)	Define atomic packing factor and calculate packing factor for F.C.C structure.	5M	CO1	L2
(OR)				
3(a)	What conditions favor the formation of substitutional solid solutions? Explain.	5M	CO1	L2
(b)	What is an alloy? Describe the necessity of alloying.	5M	CO1	L2
4(a)	Describe the following invariant reactions. (i) Peritectic Reaction (ii) Eutectic Reaction	5M	CO2	L2
(b)	State the Gibb's Phase rule? Explain its significance.	5M	CO2	L2
(OR)				
5(a)	Enumerate and explain the types of equilibrium diagrams.	5M	CO2	L2
(b)	Derive the lever rule as applied to equilibrium diagrams.	5M	CO2	L2
6(a)	Describe the classification of steels based on the amount of carbon percentage.	5M	CO3	L2
(b)	Describe the processes involved in producing the malleable cast iron.	5M	CO3	L2
(OR)				
7(a)	What are brasses? Explain the classification of brasses.	5M	CO3	L2
(b)	Enumerate and explain the properties and applications of aluminum.	5M	CO3	L2
8(a)	What is TTT diagram? Explain the procedure to draw it.	5M	CO4	L2
(b)	Differentiate between annealing and normalizing heat treatment processes.	5M	CO4	L2
(OR)				
9(a)	Explain the effect of cold working and hot working process on material properties.	5M	CO4	L2
(b)	What test is used for determining the hardenability of steels? Explain.	5M	CO4	L2
10(a)	Define composite material. Explain how the composite materials are classified.	5M	CO5	L2
(b)	Describe hand layup process of manufacturing fiber reinforced composites.	5M	CO5	L2
(OR)				
11(a)	Calculate the tensile modulus of elasticity of a laminated composite consisting of 60% by volume of unidirectional carbon fibres and epoxy matrix. The tensile modulus of elasticity of the carbon fibres is 350 GPa and tensile modulus of elasticity of the epoxy is 3000 MPa.	5M	CO5	L3
(b)	Describe Metal Matrix Composites.	5M	CO5	L2
