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) (R20) Semester End Examinations (Supplementary) – November 2025

TIME TABLE

R20

Time : 10.00 AM to 01.00 PM **A.Y. : 2025-26**

Branch	17-11-2025 (Monday)	18-11-2025 (Tuesday)	19-11-2025 (Wednesday)	20-11-2025 (Thursday)	21-11-2025 (Friday)	22-11-2025 (Saturday)
AI & DS	20MC02 -Environmental Science	20FE09 - Probability and Statistics	20CS05 - Python Programming	20CS07 -Database Management Systems	20AD02 - Computer Architecture	20CS09 - Object Oriented Programming
ASE	20MC02 - Environmental Science	20FE10 - Numerical Methods and Integral Calculus	20EE02 - Basic Electrical and Electronics Engineering	20AE02 - Engineering Fluid Mechanics	20AE03 - Engineering Thermodynamics	20AE04 - Strength of Materials
CE	20MC02 - Environmental Science	20FE10 - Numerical Methods and Integral Calculus	20CE05 - Mechanics of Fluids	20CE06 - Solid Mechanics	20CE07 - Concrete Technology	20CE08 - Engineering Geology
CSE	---	20FE09 - Probability and Statistics	20CS04 - Discrete Mathematical Structures	20CS07 - Database Management Systems	20CS08 - Computer Organization	20CS09 - Object Oriented Programming
CSE (AI & ML)	---	20FE09 - Probability and Statistics	20CS04 - Discrete Mathematical Structures	20CS07 - Database Management Systems	20AD02 - Computer Architecture	20CS09 - Object Oriented Programming
ECE	---	20FE10 -Numerical Methods and Integral Calculus	20CS03 - Data Structures	20EC03 - Analog Circuit Design	20EC04 - Signals and Systems	20EC05 - Random Variables and Stochastic Processes
EEE	20MC02 - Environmental Science	20FE10 - Numerical Methods and Integral Calculus	20CS03 - Data Structures	20EE05 - Electrical Circuit Analysis	20EE06 - Digital Electronics	20EE07 - Electric and Magnetic Fields
IT	---	20FE09 - Probability and Statistics	20CS04 - Discrete Mathematical Structures	20CS07 - Database Management Systems	20CS08 - Computer Organization	20CS09 - Object Oriented Programming
ME	20MC02 - Environmental Science	20FE10 - Numerical Methods and Integral Calculus	20ME03 - Fluid Mechanics and Hydraulic Machinery	20ME04 - Thermodynamics	20ME05 - Metallurgy and Material Science	20ME06 - Mechanics of Solids

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

Date: 01-11-2025

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs 2. T&P cell, Transport in-charge & Librarian
3. Canteen, PD, Security & Hostels 4. Coordinator-Disciplinary 5. Notice Boards

17 NOV 2025

H.T.No.										

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.
B.Tech. (III Semester) ~~Regular~~ / Supplementary Examinations

20MC02-ENVIRONMENTAL SCIENCE
((AI&DS),ASE,CE,EEE&ME)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Justify the need for public awareness of Environmental Studies.	7M	CO1	L2
(b)	Can you interpret the major causes of displacement of people. Discuss in the light of some case studies.	7M	CO1	L2
	(OR)			
2(a)	Differentiate between re-habilitation and re-settlement of people.	7M	CO1	L2
(b)	Justify the significance of IT in the medical advances in terms of human health.	7M	CO1	L2
3(a)	Can you find out the major consequences of over-exploitation of mineral resources. How can they be conserved?	7M	CO2	L1
(b)	Suggest some measures needed to be taken for conserving forest wealth.	7M	CO2	L2
	(OR)			
4(a)	Identify the advantages and disadvantages of chemical fertilizers and pesticides.	7M	CO2	L1
(b)	"Improper management of water resources may be one of the reason for disasters like floods and draughts". Discuss.	7M	CO2	L2
5(a)	Can you explain what species extinction is? Mention the types of biological extinctions that happened on the earth.	7M	CO3	L1
(b)	Draw a neat sketch and explain the water cycle.	7M	CO3	L2
	(OR)			
6.	Identify the present-day major threats to the biodiversity. Elaborate the efforts taken towards conservation of biodiversity.	14M	CO3	L1
7(a)	Explain the strategies that can be adapted for the management of Municipal Solid Waste.	7M	CO4	L2
(b)	According to biomedical waste management rules 1998, into how many categories the biomedical waste is classified. How can it be handled?	7M	CO4	L1
	(OR)			
8(a)	Isn't greenhouse effect a part of natural cycle. List out any five greenhouse gases.	7M	CO4	L1
(b)	Analyze the challenges faced by the community after an earthquake and suggest the measures to be taken to mitigate an earthquake.	7M	CO4	L2
9(a)	Identify the different strategies that can be adapted to support sustainable development in the country.	7M	CO5	L2
(b)	What was the major objective of Stockholm conference? State some of the principles declared at Stockholm conference.	7M	CO5	L1
	(OR)			
10.	Define EIA. Paraphrase in general the methodology for EIA in India.	14 M	CO5	L2

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H.T.No										

18 NOV 2025

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B.Tech. (III Semester) Supplementary Examinations

20FE09-PROBABILITY AND STATISTICS
(AI&DS,CSE,CSE(AI&ML) and IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	In a bolt factory machines A, B and C manufacture respectively 20%, 30% and 50% of the total of its output. Of them 5%, 4% and 2% respectively are defective bolts. A bolt is drawn at random from the total output and is found to be defective. What is the probability that it was manufactured by machine B?	7M	CO1	L2
(b)	If $f(x) = 3x^2$, for $0 < x \leq 1$ is the probability function of a continuous random variable X, then calculate the Mean and Variance of X.	7M	CO1	L2
	(OR)			
2(a)	Consider the density function $f(x) = 2e^{-2x}$ for $x>0$ $= 0$, otherwise Evaluate (i) $P(0<X<1)$ (ii) $P(X>5)$.	7M	CO1	L2
(b)	Given that $f(x) = \frac{k}{2x}$ is a probability distribution for a random variable X that can take on the values x= 1,2,3,4. Find k and variance of X.	7M	CO1	L3
3(a)	Assume that the probability that a bomb dropped from an aero plane will strike a certain target is 1/5, if 6 bombs are dropped, find the probability that (i) Exactly 2 will strike the target (ii) At least two will strike the target.	7M	CO2	L3
(b)	A certain type of storage battery lasts, on average 3.0 years with a standard deviation of 0.5 years. Assuming that battery life is normally distributed, Determine the probability that a given battery will last (i) less than 2.3 years (ii) more than 2.5 years.	7M	CO2	L3
	(OR)			
4(a)	Derive the mean and variance of Binomial distribution.	7M	CO2	L3
(b)	If X has a Poisson distribution such that P(X=1) = P(X=2), then estimate the mean value λ, (i)P (X= 4) (ii) P(X≥1).	7M	CO2	L3
5(a)	If the mean breaking strength of copper wire is 505 lbs, with standard deviation of 15 lbs for a sample of size 49. Construct 95% confidence interval for the mean breaking strength of the population.	7M	CO3	L3

<table>
<tr><td>(b)</td><td>A new rocket-launching system is being considered for deployment of small, short-range rockets. A sample of 40 experimental launches is made with the new system, and 34 are successful. Construct 95% and 99% confidence interval for population proportion of success.</td><td>7M</td><td>CO3</td><td>L3</td></tr>
<tr><td colspan="5">(OR)</td></tr>
<tr><td>6(a)</td><td>What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence?</td><td>7M</td><td>CO3</td><td>L2</td></tr>
<tr><td>(b)</td><td>The contents of seven similar containers of sulphuric acid are 9.8, 10.2, 10.4, 9.8, 10.0, 10.2, and 9.6 litters. Find a 95% confidence interval for the mean contents of all such containers, assuming an approximately normal distribution.</td><td>7M</td><td>CO3</td><td>L2</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>7(a)</td><td>A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased.</td><td>7M</td><td>CO5</td><td>L3</td></tr>
<tr><td>(b)</td><td>The following data give the number of air-craft accidents that occurred during the various days of a week.
<table>
<tr><td>Day</td><td>Mon</td><td>Tues</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td></tr>
<tr><td>No. of accidents</td><td>15</td><td>19</td><td>13</td><td>12</td><td>16</td><td>15</td></tr>
</table>
Test whether the accidents are uniformly distributed over the week.</td><td>7M</td><td>CO5</td><td>L3</td></tr>
<tr><td colspan="5">(OR)</td></tr>
<tr><td>8(a)</td><td>Explain (i) Null Hypothesis (ii) Alternative Hypothesis (iii) Type I and Type II errors.</td><td>7M</td><td>CO4</td><td>L2</td></tr>
<tr><td>(b)</td><td>Fit a Poisson distribution for the following distribution and also test the goodness of fit.
<table>
<tr><td>x:</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>Total</td></tr>
<tr><td>f:</td><td>142</td><td>156</td><td>69</td><td>27</td><td>5</td><td>1</td><td>400</td></tr>
</table></td><td>7M</td><td>CO4</td><td>L3</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>9(a)</td><td>Determine (i) Coefficient of correlation (ii) Regression line y on x from the following data of 10 observations.
$\sum x = 250$, $\sum x^2 = 6500$, $\sum y = 300$, $\sum y^2 = 10000$ and $\sum xy = 7900$</td><td>7M</td><td>CO5</td><td>L3</td></tr>
<tr><td>(b)</td><td>The regression equations of two variables X and Y are as follows. 3X+2Y-26=0 and 6X+Y-31=0 then find (i) the means of X and Y (ii) the regression coefficients (iii) the coefficient of correlation between X and Y.</td><td>7M</td><td>CO5</td><td>L3</td></tr>
<tr><td colspan="5">(OR)</td></tr>
<tr><td>10.</td><td>The following table gives the age of cars of a certain make and their annual maintenance costs. (i) Calculate the correlation coefficient (ii)Derive the regression equation for costs related to age of cars. (iii) Estimate the maintenance cost of a car of age 5 years.
<table>
<tr><td>Age of cars (in yrs.)</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td></tr>
<tr><td>Maintenance Cost (Rs. In 1000's)</td><td>10</td><td>20</td><td>25</td><td>30</td><td>45</td></tr>
</table></td><td>14M</td><td>CO5</td><td>L3</td></tr>
</table>

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H.T.No										

18 NOV 2025

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B.Tech. (III Semester) Supplementary Examinations

20FE10-NUMERICAL METHODS AND INTEGRAL CALCULUS

(ASE,CE,ECE,EEE&ME)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Find y(1.6) using Newton's Forward interpolation formula from the following data X: 1, 1.4, 1.8, 2.2, 2.6 Y: 3.49, 4.82, 5.96, 6.5, 7.2	7M	CO1	L3
(b)	Find the unique polynomial of p(x) of degree two or less such that $p(1)=1$, $p(3)=27$, $p(4)=64$ using Lagrange's interpolation.	7M	CO1	L3
	(OR)			
2(a)	Given $\sin 45^0 = 0.7071$, $\sin 50^0 = 0.7660$, $\sin 55^0 = 0.8192$ and $\sin 60^0 = 0.8660$. Find $\sin 57^0$ using Newton's backward interpolation formula.	7M	CO1	L3
(b)	Show that (i) $\Delta \equiv E\nabla \equiv \nabla E$ (ii) $\Delta - \nabla \equiv \delta^2$	7M	CO1	L2
3(a)	Applying Regula-Falsi method, find a real root of the equation $f(x) = x^3 - 5x - 7 = 0$.	7M	CO2	L3
(b)	Evaluate $I=\int_0^1 \frac{dx}{1+x}$ with n=10 using Simpson's 1/3 rule.	7M	CO2	L3
	(OR)			
4(a)	Using Newton-Raphson method, find a real root of the equation $e^x = 2x + 1$.	7M	CO2	L3
(b)	Evaluate $\int_{0.6}^{2} y\,dx$ by using Trapezoidal rule for the following data. x: 0.6, 0.8, 1, 1.2, 1.4, 1.6, 1.8, 2 y: 1.23, 1.58, 2.03, 4.32, 6.25, 8.38, 10.2, 12.4	7M	CO2	L3
5(a)	Evaluate $\iint_R ydxdy$ where R is the region bounded by the parabolas $y^2 = 4ax$ and $x^2 = 4ay$.	7M	CO3	L3
(b)	Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dxdydz$	7M	CO3	L3
	(OR)			
6(a)	Evaluate $\int_0^2 \int_0^x e^{x+y}\,dydx$	7M	CO3	L3
(b)	By changing the order of integration, evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dydx$	7M	CO3	L3
7(a)	Expand the function $f(x) = x^2 + x$ as a Fourier series in $-\pi < x < \pi$	7M	CO4	L3
(b)	Express the function $f(x) = \pi x$ as half – range cosine series on $0 < x < \pi$.	7M	CO4	L3
	(OR)			
8(a)	Find the Fourier series to represent $f(x) = x^2$, in the interval $-l \le x \le l$	7M	CO4	L3
(b)	Find the half range Fourier sine series expansion of $f(x) = e^{ax}$ in (0,2).	7M	CO4	L3
9(a)	Find the directional derivative $\phi = xy^2+yz^2$ in the direction of the vector $\vec{i} + 2\vec{j} + 2\vec{k}$ at the point (2, -1, 1).	7M	CO5	L3
(b)	If $\vec{f} = xy^2\vec{i} + 4x^2yz\vec{j} - 2yz^2\vec{k}$ find $div\vec{f}$ at (1, -2, 3).	7M	CO5	L3
	(OR)			
10(a)	If the given function $\bar{A}$ = (x+2y+az)$\bar{i}$+(bx-3y-z)$\bar{j}$ + (4x+cy+2z)$\bar{k}$ is irrotational, find the constants a, b, c.	7M	CO5	L3
(b)	Prove that $\nabla(r^n) = n\,r^{n-2}\,\bar{r}$	7M	CO5	L2

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19 NOV 2025

R20

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

20CS05-PYHTON PROGRAMMING

(AI&DS)

Bossee 19/11/25

Time : 3 hours Max. Marks :70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain with example bitwise operators in Python.	7M	CO1	L1
(b)	Assume a suitable value for distance between two cities (in km.). Write a program to convert and print this distance in meters, feet, inches and centimeters.	7M	CO1	L3
	(OR)			
2(a)	Demonstrate the usage of while and for loops with syntax and examples.	7M	CO1	L2
(b)	List and explain the following operators with suitable examples. (i) Logical operators (ii) Bitwise operators (iii) Membership operators (iv) Identity operators.	7M	CO1	L2
3(a)	Discuss the List Accessing Methods and List Comprehension with examples.	7M	CO2	L2
(b)	Write a python script that creates one set with Squares and other set with Cubes in range 1-10.	7M	CO2	L3
	(OR)			
4(a)	What is list? Explain the concept of slicing and indexing with proper examples.	7M	CO2	L1
(b)	What are the different methods supports in python List? Illustrate all the methods with an example	7M	CO2	L2
5(a)	How to create a user defined exception?	7M	CO3	L3
(b)	Explain how to handle an exception using try except block.	7M	CO3	L3
	(OR)			
6(a)	Give the syntax and example for following blocks: (i) try (ii) except (iii) raise (iv) finally	7M	CO3	L2
(b)	Write a python script which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.	7M	CO3	L3
7(a)	Demonstrate basic string operations, length, Indexing and slicing with an appropriate example.	7M	CO4	L2
(b)	Tabulate and discuss different access modes for opening a file.	7M	CO4	L2
	(OR)			
8(a)	Write a python script to open file using "WITH" keyword and write and display the content of the file.	7M	CO4	L3
(b)	Demonstrate types of Functions in Regular Expressions.	7M	CO4	L2
9(a)	Discuss the various principles of Object-Oriented Programming (OOP).	7M	CO5	L2
(b)	Write a Program that depicts the concept of Abstraction in Python.	7M	CO5	L3
	(OR)			
10(a)	Explain types of constructs.	7M	CO5	L2
(b)	Discuss data hiding with example.	7M	CO5	L2

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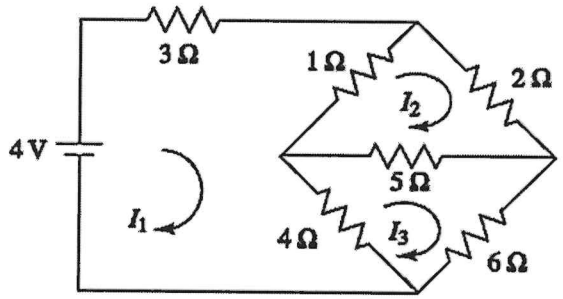
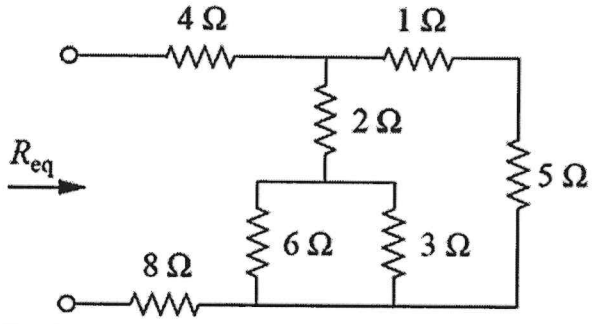
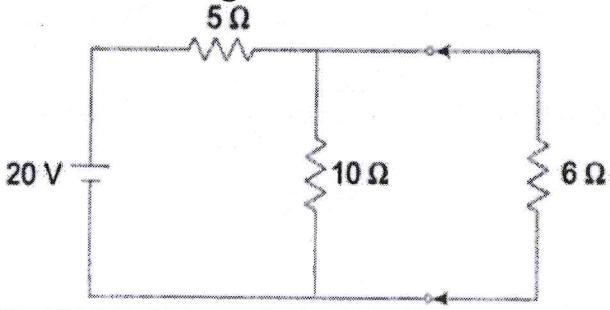
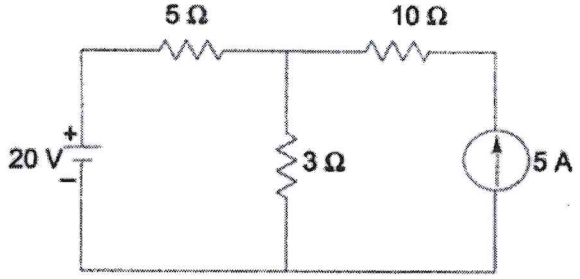
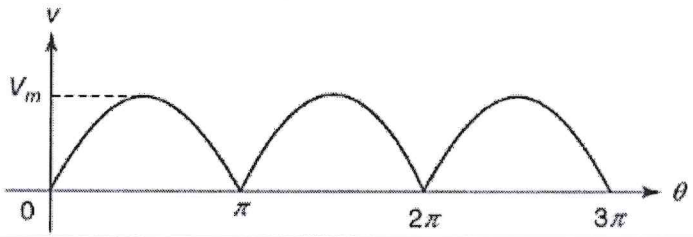
B.Tech. (III Semester) Supplementary Examinations

20EE02-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(ASE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Using mesh analysis, find the mesh currents and total current supplied by the battery. 	7M	CO1	L3
(b)	Three resistances 2 Ω, 4 Ω and 6 Ω are connected in series across 24 volts supply. Find the voltages across three resistors and current through each resistor.	7M	CO1	L3
	(OR)			
2(a)	Explain Kirchhoff's Laws in detail.	7M	CO1	L2
(b)	Solve the below circuit to obtain Req. 	7M	CO1	L3
3(a)	Determine the voltage across 6Ω resistor using Norton's theorem for the following circuit. 	7M	CO1	L3

(b)	Determine the following parameters of a voltage v = 400 sin314t. (i) Frequency (ii) Form factor (iii) Crest factor.	7M	CO1	L3
	(OR)			
4(a)	Find the current through 3Ω resistor using superposition theorem in the circuit. 	7M	CO1	L3
(b)	Determine the average value and rms value of the waveform shown in the fig. 	7M	CO1	L3
5(a)	Illustrate the constructional details of a DC machine.	7M	CO2	L2
(b)	Illustrate the principle of operation of a transformer.	7M	CO2	L2
	(OR)			
6(a)	Discuss various types of DC generators with neat circuit diagrams.	7M	CO2	L2
(b)	Derive the EMF equation of a DC generator.	7M	CO2	L3
7(a)	Demonstrate the forward bias and reverse bias characteristics of a pn junction diode.	7M	CO3	L2
(b)	Draw and discuss the V-I characteristics of the Zener diode.	7M	CO3	L2
	(OR)			
8(a)	Draw the circuit diagram of the Half Wave Rectifier and explain its operation with the help of waveforms.	7M	CO3	L2
(b)	Explain how the Zener diode acts as a voltage regulator.	7M	CO3	L2
9(a)	Interpret the principle of operation of a MOSFET with a neat sketch.	7M	CO4	L2
(b)	Describe the principle operation of the JFET with a neat sketch.	7M	CO4	L2
	(OR)			
10(a)	Summarize the constructional details and modes of operation of a transistor in detail.	7M	CO4	L2
(b)	How can the transistor work as an amplifier? Justify.	7M	CO4	L2

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R20

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

19/11/25

20CE05-MECHANICS OF FLUIDS
(CE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define and state the purposes of a manometer and peizometer. How they are used in fluid mechanics? Explain with an example.	7M	CO1	L2
(b)	Calculate the following: (i) Pressure at a depth of 10m in river water (ii) Corresponding depth of water for a pressure of 100kPa.	7M	CO1	L3
	(OR)			
2(a)	Calculate specific weight, density and specific gravity of two liters of a liquid which weigh 15 N.	7M	CO1	L3
(b)	Define pressure. Obtain an expression for the pressure intensity at a point in a fluid.	7M	CO1	L2
3(a)	Define and distinguish between one, two and three dimensional flow.	7M	CO2	L4
(b)	Show that streamlines and equipotential lines intersect orthogonally.	7M	CO2	L2
	(OR)			
4(a)	Define and explain (i) uniform and non uniform flow (ii) Stream line.	7M	CO1	L2
(b)	Calculate the unknown velocity component if they satisfy continuity equation: $v = 2x^2 + 2y^2$, $w = z^3 + 4xz + 2yz$.	7M	CO3	L3
5(a)	What is Euler's equation of motion? Explain how will you obtain Bernoulli's equation from it.	7M	CO3	L2
(b)	Develop the momentum equation. Explain how will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend.	7M	CO3	L3
	(OR)			
6(a)	Derive an expression for force exerted by a flowing fluid on a pipe bend.	7M	CO3	L3
(b)	A 300 mm diameter pipe carries water under a head of 20meters with a velocity of 3.5m/s. If the axis of pipe turns through 45^0, find the magnitude and direction of the resultant force at the bend.	7M	CO3	L3
7(a)	Describe the Reynold's experiment and deduce the conclusions drawn from the experiment.	7M	CO1	L2
(b)	A pipe carrying a discharge of 500L/s of water is suddenly enlarged from 200mm to 400mm. Calculate the head loss due to expansion.	7M	CO4	L3
	(OR)			
8(a)	Explain the Reynold's experiment to classify the flows.	7M	CO4	L2
(b)	Derive Hagen Poiseuille equation for laminar flow in circular pipe line.	7M	CO4	L3
9(a)	What are the different laws on which models are designed for dynamic similarity? Where are they used?	7M	CO5	L2
(b)	Explain the terms: Distorted models and undistorted models. What is the use of distorted models?	7M	CO5	L2
	(OR)			
10(a)	Describe the procedure of dimensional analysis using Buckingham π method.	7M	CO1	L2
(b)	Derive Reynolds and Froude numbers and list out their applications for use in fluid mechanics.	7M	CO1	L2

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H.T.No										

19 NOV 2025

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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) Supplementary Examinations

20CS04-DISCRETE MATHEMATICAL STRUCTURES

(CSE,CSE(AI&ML)&IT)

Time : 3 hours | Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Draw the truth tables for the following (i) (P →Q) V (P Λ ~ Q) (ii) (P → (Q V R)) Λ P Λ ~ QΛ ~ R.	7M	CO1	L1
(b)	Show that (P→(QVR)) Λ P Λ ~ QΛ~ R is a contradiction without using a truth table.	7M	CO1	L2
	(OR)			
2(a)	Identify the PCNF and PDNF of the compound proposition (¬P→Q) ∧ (Q⇄P).	7M	CO1	L2
(b)	State that R→S can be derived from the premises P→(Q→S), ¬RvP and Q, using rule CP.	7M	CO1	L1
3(a)	Discuss about operations on sets with examples.	7M	CO2	L2
(b)	If A={1,2,3,4} and R,S are relations on A defined by R={(1,2), (1,3), (2,4), (4,4)} S={(1,1), (1,2), (1,3), (1,4), (2,3), (2,4)}. Find ROS, SOR,R^2,S^2 and write down their matrices.	7M	CO2	L3
	(OR)			
4(a)	Define Bijective function with an 2 examples .	7M	CO2	L1
(b)	Define primitive recursive function ?show that the function f(x, y) = x + y is primitiverecursive.	7M	CO2	L3
5(a)	Explain about complete graph and planar graph with an example.	7M	CO3	L1
(b)	Define the following graph with one suitable examples for each graphs complement graph (ii) subgraph (iii) induced subgraph (iv) spanning subgraph.	7M	CO3	L2
	(OR)			
6(a)	Prove that a connected graph G is Euler graph if and only if every vertex of G is of even degree.	7M	CO3	L2
(b)	Show that isomorphism of that simple graphs is an equivalent relation.	7M	CO3	L2
7(a)	Show that G = {1, –1, i, –i } is an abelian group under multiplication.	7M	CO4	L2
(b)	State and prove Lagrange's Theorem.	7M	CO4	L2
	(OR)			
8(a)	List the number of integers <500 and divisible by 9 or 11or 13.	7M	CO4	L4
(b)	Find the number of permutations of the letters of the word MASSASAUGA. In how many of these, all four A's are together. How many of them begin with S?	7M	CO4	L3
9(a)	Solve the Recurrence Relation $\mathbf{a_n+a_{n-1}-8a_{n-2}-12a_{n-3}=0}$ for n≥3, with $a_0=1$, $a_1=5$, $a_2=1$.	7M	CO5	L3
(b)	Evaluate a generating function for the recurrence relation and solve the relation $\mathbf{a_{n+1}- a_n = n^2}$, n>=0 and $a_0=1$.	7M	CO5	L3
	(OR)			
10(a)	Solve $4x_{n+1}+8x_n+3x_{n-1}=0$.	7M	CO5	L3
(b)	Find the solution to $x_{n+1}- 8x_n+15x_{n-1}=0$ which is satisfies the condition $x_0=5$ and $x_1=21$.	7M	CO5	L2

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H.T.No										

19 NOV 2025

R20

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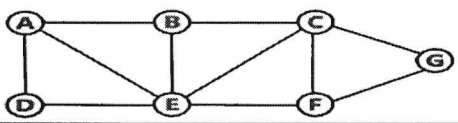
B.Tech. (III Semester) Supplementary Examinations

19/11/25

20CS03-DATA STRUCTURES
(ECE&EEE)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define Recursion. Give examples for linear and non-linear recursion.	7M	CO1	L1
(b)	Explain linear search procedure for the following list of elements and assume the key element is 96. 12, 23, 34, 45, 55, 62, 71, 85, 96.	7M	CO1	L3
	(OR)			
2(a)	Write an algorithm with Logarithmic time complexity.	7M	CO1	L2
(b)	Write an algorithm with constant space complexity i.e. O(1).	7M	CO1	L2
3(a)	Explain infix to postfix conversion algorithm using stack with suitable example.	7M	CO2	L2
(b)	What is a Linear Queue? Write a C program to implement Linear Queue ADT using Arrays.	7M	CO2	L2
	(OR)			
4(a)	Write a program for implementing Queue using linked list.	7M	CO2	L2
(b)	Discuss the applications of DEQUE.	7M	CO2	L2
5(a)	Give the algorithm of Insertion Sort.	7M	CO3	L2
(b)	Sort the following elements using Quick sort. 20, 12, 30, 45, 44, 16, 7, 5, 90, 21	7M	CO3	L3
	(OR)			
6(a)	Discuss about Insertion sort with an example.	7M	CO3	L2
(b)	Sort the following elements using Bubble sort. 131, 8, 92, 34, 13, 12, 25.	7M	CO3	L3
7(a)	Construct Binary Search Tree with {7, 6, 5, 4, 3, 2, 1} and give your observations.	7M	CO4	L3
(b)	Construct Binary Tree for the list {7, 6, 5, 4, 3, 2, 1} and differentiate both the trees.	7M	CO4	L3
	(OR)			
8(a)	What is a binary search tree? How do you insert an element into a binary search tree?	7M	CO4	L2
(b)	What is traversing? Write recursive procedure for in order traversal in a binary tree.	7M	CO4	L2
9(a)	Demonstrate DFS traversal on the following graph. Take A as starting vertex. 	7M	CO5	L3
(b)	Discuss types of graphs & describe various ways of representing graphs.	7M	CO5	L1
	(OR)			
10(a)	Define Collision. Explain the various techniques to resolve a collision.	7M	CO5	L2
(b)	What is a Hash Function? Explain different types of Hash functions.	7M	CO5	L2

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H.T.No										

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R20

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

B.Tech. (III Semester) Supplementary Examinations

20ME03-FLUID MECHANICS AND HYDRAULIC MACHINERY

(ME)

Time : 3 hours Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid ofsp.gr. 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm.	7M	CO1	L3
(b)	Explain in detail about the principle of dimensional homogeneity.	7M	CO1	L2
	(OR)			
2(a)	A fan delivers 4 m^3 of air per second at 20^0C and 1.25 bar. Assuming molecular weight of air as 28.97, calculate the mass of air delivered .Also determine the density, specific volume and specific weight of the air being delivered.	7M	CO1	L3
(b)	Enumerate the steps involved in Buckingham's pi theorem method.	7M	CO1	L1
3(a)	The velocity potential function given by $\emptyset = 4(x^2 - y^2)$. Calculate the velocity components at the point (2, 3) and also find out the stream function.	7M	CO2	L3
(b)	Water under a pressure of $3.924 \times 10^{-3} N/m^2$is flowing through a 0.3 m pipe at the rate of 0.25 m^3/sec. if the pipe is bent 135^0, find the magnitude and direction of the resultant force on the bend.	7M	CO2	L3
	(OR)			
4(a)	Explain in detail about the classification of flows.	7M	CO2	L2
(b)	A 300 mm diameter pipe conveying water branches into two pipes of diameter 250 mm and 200 mm and respectively. If the average velocities in the 300 mmand the 200 mm pipes be 2.5m/sec and 1 m/sec, calculate the velocity in the 250mm pipe.	7M	CO2	L3
5(a)	Deduce an expression for the force exerted by the jet on the curved plate when the plate is moving in the direction of jet.	7M	CO3	L2
(b)	A nozzle of 50mm diameter delivers a stream of water at 20m/s perpendicular to a plate moves away from the jet at 5m/s. Calculate (i) the force on the plate (ii) the efficiency of jet.	7M	CO3	L3
	(OR)			
6(a)	Formulate an expression for the energy thickness for boundary layer flow.	7M	CO3	L2

(b)	Estimate the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $(u/U)=2(y/\delta)-(y/\delta)^2$.	7M	CO3	L3
7(a)	Explain importance and different types of draft tubes used in a Francis turbine.	7M	CO5	L2
(b)	A reaction turbine develops 7000KW under a head of 45m with a speed of 150rpm. What is the specific speed of the turbine? What will be the power and speed when the turbine works under a head of 20m.	7M	CO5	L3
	(OR)			
8(a)	Derive condition for maximum efficiency of a pelton wheel.	7M	CO5	L2
(b)	A Kaplan turbine produces 60000KW under a net head of 25m with an overall efficiency of 90%. Taking the value speed ratio as 1.6, flow ratio as 0.5 and the hub diameter as 0.35 times the outer diameter, Determine the diameter and speed of the turbine.	7M	CO5	L3
9(a)	Give the classification of reciprocating pumps.	7M	CO5	L1
(b)	A double acting reciprocating pump, running at 40r.p.m delivers $1m^3$/minute. The pump has a stroke of 400mm. the diameter of the piston is 200mm. The delivery and suction head are 20m and 5m. Estimate the slip of the pump and power required to drive the pump.	7M	CO5	L3
	(OR)			
10(a)	Illustrate the centrifugal pumps connected in series and parallel.	7M	CO5	L2
(b)	Centrifugal pump delivers water against a net head of 14.5m and a design speed of 1000rpm. The vanes are curved back to an angle of 300 with the periphery. The impeller diameter is 300mm and outlet width is 50mm. Find the discharge of the pump if manometric efficiency is 95%.	7M	CO5	L3

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B.Tech. (III Semester) Supplementary Examinations

20CS07-DATABASE MANAGEMENT SYSTEMS
(AI&DS,CSE,CSE(AI&ML)& IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	How to model the data? Explain various ways of data modelling with suitable examples.	7M	CO1	L2
(b)	Write and explain the working principle of client server architecture.	7M	CO1	L1
	(OR)			
2(a)	Write a note on various types of end users who use DBMS. List out the responsibilities of a database administrator.	7M	CO1	L2
(b)	Discuss the types of relationships that can be represented in E-R diagram. Explain them with an example.	7M	CO1	L2
3(a)	What is a relation? Differentiate between relation schema and relation instance.	7M	CO2	L2
(b)	Define the terms unity and degree of relation. What are domain constraints?	7M	CO2	L1
	(OR)			
4(a)	What is the usage of 'group by' and 'having' clauses in SQL? Demonstrate with an example.	7M	CO2	L3
(b)	Demonstrate various types of joins with appropriate examples.	7M	CO2	L3
5(a)	Explain the importance of Schema Refinement. Discuss with examples about the problems caused by Redundancy.	7M	CO3	L3
(b)	Compare and contrast BCNF with 3rd Normal form stating relevant examples.	7M	CO3	L3
	(OR)			
6(a)	What are the conditions required by a relation to be in 3NF and in 4NF? Explain with suitable examples.	7M	CO3	L3
(b)	Illustrate with examples how Loss Less Join dependency is implemented.	7M	CO3	L3
7(a)	Discuss about Conflict Serializability with an example.	7M	CO4	L2
(b)	How would time stamping protocols help in concurrency control?	7M	CO4	L2
	(OR)			
8(a)	Discuss in detail about timestamp based concurrency control techniques.	7M	CO4	L2
(b)	List with examples any two methods for dealing deadlock problem.	7M	CO4	L2
9(a)	State and explain various file organisation methods. Give suitable examples to each them.	7M	CO5	L2
(b)	Explain the different kinds of NoSQL data stores.	7M	CO5	L2
	(OR)			
10.	Discuss about Hash-based indexing and tree-based indexing.	14M	CO5	L2

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20 NOV 2025

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

20AE02-ENGINEERING FLUID MECHANICS
(ASE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Find the pressure represented by a column of (i) 10cm water (ii) 5cm of oil of relative density 0.75 (iii) 2cm of Mercury.	7M	CO1	L2
(b)	State the Pascal's law. Discuss the working principle of Hydraulic press.	7M	CO1	L2
	(OR)			
2(a)	Prove that the pressure is exerted equally in all direction at any point in a liquid at rest.	7M	CO1	L2
(b)	A circular plate of diameter 0.75m is immersed in a liquid of relative density 0.80 with its plane making an angle of 30° with the horizontal. The centre of the plate is at a depth of 1.50 m below the free surface. Calculate the total force on one side of the plate and the location of the centre of pressure.	7M	CO1	L3
3(a)	For a two-dimensional potential flow, the velocity potential is given by $\Phi = 4x(3y-4)$, determine the velocity at the point (2, 3) and also the value of stream function at the point (2, 3).	7M	CO2	L3
(b)	Derive the Euler's equation of motion along a streamline.	7M	CO2	L2
	(OR)			
4(a)	List and explain the various practical applications of Bernoulli's equation.	7M	CO2	L2
(b)	State the working principle of Venturimeter. Derive an expression for discharge through Venturimeter.	7M	CO2	L3
5(a)	Derive the Darcy-weisbach equation for friction head loss in a pipe.	7M	CO4	L3
(b)	The pressure difference Δp in a pipe of D and length l due to viscous flow depends on the velocity V, viscosity μ and density ρ. Using Buckingham's π theorem, obtain an expression for Δp.	7M	CO4	L4
	(OR)			
6(a)	Explain about the Reynold's experiment with a neat sketch.	7M	CO4	L2
(b)	Derive an expression for equivalent size of a compound pipe.	7M	CO4	L3
7(a)	A Pelton wheel generates 8000KW under a net head of 130 m at a speed of 200 rpm. Assuming the coefficient of velocity for the nozzle 0.98, hydraulic efficiency 87%, speed ratio 0.46 and jet diameter to wheel diameter ratio is 1/9. Determine (i) Discharge required (ii) Diameter of the wheel (iii)Diameter and number of jets required (iv)Specific speed; Mechanical efficiency is 75%.	7M	CO5	L3

(b)	Differentiate between reaction turbine and impulse turbine. Explain the importance of draft tube.	7M	CO5	L2
	(OR)			
8(a)	Explain the construction and working of Pelton Wheel with neat sketch.	7M	CO4	L2
(b)	Draw the velocity triangles of Pelton wheel.	7M	CO4	L2
9(a)	Compare and comment on effect backward curved vane, forward curved vane and radial vane on the operation of centrifugal pump impeller. Explain the comparisons by drawing the velocity triangles.	7M	CO5	L2
(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.	7M	CO5	L3
	(OR)			
10(a)	Explain the following of a reciprocating pump with neat sketches (i) Suction stroke (ii) Deliver stroke (iii) Slip	7M	CO5	L2
(b)	A centrifugal pump is running at 1000 r.p.m. The outlet vane angle of the impeller is 45° and velocity of flow at outlet is 2.5 m/s. The discharge through the pump is 200 litres/s when the pump is working against a total head of 20 m. If the manometric efficiency of the pump is 80%, determine (i) the diameter of the impeller, and (ii) the width of the impeller at outlet.	7M	CO5	L3

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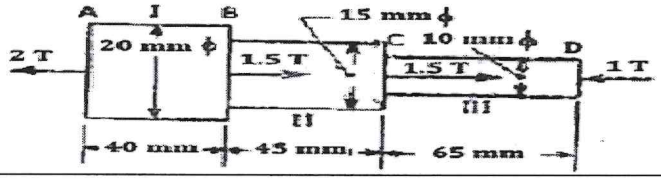
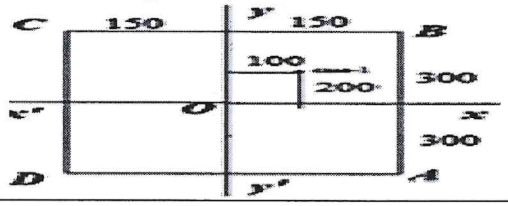
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

20CE06-SOLID MECHANICS
(CE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Derive relation between Young's modulus (E), Rigidity Modulus (G) and Bulk Modulus (K).	7M	CO1	L2
(b)	A stepped circular bar 150 mm long with diameters 20mm, 15mm and 10mm along the lengths *AB, BC* and *CD* respectively is subjected to various forces as shown in the Fig. There is a tensile force on section *A* (as the force is pointing away from the plane) and there is a compressive force on section *D* (as the force is pointing towards the plane). Determine the change in length if $E = 2 \times 10^5$ N/mm^2. 	7M	CO3	L3
	(OR)			
2(a)	Derive an expression for the stress developed due to Impact loading.	7M	CO2	L2
(b)	A steel bolt passes centrally through a brass tube. At the ends washers and nuts are provided. The whole assembly is raised in temperature by 50°C The area of the cross section of steel bolt is 2000mm^2 and that of brass tube is 1000mm^2. E_{steel} is 2times E_{brass}. If the stress due to temperature rise is 40N/mm^2 (tensile) in steel bolt, determine the stress in brass tube.	7M	CO3	L3
3(a)	An elemental cube is subjected to tensile stresses of 30N/mm^2 and 10N/mm^2 acting on two mutually perpendicular planes and a shear stress of 10N/mm^2 on these planes. Determine the magnitude and directions of principal stresses and also the greatest shear stress.	7M	CO5	L2
(b)	The stresses at a point in a bar are 200N/mm^2 (tensile) and 100N/mm^2 (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 60^0 to the axis of major stress. Also determine the maximum shear stress in the material at the point.	7M	CO5	L3
	(OR)			
4(a)	Derive the formulae for normal and shear stresses on an inclined plane whose normal makes an angle '□' with the horizontal in case of bi-axial stress system.	7M	CO2	L2
(b)	At a point in a strained material the resultant intensity of stress across a vertical plane is 100MPa tensile inclined at 35° clockwise to its normal. The normal component of intensity of stress across the horizontal plane is 50MPa compressive Determine graphically using Mohr's circle method the position of principal planes and stresses across them.	7M	CO3	L3

5(a)	A cantilever of length 12m carries two point loads 4kN and 6kN at a distance of 2m and 6 m from fixed end respectively. In addition to this the beam also carries a uniformly distributed load of 2kN/m over a length of 4 m at a distance of 6 m from the fixed end. Draw the S.F and B.M diagrams for the cantilever.	7M	CO4	L3
(b)	Explain each term in bending equation along with its significance.	7M	CO2	L2
	(OR)			
6(a)	Draw the shear force and bending moment diagrams for a cantilever beam of length 4m if two anti-clockwise moments of 15kNm and 10kNm are applied at the mid-span and the free end, respectively.	7M	CO4	L3
(b)	A beam is simply supported and carries a uniformly distributed load of 40kN/m run over the whole span. The section of the beam is rectangular having depth as 500mm. If the Maximum stress in the material of the beam is 120N/mm^2 and moment of inertia of the section is 7 x 10^{8}mm^4, find the span of the beam.	7M	CO3	L3
7(a)	State the assumptions made in the formulation of pure torsion equation.	7M	CO2	L2
(b)	A 400mm × 150mm I-girder has 20mm thick flanges and 13mm thick web. Calculate the maximum intensity of shear stress and sketch the distribution of shear stress across the section, the shear force at the cross-section being 160kN.	7M	CO4	L3
	(OR)			
8(a)	Prove that the maximum shear stress of a Circular section is equal to 1.33times of average shear stress.	7M	CO4	L2
(b)	A hollow shaft is subjected to a torque of 40kNm and bending moment of 30kNm. The internal diameter of the shaft is one-half of the external diameter. If maximum shear stress is not to exceed 82 N/mm^2, find the diameter of the shaft.	7M	CO3	L3
9(a)	Derive the expression for Euler's crippling load for a column When both ends are fixed.	7M	CO3	L2
(b)	Calculate the combined stresses at the corners of the rectangular section ABCD (AB=CD=600mm, BC=AD=300mm), when a load of 100kN is acting at eccentricity (e_x=100mm and e_y=200mm) in XOY region as shown in figure. 	7M	CO3	L3
	(OR)			
10(a)	What is the ratio of the strength of a solid steel column of 150mm diameter to that of a hollow circular steel column of the same cross-sectional area and a wall thickness of 15mm? The two columns have the same length and similar end conditions.	7M	CO3	L3
(b)	A square chimney 30m high has a flue opening of size 1.5m x 1.5m. Find the minimum width requires at the base for no tension, if the masonry weighs 20kN/m^3 and the wind pressure is 1.5kN/m^2. The permissible stress in masonry is 1N/mm^2.	7M	CO5	L3

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B.Tech. (III Semester) Supplementary Examinations

20/11/25

20EC03-ANALOG CIRCUIT DESIGN

(ECE)

Time : 3 hours Max.Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate the expression for voltage gain common source amplifier with channel length modulation.	7M	CO1	L2
(b)	A voltage source V_s of internal resistance R_s=800Ω derives a CE amplifier. That load is a resistance of 2500Ω. The h-parameter are h_{je}=950Ω, h_{re}=2.0X 10^{-4}, h_{fe}=50 & h_{oe}=25μA/V. Find A_i, A_v, A_{is}, A_{vs}, R_i, Z_o, A_p.	7M	CO2	L3
	(OR)			
2(a)	Draw the circuit diagram of single stage CE amplifier and derive the expression for short circuit current gain.	7M	CO1	L2
(b)	Draw the CD amplifier and derive the expression for voltage gain at low frequencies.	7M	CO2	L3
3(a)	Briefly explain about Cascade Amplifier Working and Its Applications.	7M	CO2	L2
(b)	What is the working principle of Darlington transistor?	7M	CO2	L2
	(OR)			
4.	Explain working principle of Three Stage Direct Coupled Amplifier.	14M	CO2	L2
5(a)	Establish the condition for frequency of oscillation in an RC phase shift oscillator.	7M	CO2	L3
(b)	Derive the oscillation condition for LC circuits.	7M	CO2	L4
	(OR)			
6(a)	Discuss quantitative analysis of voltage series Feedback amplifies using practical circuit.	7M	CO2	L3
(b)	Draw the circuit diagram of general LC oscillators and obtain general condition to maintain frequency of oscillators.	7M	CO1	L2
7(a)	Determine an expression for output of a RC differentiator circuit when its input is exponential signal. Determine the transmission error.	7M	CO4	L3
(b)	What is the ratio of the rise time of the three sections in cascade to rise time of single section of a low pass RC circuit?	7M	CO4	L3
	(OR)			
8(a)	Express the output voltage across the resistance of an RC circuit, when the input is a pulse of duration T sec and amplitude.	7M	CO4	L3
(b)	Derive the gain response of a RC high pass circuit when sinusoidal signal as input.	7M	CO4	L3
9(a)	Explain the function of Astable multivibrator with waveforms.	7M	CO4	L4
(b)	What is Schmitt trigger? With the help of a neat circuit diagram and waveforms, explain the working of Schmitt trigger.	7M	CO3	L4
	(OR)			
10(a)	What are different types of multivibrators? Explain the stable state of a multivibrator.	7M	CO4	L1
(b)	The Schmitt trigger circuit also called sinusoidal to square converter? Explain the working principle.	7M	CO4	L2

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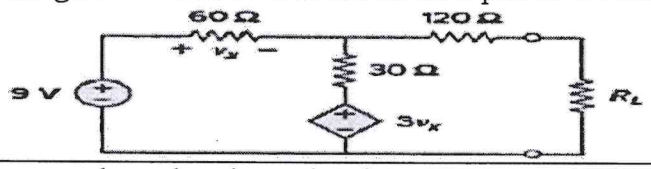
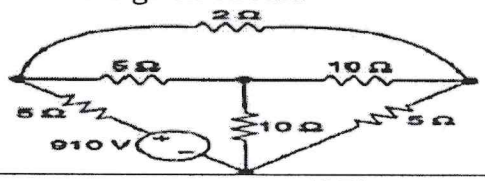
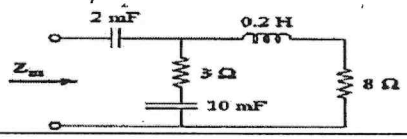
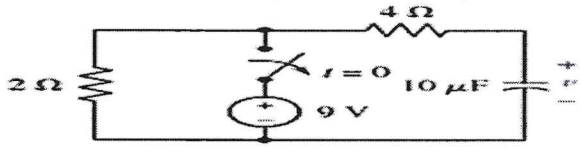
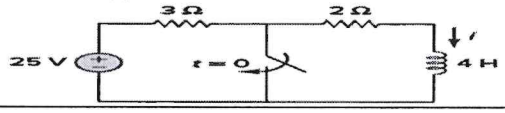
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

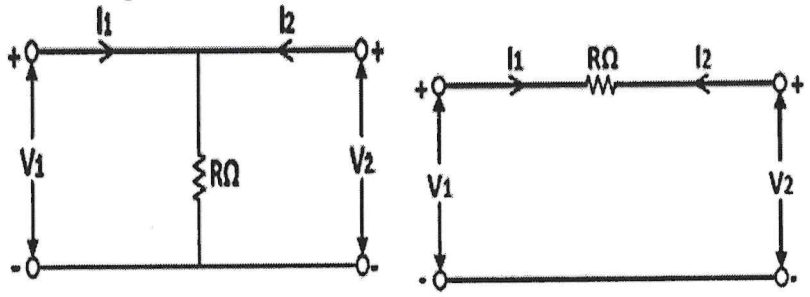
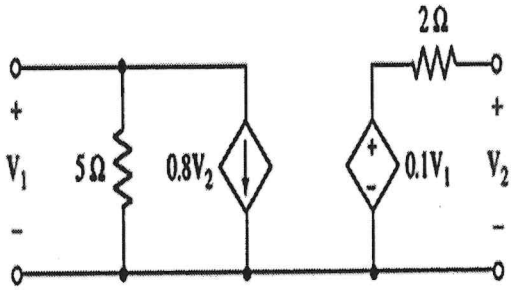
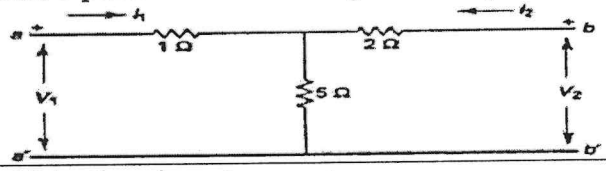
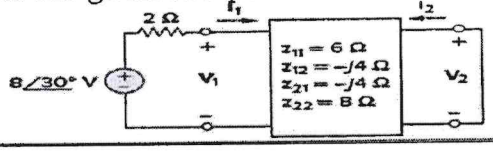
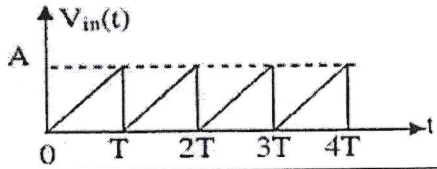
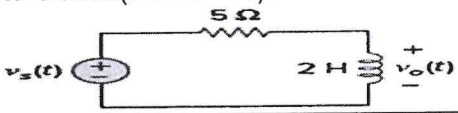
20EE05-ELECTRICAL CIRCUIT ANALYSIS

(EEE)

Time : 3 hours | Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	State maximum power transfer theorem for dc and ac circuits and calculate value of RI, in the given circuit so that maximum power is transferred. 	7M	CO1	L3
(b)	Draw the dual network to the given circuit. 	7M	CO1	L3
	(OR)			
2(a)	Derive the condition for maximum power transfer to a load.	7M	CO1	L4
(b)	Find the input impedance of the circuit shown in figure. Assume that the circuit operates at ω = 50 rad/s. 	7M	CO1	L1
3(a)	Derive an expression for transient response of series RC circuit with AC excitation.	7M	CO2	L4
(b)	In a series RLC circuit L=0.3H, and C=4 F. A DC voltage of 50V is applied at t=0. 0. Find an expression for current i (t) in the circuit, when (i) R= 5S-2 (ii) R= 6Q.	7M	CO2	L1
	(OR)			
4(a)	For the given circuit, find the voltage v at t =200 μs. 	7M	CO2	L3
(b)	Assuming switch has been open for a longer period and closed at t=0. Derive the expression for $i_L(t)$ for t>0. 	7M	CO2	L3
5(a)	Three equal impedances, each of (2 + j5) ohms, are connected in delta. This is further connected to a 440V, 50Hz, three-phase balanced star connected supply. Calculate (i) phase voltages (ii) phase currents (iii) line currents.	7M	CO3	L2
(b)	The two-wattmeter method produces wattmeter readings P1=1560W and P2 = 2100W when connected to a delta-connected load. If the line voltage is 220V, calculate: (i) the per-phase average power, (ii) the per phase reactive power, (iii) the power factor.	7M	CO3	L2
	(OR)			

6(a)	Prove that two wattmeter's are enough to measure 3-Phase power.	7M	CO3	L2
(b)	The three rms phase voltage of a balanced 3-Phase supply are $V_{RY}=100\angle 0^0V$, $V_{YB}=100\angle -120^0V$, $V_{BR}=100\angle -240^0V$ respectively. If a balanced 3-phase delta connected load with impedance $10\angle 30^0$ohms is connected, find the line and Phase currents.	7M	CO3	L3
7(a)	Obtain Z parameters of the following networks. 	7M	CO4	L3
(b)	Determine the impedance parameters for the two-port exhibited in Figure. 	7M	CO4	L3
	(OR)			
8(a)	Compute the Z and Y parameters for the given two-port network. 	7M	CO4	L3
(b)	Calculate II and 12 in the given two-port. 	7M	CO4	L3
9(a)	Design a m-derived low pass filter having cut-off frequency of 1KHz, design impedance of 400Ω and the resonant frequency of 1100Hz.	7M	CO5	L4
(b)	Calculate the Fourier series for the function shown in fig. 	7M	CO5	L3
	(OR)			
10(a)	Find the response $v_o(t)$ of the circuit if $v_s(t) = 24+192\cos 120\pi t+96\cos(360\pi t-30)$. 	7M	CO5	L3
(b)	Describe the low pass RC filter with frequency response.	7M	CO5	L3

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20 NOV 2025

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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) Supplementary Examinations

20ME04-THERMODYNAMICS

(ME)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Differentiate between macroscopic approach and microscopic approach of thermodynamics.	7M	CO1	L2
(b)	Illustrate different types of thermodynamic processes by representing them on P-V coordinates.	7M	CO1	L2
	(OR)			
2(a)	Differentiate thermal and thermodynamic equilibrium. What do you mean by quasi static process?	7M	CO1	L2
(b)	List different types of thermometers and explain the working of constant volume gas thermometer.	7M	CO1	L1
3(a)	Establish an equation for first law of thermodynamics applied to a closed system operating in a cycle with the help of Joule's experiment.	7M	CO2	L2
(b)	Apply the first law of thermodynamics for a closed system and prove that internal energy is a property of system.	7M	CO2	L3
	(OR)			
4(a)	Apply steady flow energy equation and derive an equation for the flow through nozzle, turbine, compressor and heat exchanger. State the necessary assumptions.	7M	CO2	L3
(b)	At the inlet to a certain nozzle, the enthalpy of the fluid passing is 3000 kJ/kg and the velocity is 60 m/s. At the discharge end, the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it. (i) Estimate the velocity at exit from the nozzle, (ii) If the inlet area is 0.1 m^2 and the specific volume at inlet is 0.187 m^3/kg, compute the mass flow rate. (iii) If the specific volume at the nozzle exit is 0.498 m^3/kg, estimate the exit area of the nozzle.	7M	CO2	L3
5(a)	State second law of thermodynamics. It is impossible to construct PMM 2. Justify.	7M	CO3	L1
(b)	A refrigeration plant for a food store operates as a reversed Carnot heat engine cycle. The store is to be maintained at a temperature of – 5^0C and the heat transfer from the store to the cycle is at the rate of 5 kW. If heat is transferred from the cycle to the atmosphere at a temperature of 25^0C, estimate the power required to drive the plant.	7M	CO3	L3
	(OR)			
6(a)	State and prove Carnot's theorem.	7M	CO3	L2
(b)	Establish the inequality of Clausius and derive an expression for the entropy change in an irreversible process.	7M	CO3	L2
7(a)	Differentiate between wet, dry saturated steam and superheated steam.	7M	CO4	L2
(b)	Find the specific volume, enthalpy, entropy and internal energy of steam at 1.4 MPa, 380^0C.	7M	CO4	L3
	(OR)			
8(a)	Discuss the Dalton's law and Amagat's law of gas mixtures.	7M	CO4	L1
(b)	A gas mixture at 20 °C, 125 kPa is 50% N_2, 30% H_2O and 20% O_2 on a mole basis. Find the mass fraction, the mixture gas constant and the volume for 5kg of mixture.	7M	CO4	L3
9(a)	Illustrate the working of Diesel cycles with help of P-V and T-S diagrams.	7M	CO5	L2
(b)	Compare thermal efficiency of Otto, Diesel and Dual cycles for the same compression ratio and heat rejection	7M	CO5	L2
	(OR)			
10(a)	Illustrate the working of simple VCR cycle with the help of P-h diagram.	7M	CO5	L2
(b)	In an air standard Brayton cycle the pressure ratio is 7 and the maximum temperature of the cycle is 800°c. The compression begins at 0.1Mpa, 35°c. Find (i) the heat supplied per kg of air, (ii) the net work done per kg of air, (iii) the cycle efficiency.	7M	CO5	L3

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H.T.No										

21 NOV 2025

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

20AD02-COMPUTER ARCHITECTURE
(AI&DS and CSE(AI&ML))

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the importance of instruction set in measuring the performance of a computer system.	7M	CO1	L2
(b)	Describe about (i) Arithmetic Logic Unit (ii) Memory Unit.	7M	CO1	L2
	(OR)			
2(a)	Define an addressing mode. Explain about various addressing modes.	7M	CO1	L1
(b)	Explain about various general purpose registers involved in the typical computer system.	7M	CO1	L2
3(a)	Illustrate with examples fixed point representation and floating point representation.	7M	CO2	L2
(b)	Multiply -3 and -5 using Booth multiplication algorithm.	7M	CO2	L2
	(OR)			
4(a)	Design a Booth multiplication algorithm to perform multiplication between two signed 2's complement numbers.	7M	CO2	L3
(b)	Interpret an example to demonstrate Add operation with fixed point representation	7M	CO2	L1
5(a)	Model a complete processor using Hardwired control technique.	7M	CO3	L3
(b)	Examine the differences between Data hazards with Instruction hazards.	7M	CO3	L3
	(OR)			
6(a)	Explain the design of micro programmed control unit in detail.	7M	CO3	L2
(b)	Explain about Cache coherence in detail.	7M	CO3	L2
7(a)	List and explain the functioning of different varients of RAM.	7M	CO4	L2
(b)	Write a brief note son memory hierarchy.	7M	CO4	L2
	(OR)			
8.	Illustrate with examples how Mapping functions are implemented in Cache Memories.	14M	CO4	L4
9(a)	What is the difference between isolated I/O and memory mapped I/O? What are the advantages and disadvantages of each?	7M	CO5	L2
(b)	Explain the process of asynchronous data transfer with an example.	7M	CO5	L2
	(OR)			
10(a)	Explain about Exceptions and recovery from errors.	7M	CO5	L2
(b)	Quote the significance of Interrupts and ISR.	7M	CO5	L1

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21 NOV 2025

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

20AE03-ENGINEERING THERMODYNAMICS
(ASE)

Time : 3 hours Max. Marks :70

Answer all the questions
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Formulate the relation between Celsius scale and Fahrenheit scale.	7M	CO1	L1
(b)	A mass of gas expands from an initial state of to 0.4MPa, 0.03m^3 to 80kPa, 0.1m^3 in a piston-cylinder arrangement. Compare the work done if the process is (i) Isobaric (ii) Isothermal.	7M	CO2	L2
	(OR)			
2(a)	Is it possible to compress an ideal gas isothermally in an adiabatic piston–cylinder device? Discuss.	7M	CO1	L2
(b)	A piston–cylinder device contains 0.8kg of nitrogen initially at 100kPa and 27°C. The nitrogen is now compressed slowly in a polytropic process during which $PV^{1.3}$=constant until the volume is reduced by one-half. Determine the work done and the heat transfer for this process. Take the gas constant of nitrogen as 0.296kJ/kg-K.	7M	CO2	L3
3(a)	Define specific heat. Derive the equations for specific heat at constant pressure (c_p) and specific heat at constant volume (c_v).	7M	CO1	L1
(b)	A closed system of mass 20kg undergoes a process in which there is a heat transfer of 1000kJ from the system to the surroundings. The work done on the system is 200kJ. If the initial specific internal energy of the system is 300kJ/kg, what is the final specific internal energy, in kJ/kg? Neglect changes in kinetic and potential energy.	7M	CO2	L4
	(OR)			
4(a)	The compressor of a large gas turbine power plant receives air from the ambient at 95kPa, 20°C, with a low velocity. At the compressor discharge, air exists at 1.52MPa, 430°C, with a velocity of 90m/s. The power input to the compressor is 5000kW. Determine the mass flow rate of air through the unit.	7M	CO2	L4
(b)	An ordinary shower where hot water at 70°C is mixed with cold water at 20°C. If it is desired that a steady stream of warm water at 50°C be supplied, determine the ratio of the mass flow rates of the hot to cold water. Assume the heat losses from the mixing chamber to be negligible and the mixing to take place at a pressure of 20psia.	7M	CO2	L3
5(a)	State and prove Carnot's theorem.	7M	CO2	L2

(b)	Two reversible heat engines are arranged in series. The first one receives heat from a temperature of T_H and the second one rejects heat to a reservoir at a temperature of T_L. The first heat engine rejects energy to a reservoir at an intermediate temperature T. The second cycle receives the energy rejected by the first cycle from the reservoir at temperature T. Derive an expression for the intermediate temperature T in terms of T_H and T_L when both heat engines equally efficient.	7M	CO3	L3
	(OR)			
6(a)	Prove that the entropy is a point function.	7M	CO3	L2
(b)	Two 5kg blocks of steel one at 250°C and the other is at 25°C comes into thermal contact. Find the final temperature and the entropy change.	7M	CO3	L3
7(a)	A Mixture of ideal gases consists of 3kg of N_2, 5kg of CO_2 at a pressure of 300kPa and a temperature of 20°C. Find out (i) Mole fraction of each component (ii) mass fraction of each component (iii) The equivalent gas constant of the mixture.	7M	CO4	L4
(b)	State Dalton's law of partial pressure and Amagat's law of additive volumes and write their mathematical form.	7M	CO4	L4
	(OR)			
8(a)	Discuss the phase change process of water by using Pressure (P)-specific volume (v) diagram.	7M	CO4	L2
(b)	Calculate the enthalpy, internal energy and entropy of steam at a pressure of 2MPa and the specific volume is $0.09m^3/kg$.	7M	CO4	L2
9(a)	Derive the equation for air standard efficiency of Bryton cycle.	7M	CO5	L2
(b)	A petrol engine works on air standard Otto cycle. The pressure and temperature of air at beginning is 1bar, 15°C and compression ratio is 8. The heat supplied per kg of air is limited to 2000kJ. Find air standard efficiency.	7M	CO5	L4
	(OR)			
10(a)	Discuss the working of simple vapor compression refrigeration system with neat diagram.	7M	CO5	L2
(b)	A four-cylinder two-stroke 2.4-L diesel engine that operates on an ideal Diesel cycle has a compression ratio of 17 and a cutoff ratio of 2.2. Air is at 55°C and 97kPa at the beginning of the compression process. Using the air standard assumptions, determine how much power the engine will deliver at 1500rpm.	7M	CO5	L4

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21 NOV 2025

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

20CE07-CONCRETE TECHNOLOGY
(CE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain with the help of flow chart manufacturing process of cement.	7M	CO1	L2
(b)	What is sieve analysis of fine aggregate?	7M	CO1	L1
	(OR)			
2(a)	What are different types of cement? What is hydration of cement?	7M	CO1	L1
(b)	Write about bulk density and moisture absorption of aggregates.	7M	CO1	L1
3(a)	Describe the role of aggregate in creep of concrete.	7M	CO1	L2
(b)	Discuss the influence of mix proportions of concrete on Shrinkage.	7M	CO2	L2
	(OR)			
4.	What are the properties of fresh concrete? What are the different tests of workability?	14M	CO2	L1
5(a)	Describe briefly the following method of compaction of concrete. (i) Rodding (ii) Ramming (iii) Tamping	7M	CO3	L2
(b)	Classify the methods of curing of concrete and explain in detail.	7M	CO3	L1
	(OR)			
6(a)	Differentiate between retarding and accelerating admixtures in concrete.	7M	CO3	L2
(b)	State the uses of adding blast furnace slag to cement concrete.	7M	CO3	L1
7(a)	What are the different types of fibres? What are factors affecting properties of FRC?	7M	CO4	L1
(b)	Write about High Performance Concrete.	7M	CO4	L1
	(OR)			
8(a)	Define light weight concrete and explain in detail the classification of light weight concrete.	7M	CO4	L1
(b)	Discuss in detail about high density concrete.	7M	CO4	L6
9(a)	Define concrete mix design and state the principles of concrete mix design.	7M	CO4	L1
(b)	Define following (i) target mean strength (ii) water cement ratio (iii) aggregate cement ratio.	7M	CO4	L1
	(OR)			
10.	Design M40 grade concrete for the following data: Maximum nominal size of aggregate - 20mm (angular) Grade of cement = 53, Degree of workability, slump of concrete - 75mm, Type of exposure – moderate. Test data for concrete making materials - Specific gravity: cement = 3.15, coarse aggregate = 2.64 and fine aggregate = 2.60 Water absorption: Coarse aggregate = 1% Fine aggregate = 2% Sand is conforming to zone II. Assume any data if required.	14M	CO4	L3

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

20CS08-COMPUTER ORGANIZATION
(CSE & IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	(i) Convert $B9F.AE_{16}$ to octal (ii) Convert 756.603_8 to hexa-decimal.	7M	CO1	L1
(b)	Implement the following Boolean function F using K-Map $F(A,B,C,D) = \sum m(0, 1, 2, 3, 4, 5, 6, 9, 12, 13, 14)$.	7M	CO1	L2
	(OR)			
2(a)	Realize the basic gates (AND,OR,NOT) using NAND gate.	7M	CO1	L1
(b)	Convert the following numbers with given radix to decimal. (i) 4433_5 (ii) 1199_{12} (iii) 5654_7 (iv) 1221_3.	7M	CO1	L2
3(a)	Explain the working of D flip-flop.	7M	CO2	L2
(b)	Explain synchronous and ripple counters.	7M	CO2	L2
	(OR)			
4(a)	Discuss full adder.	7M	CO2	L2
(b)	Explain multiplexers and its applications.	7M	CO2	L2
5(a)	Explain in detail about instruction execution characteristics.	7M	CO3	L2
(b)	Draw and explain the flow chart for decimal division.	7M	CO3	L2
	(OR)			
6(a)	What do you mean by addressing mode? Explain the following addressing modes with examples. (i) Direct Addressing Mode (ii) Immediate Addressing Mode.	7M	CO2	L1
(b)	Explain the steps for Floating Point Multiplication with neat diagram and suitable example.	7M	CO3	L2
7(a)	Distinguish between Hardwired control unit and Micro-programmed control unit.	7M	CO4	L1
(b)	Summarize parallel processing in basic computer organization.	7M	CO4	L2
	(OR)			
8(a)	Demonstrate concept of Micro-program Sequencer with neat diagram and its truth table.	7M	CO4	L2
(b)	List out the hazards encountered in instruction pipelining, explain them.	7M	CO4	L1
9(a)	With a neat diagram, describe DMA transfer in a computer system.	7M	CO5	L2
(b)	Explain the function of standard I/O interface.	7M	CO5	L2
	(OR)			
10(a)	Explain memory hierarchy with neat diagram.	7M	CO5	L2
(b)	Discuss cache memory mapping techniques.	7M	CO5	L2

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21 NOV 2025

R20

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

21/11/25

20EC04-SIGNALS AND SYSTEMS

(ECE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine whether the following signals are energy or power signals (i) $x(t) = \sin^2\omega_o t$ (ii) $x(t) = t\,u(t)$.	7M	CO1	L2
(b)	Discuss the Graphical representation of convolution with an example.	7M	CO2	L2
	(OR)			
2(a)	Define signal and discuss continuous time, analog, discrete time and digital signals with suitable graphs.	7M	CO1	L2
(b)	Discuss the time shifting and time scaling operations with suitable examples.	7M	CO2	L3
3(a)	Discuss the concept of trigonometric Fourier series and derive the expressions for coefficients.	7M	CO2	L2
(b)	Examine the manner in which the approximation of a signal by a set of mutually orthogonal signals and obtain the expression for mean square error.	7M	CO2	L1
	(OR)			
4(a)	Derive the expression for Mean Square Error for signal approximation using orthogonal functions.	7M	CO2	L3
(b)	Obtain the trigonometric Fourier series for the signal $x(t)=t/2\pi$ for $0\le t\le 2\pi$.	7M	CO4	L4
5(a)	State and prove duality property and find the Fourier Transform of $\{1/\pi t\}$.	7M	CO4	L2
(b)	Find the Nyquist rate and Nyquist interval for the signals (i) rect (300t) (ii) 10 sin (40πt) cos (300 πt).	7M	CO1	L2
	(OR)			
6(a)	Examine the complex conjugate and Parseval's theorem properties for Fourier transform.	7M	CO2	L3
(b)	Analyze the of Fourier transform of step signal u(t) and Signum signal Sgn(t).	7M	CO4	L4
7(a)	Illustrate the conditions for the distortion less transmission system through a system.	7M	CO3	L3
(b)	Calculate the system function, impulse response, frequency response, magnitude and phase response of the low pass RC circuit.	7M	CO3	L3
	(OR)			
8(a)	The frequency response of an LTI system is given by $H(\omega) = \frac{2+j\omega}{12+7j\omega-\omega^2}$. Find (i) Impulse response of the system. (ii) Output of the system when input $x(t) = e^{-2t}u(t)$.	7M	CO3	L3
(b)	Discuss about distortion less transmission through a system.	7M	CO3	L2
9(a)	Interpret the concept of ROC and discuss it's properties .	7M	CO4	L2
(b)	Compute the Laplace transform and its Region of Convergence of a signal $x(t)=2e^{-3t}\,u(t)+3e^{-2t}u(t)$.	7M	CO4	L4
	(OR)			
10(a)	State and Prove time differentiation and time integration properties of Laplace transform.	7M	CO2	L2
(b)	Analyze the Laplace Transform and its Region Convergence of a signal $x(t) = e^{-a\|t\|}u(t)$ through graphically.	7M	CO4	L3

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H.T.No										

21 NOV 2025

R20

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

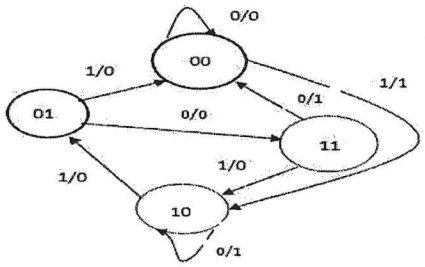
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

20EE06-DIGITAL ELECTRONICS
(EEE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	(i) Convert the number $(3BA.\ 25)_{14}$ to base 6. (ii) List the ASCII code for the 10 decimal digits (1 to 10) with an even parity bit in the leftmostposition.	7M	CO1	L3
(b)	Find the minimum sum-of-products expression for *F*, using the Quine-McCluskey method. $F(A, B, C, D, E) = \Sigma m$ (0, 2, 6, 7, 8, 10, 11, 12, 13, 14, 16, 18, 19, 29, 30)+ Σ d (4, 9, 21)	7M	CO2	L3
	(OR)			
2(a)	Perform the following arithmetic operations in BCD. (i)$(236)_{10}$+ $(455)_{10}$and (ii)$(236)_{10}$- $(455)_{10}$, use 2's complement method to represent a negative umber.	7M	CO1	L3
(b)	Reduce the following Boolean expression to two literals: F(x, y, z) $=x'y'z'+ y + xy'z'$ and draw logic diagrams of the circuits that implement the original and simplified expressions.	7M	CO2	L3
3(a)	Simplify the following Boolean function *F*, together with the don't-care conditions *d*, and implement it with two-level NAND gate circuit: $F(A, B, C, D) = \Sigma m$ (4, 5, 8, 9, 14, 15) + Σ d(2, 3, 12, 13)	7M	CO2	L3
(b)	Draw a two-level logic diagram to implement the Boolean function using only NOR gates: $F = BC' + AB + ACD$.	7M	CO2	L3
	(OR)			
4(a)	Implement the Boolean function $F = xz + x'z' + x'y$with NAND and inverter gates.	7M	CO2	L4
(b)	Draw the multiple level NOR circuit for the following expression: $CD.\ (B + C).\ A + (BC' + DE')$.	7M	CO2	L4
5(a)	Write the comparisons between PAL, PLA.	4M	CO3	L1
(b)	Design a BCD to excess-3 code converter using PAL.	10M	CO3	L3
	(OR)			
6(a)	Realize full adder and full subtractor using 8:1 MUX.	7M	CO3	L3
(b)	Design and implement Full adder with PLA.	7M	CO3	L4
7(a)	Explain the differences among a truth table, a state table, a characteristic table, and anexcitation table.	7M	CO3	L2
(b)	Convert a D-flip flop to a JK-flip flop by means of a sequential circuit design procedure.	7M	CO4	L3
	(OR)			

8(a)	Show that the characteristic equation for the complement output of a T flip-flop is: $Q(t+1) = T'Q' + TQ$.	7M	CO4	L2
(b)	A certain flip-flop has four operations: complement, set to 1, set to 0, and no change, when inputs A and B are 00, 01, 10, and 11, respectively. (i) Tabulate the characteristic table, (ii) Tabulate the excitation table, and(iii)Derive the characteristic equation.	7M	CO4	L3
9(a)	Write a brief note on Finite State Machines.	4M	CO4	L3
(b)	A sequential circuit has one input and one output. The state diagram is shown below. Design the sequential circuit with RS flip-flop. 	10M	CO4	L2
	(OR)			
10(a)	Give the comparison between Mealy and Moore models.	4M	CO4	L2
(b)	With an example explain the procedure for conversion of Moore machine to Mealy machine.	10M	CO4	L2

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H.T.No.										

21 NOV 2025

R20

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

20ME05-METALLURGY AND MATERIAL SCIENCE
(ME)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Enumerate and explain the methods employed for measuring the grain size of material.	7M	CO1	L1
(b)	Define atomic packing factor and calculate packing factor for B.C.C structure.	7M	CO1	L2
	(OR)			
2(a)	On what factors grain size depends. Explain?	7M	CO1	L1
(b)	Yield strength of poly crystalline material increases from 120 MN/m^2 to 220 MN/m^2 on decreasing the grain diameter from 0.04 to 0.01 mm. Find the yield strength for a grain size of 0.0159 mm.	7M	CO1	L2
3(a)	Draw Cu-Ni phase diagram and label the important reactions and regions.	7M	CO2	L3
(b)	What is eutectic reaction? How does it differ from a eutectoid reaction?	7M	CO2	L2
	(OR)			
4(a)	List and explain the methods of construction of phase diagrams.	7M	CO2	L2
(b)	Write the peritectoid reaction. Draw a labeled phase diagram showing this reaction. Also give examples.	7M	CO2	L2
5(a)	Draw the Fe-Fe_3C equilibrium diagram and explain it.	7M	CO3	L2
(b)	Give a few applications where Aluminium and its alloys are exclusively used.	7M	CO3	L3
	(OR)			
6(a)	Differentiate between medium carbon steel and high carbon steels.	7M	CO3	L3
(b)	Explain in detail about the properties and applications of white cast iron.	7M	CO3	L2
7(a)	Compare annealing and normalizing.	7M	CO4	L3
(b)	What is Nitriding? Explain the process, advantages and disadvantages.	7M	CO4	L2
	(OR)			
8(a)	Compare cold and hot working of metals.	7M	CO4	L2
(b)	Explain the procedure for hardening of steels.	7M	CO4	L3
9(a)	Define composite material. Explain how the composite materials are classified.	7M	CO5	L2
(b)	What are the different types of Composite Materials based on fibrelength? Explain.	7M	CO5	L1
	(OR)			
10(a)	Explain in detail about the Ceramic Matrix Composites.	7M	CO5	L2
(b)	Explain about the continuous pultrusion process and resin transfer moulding.	7M	CO5	L2

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H.T.No										

22 NOV 2025

R20

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

20CS09-OBJECT ORIENTED PROGRAMMING
((AI&DS),CSE,CSE(AI&ML)&IT)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Compare while and do while control structure.	7M	CO1	L4
(b)	Explain Switch Statement and write a program in java using switch().	7M	CO1	L2
	(OR)			
2(a)	Discuss the principles of object oriented languages in detail.	7M	CO1	L2
(b)	Explain the importance of **this** Keyword in Java with example.	7M	CO1	L2
3(a)	Write a java program that reads book title name and author name of n books and display the book titles of the common author name.	7M	CO2	L2
(b)	What is Dynamic Method Dispatch? Explain how java achieves run-time polymorphism with a suitable example.	7M	CO2	L2
	(OR)			
4(a)	Demonstrate the concept of ***method overloading*** with a suitable java program.	7M	CO2	L2
(b)	Write a java program that reads n strings and displays the strings that starts and ends with same character. **Note** :you must use appropriate String class functions.	7M	CO2	L2
5(a)	How can you catch multiple exceptions?	7M	CO3	L1
(b)	What is the difference between throw and throws keyword in Java?	7M	CO3	L4
	(OR)			
6(a)	List out mostly used Java API packages and also explain adding more classes to a package.	7M	CO3	L1
(b)	Describe the syntax of exception handling and explain the procedure for handling Arithmetic Exception.	7M	CO3	L2
7(a)	Write the differences between Byte Stream and Character Stream.	7M	CO4	L1
(b)	Draw a thread life cycle for inter thread communication.	7M	CO4	L1
	(OR)			
8(a)	Explain thread synchronization with respect to multithreading. Why is it important?	7M	CO4	L2
(b)	Explain set and map data structures with their operations.	7M	CO4	L2
9(a)	How menus are created? Give example through java program?	7M	CO5	L1
(b)	How to compile and run the Applet Program?	7M	CO5	L1
	(OR)			
10(a)	Implement a program in AWT to design the registration form.	7M	CO5	L3
(b)	Explain the procedure to handle events in Java through event listeners.	7M	CO5	L2

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H.T.No.										

22 NOV 2025

R20

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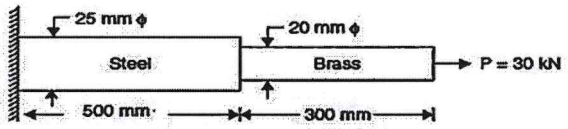
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

20AE04-STRENGTH OF MATERIALS
(ASE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define the following (i) Strain energy (ii) Impact loading, (iii) Volumetric strain (iv) Poisson's ratio.	7M	CO1	L1
(b)	A bar 30mm X 30mm X 250mm long is subjected to a pull of 90KN in the direction of its length. The extension of the bar was found to be 0.125mm, while the decrease in each lateral dimension is found to be 0.00375mm. Find the Young's Modulus, Poisons ratio, Modulus of rigidity and Bulk modulus for the material of the bar.	7M	CO1	L2
	(OR)			
2(a)	An axial pull of 20 kN is suddenly applied on a steel rod 2.5 m long and 1000 mm^2 in cross-section. Calculate the strain energy, which can be absorbed in the rod. Take E = 200 GPa.	7M	CO1	L2
(b)	The composite bar shown in Figure is subjected to a tensile force of 30kN. The extension observed is 0.44. Find the Young's modulus of brass, if Young's modulus of steel is $2\times10^5 N/mm^2$. 	7M	CO1	L2
3.	A simply supported beam ABC which is supported at A and B, 6 m apart with anoverhang BC 2 m long, carries a udl of 15 kN/m over AB and a point load of 30 kN at C. Draw S.F. and B.M. diagrams.	14M	CO2	L3
	(OR)			
4.	A Simply supported beam of length 8m carries UDL of 5kN/m over its entire span and a point load of 20kN at a distance of 3m from its right support. Draw SF and BM diagrams.	14M	CO2	L3
5(a)	Derive relation between Twisting moment, Twist and shear stress.	7M	CO3	L3
(b)	A symmetric I-section of size 180mm x 40mm, 8mm thick is strengthened with 240mm x 10mm rectangular plate on top flange. If permissible stress in the material is $150N/mm^2$, determine how much concentrated load the beam of this section can carry at centre of 4 m span. Given ends of beam are simply supported.	7M	CO3	L3
	(OR)			

6(a)	Derive the equation $M/I = f/y = E/R$.	7M	CO3	L3
(b)	A solid shaft A of 50mm diameter rotates at 250rpm. Find the power that can be transmitted for a limiting shear stress of 60N/mm^2 in the steel. It is proposed to replace A by hollow shaft B of the same external diameter but with the limiting shear stress of 75N/mm^2. Determine the internal diameter of B to transmit the same power at the same speed.	7M	CO3	L3
7(a)	Derive the maximum shear stress in a rectangular section in terms of mean shear stress.	7M	CO3	L3
(b)	Draw variation of shear stress across I section and Triangular section.	7M	CO3	L3
	(OR)			
8(a)	Evaluate the maximum shear stress in terms of mean shear stress for a circular section.	7M	CO3	L3
(b)	Plot the variation of shear stress for Triangular section, I section and T section.	7M	CO3	L3
9(a)	Derive stress induced in a Thin spherical shell subjected to an internal pressure P and find the stress induced in a 5mm thick spherical gas vessel of 1.2m diameter is subjected to an pressure of 1.8MPa.	7M	CO5	L3
(b)	Write the assumptions used in lame's theory and write the lame's equations.	7M	CO5	L1
	(OR)			
10(a)	A cantilever beam of length L is subjected to a point load W at free end, Derive slope and deflection at free end.	7M	CO2	L3
(b)	A cantilever beam 120mm wide and 150mm deep of length 2m is subjected to a point load 20KN at free end. Determine slope and deflection at free end, Take E = 200GPa.	7M	CO2	L2

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22 NOV 2025

H.T.No. | | | | | | | | | | |

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B.Tech. (III Semester) Supplementary Examinations

20CE08-ENGINEERING GEOLOGY
(CE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Interpret the weathering of rocks and its importance from the civil engineering point of view.	7M	CO4	L2
(b)	Interpret the process of formation of OX-BOW lake with the help of figure.	7M	CO1	L3
	(OR)			
2(a)	Summarize the following: (i) Mantle (ii) Seismic Zones Map.	7M	CO1	L2
(b)	Interpret the SOIL PROFILE with the help of diagrams.	7M	CO3	L2
3(a)	Summarize the process of identifying a mineral based on a STREAK.	7M	CO2	L2
(b)	Interpret different uses of study of minerals.	7M	CO2	L1
	(OR)			
4(a)	Summarize the importance of physical property CLEAVAGE in identifying minerals.	7M	CO2	L3
(b)	Summarize the important details of the following rock forming minerals (i) Quartz (ii) Calcite.	7M	CO2	L2
5(a)	Discuss the classification and characteristics of sedimentary rocks.	7M	CO2	L1
(b)	Provide examples of major sedimentary rock types and their depositional environments.	7M	CO2	L2
	(OR)			
6.	How does understanding the classification of rocks contribute to their practical applications in civil engineering?	14M	CO2	L2
7.	Interpret the following with figures: (i) Syncline (ii) Oblique slip fault.	14M	CO3	L2
	(OR)			
8(a)	Interpret part of a FOLD with a diagram.	7M	CO4	L2
(b)	Differentiate between normal fault and reverse fault.	7M	CO4	L2
9(a)	Illustrate the geological considerations for faulted strata at the dam site.	7M	CO4	L2
(b)	Discuss Geothermal method in detail.	7M	CO4	L2
	(OR)			
10(a)	Illustrate the following (i) over break (ii) Gravity method.	7M	CO4	L2
(b)	Outline the influence of water table in the consideration for successful reservoir.	7M	CO4	L3

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H.T.No.										

22 NOV 2025

R20

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

20EC05-RANDOM VARIABLES AND STOCHASTIC PROCESSES
(ECE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What do you understand by mathematical modeling of a random experiment? Explain with an example.	7M	CO1	L2
(b)	For the binomial density function, show that E[X] = Np and variance = Np(1-p).	7M	CO3	L4
	(OR)			
2(a)	Define the distribution function of random variable X. List out various properties.	7M	CO1	L2
(b)	Automobile arrivals at a gasoline station are Poisson and occurs at an average rate of 50per/hour. The station has only one gasoline pump. If all cars are assumed to require one minute to obtain fuel, what is the probability that a weighting line will occur at the pump?	7M	CO2	L3
3(a)	Define and explain covariance and correlation coefficient of two random variables X and Y.	7M	CO2	L1
(b)	Two Statistically independent random variables X and Y have moments $m_{10}=3$, $m_{20}=14$, $m_{02}=13$ and $m_{11}=-7.5$. Find the second moment μ_{22}.	7M	CO2	L2
	(OR)			
4(a)	Show that the density function of sum of two statistically independent random variables X and Y is the convolution of marginal density functions.	7M	CO1	L2
(b)	Determine the joint moment m_{nk} from the given the joint density function. $f_{x,y}(x,y)=\begin{cases} x(y+1.5), 0<x<1, 0<y<1 \\ 0, \text{ elsewhere} \end{cases}$	7M	CO2	L3
5(a)	Distinguish between random variable and random process. Give suitable examples.	7M	CO1	L2
(b)	Given ar and om process X(t)=kt, where k is ar and om variable uniformly distributed in the range (-1, 1). Is the process WSS?	7M	CO3	L4
	(OR)			
6(a)	Define autocorrelation functions. List out various properties? Prove any two properties.	7M	CO1	L2
(b)	Determine the mean, second order moment and variance of a stationery ergodic process X(t) has an autocorrelation function $R_{XX}(\tau)=25+\frac{4}{1+6\tau^2}$	7M	CO3	L4

20EC05-RANDOM VARIABLES AND STOCHASTIC PROCESSES

7(a)	Write the properties of power density spectrum.	7M	CO1	L2
(b)	Show that $S_{xx}(\omega)=\int_{-\infty}^{\infty} Rxx(t)e^{-j\omega t}dt$.	7M	CO2	L2
	(OR)			
8(a)	What is power spectral density? Explain with a relevant mathematical forms.	7M	CO1	L2
(b)	Evaluate the autocorrelation function $R_{XX}(\tau)$ corresponds to the power spectral density $S_{XX}(w)=\frac{157+12w^2}{(16+w^2)(9+w^2)}$	7M	CO2	L3
9(a)	Find the output spectral density of RC low pass filter, where the filter is subjected to a white noise of spectral density N0/2.	7M	CO5	L1
(b)	Show that for RC low pass filter, the noise bandwidth is equal to $\frac{\pi}{2}$ times of its 3-dB bandwidth.	7M	CO5	L2
	(OR)			
10(a)	The autocorrelation function of a WSS random process is $R_{XX}(\tau)=5e^{(-\lvert\tau\rvert)}$. Find the power spectral density and average power of.	7M	CO5	L2
(b)	Write short notes on (i) white noise (ii) colored noise (iii) Thermal noise.	7M	CO5	L2

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H.T.No.										

22 NOV 2025

R20

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

20EE07-ELECTRIC AND MAGNETIC FIELDS

(EEE)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	List out the applications of Gauss's law and discuss about any one application in detail.	7M	CO4	L3
(b)	Find the vector P directed from (1, 4, 1)to (3,-2,1) in Cartesian coordinates and also fund the unit vector along P.	7M	CO1	L3
	(OR)			
2(a)	Define electric potential and hence obtain necessary expression for a given charge 'Q'.	7M	CO1	L3
(b)	Point charges 1 mC and -2 mC are located at (3, 2, -1) and (-1, -1, 4) respectively. Calculate the electric force on a 10 nC charge located at (0, 3, 1) and the electric field intensity at that point.	7M	CO2	L2
3(a)	Derive the boundary conditions for a dielectric interface.	7M	CO2	L2
(b)	Three point charges - 1 nC, 4 nC, and 3 nC are located at (0, 0, 0), (0, 0, 1), and (1, 0, 0), respectively. Find the energy in the system.	7M	CO2	L2
	(OR)			
4(a)	Using the concept of energy density in an electric field, derive an expression for total energy stored in a parallel plate system. Hence find its capacitance.	7M	CO2	L2
(b)	Find the angle by which the direction of the electric field intensity changes, as it crosses the boundary between two dielectrics with dielectric constants 4 and 5. The incident angle is $50^0$with the normal.	7M	CO2	L2
5(a)	Derive the equation to show that curl of magnetic field intensity in equal to current density. $\nabla \times H = J$.	7M	CO3	L2
(b)	Using amperes circuital law, find H and B inside a long straight non magnetic conductor of radius 8mm carrying current density of 50KA/m².	7M	CO3	L2
	(OR)			
6(a)	State Ampere's circuital law and explain any two applications of Ampere's circuital law.	7M	CO3	L2
(b)	Find the magnetic field intensity at the centre of square loop of side 5m carrying 10A of current.	7M	CO3	L2
7(a)	Describe the nature of magnetic materials with susceptibility and permeability. Also present the proper classification of magnetic materials.	7M	CO3	L3
(b)	Two long parallel wires separated 3meters apart carry currents of 100A and 200A respectively in the same direction. Determine the force per unit length between them.	7M	CO3	L3
	(OR)			
8(a)	How the self-inductance of a solenoid can be determine - Justify your answer with relevant expression?	7M	CO3	L3
(b)	A point charge Q=-3C has velocity $(2a_x+6a_y-1.1a_z)$ m/s. Find the magnitude of the force exerted on charge if, (i) $E=-12a_x+8a_y-2a_z$V/m (ii) $B=-6a_x+9a_y+5a_z$T.	7M	CO3	L3
9.	For a given magnetic field intensity H and current J, prove the following expression related to concept of displacement current. $\nabla \times H = J + \frac{\partial D}{\partial t}$	14M	CO4	L3
	(OR)			
10(a)	Obtain an EMF expression for time-varying loop and static field B and also write this expression in both point form and integral form.	7M	CO4	L3
(b)	In a material for which $\sigma = 2(\Omega - m)^{-1}$ and electric field intensity is $E = 50\ sin\ 10^{10}t\ a_z\ V/m$. Find conduction current and displacement current.	7M	CO4	L3

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H.T.No.										

22 NOV 2025

R20

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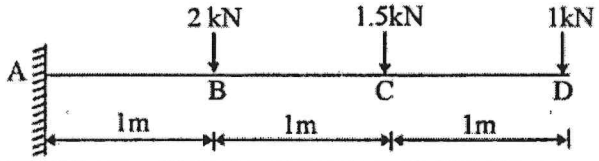
B.Tech. (III Semester) Supplementary Examinations

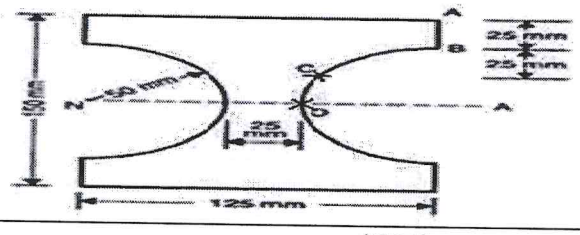
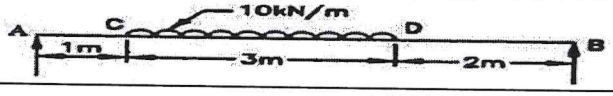
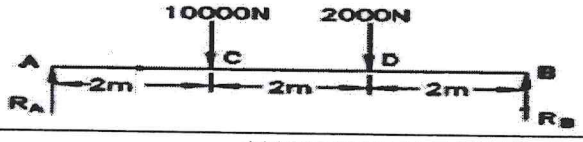
20ME06-MECHANICS OF SOLIDS

(ME)

Time : 3 hours | Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	A mild steel bar of 200mm long and 50mmx50mm cross section is subjected to an axial compressive load of 200 kN. Taking 1/m =0.3 and E = 210 kN/mm^2, calculate the changes in length, width and volume of the bar. Also calculate the values of shear and bulk moduli of the material of the bar.	7M	CO1	L3
(b)	A reinforced concrete column 50 cm in diameter has four 30mm diameter steel rods embedded, and carries an axial load of 850kN. Calculate the stresses in each of the two materials. E for steel = 2.04X10^5 N/mm^2 and E for concrete = 0.136X10^5 N/mm^2.	7M	CO1	L3
	(OR)			
2(a)	Draw the stress – strain diagram for Brittle and Ductile materials with suitable examples and mark all the salient points.	7M	CO1	L4
(b)	A circular rod of steel 14mm diameter is testing in a testing machine and it is found that when the tension is 18kN the total extension on a 21cm length is 0.15mm. Find the value of E.	7M	CO1	L3
3.	A cantilever beam of length 3m carries the point loads as shown in figure. Draw the shear force and bending moment diagrams. 	14M	CO2	L4
	(OR)			
4(a)	Define the following: i) Bending Moment ii) Shear Force	4M	CO2	L1
(b)	A simply supported beam carries inclined loads 100 N, 200 N and 300 N inclined at 30^0,45^0, and 60^0 to the vertical. These loads act at 1 metre, 2 metre and 3 metres from the left support respectively. If the span is 4 metres, draw shear force and bending moment diagrams.	10M	CO2	L4
5(a)	A 3m long rectangular beam of section 100mm x 200mm is loaded with point load of 30000N at a distance of 1 m from the right-hand support. Find the bending stress under the load.	7M	CO3	L3

(b)	Figure shows a section, which is subjected to a sheer force of 100kN. Determine the shear stresses at A, B, C, and D. Sketch the shear stress distribution also. 	7M	CO3	L3
	(OR)			
6(a)	A rectangular beam 300mm deep and 150mm wide is simply supported over a span of 4m. Determine the bending stress at salient points and draw its distribution when it carries a U.D.L of 2kN/m over its entire span.	7M	CO3	L3
(b)	A beam of triangular cross-section with a base of 120mm and 150mm, the lower surface being horizontal. If the shear force on a section is 30kN, draw the distribution of shear stress in the beam.	7M	CO3	L3
7.	At a point within a body subjected to two mutually perpendicular directions, the stresses are 80N/mm^2 tensile and 40N/mm^2 tensile. Each of the above stresses is accompanied by a shear stress of 60N/mm^2. Determine the magnitude and directions of principal stresses and maximum shear stress.	14M	CO4	L4
	(OR)			
8(a)	A body is subjected to direct stresses in two mutually perpendicular directions accompanied by a simple shear stress. Draw the Mohr's circle of stresses and explain how will you obtain the normal, tangential and resultant stresses on oblique plane.	7M	CO4	L3
(b)	The principal tensile stresses at a point across two mutually perpendicular planes are 120N/mm^2 and 60N/mm^2. Determine the normal, tangential and resultant stresses on a plane inclined at 30^0 to the axis of the minor principal stress.	7M	CO4	L4
9.	A simply supported beam is loaded with uniformly distributed load of 10KN figure below. If flexural rigidity EI = 45000KN/m^2, determine the central deflection and maximum deflection and the location of its occurrence. 	14M	CO1	L3
	(OR)			
10.	A simply supported beam is loaded as shown in the figure below. Calculate the deflection at the load points. Take E = 2 x 107N/cm^2 and I = 20000cm^4 	14M	CO5	L3

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