



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) April 2026

TIME TABLE

R20

Time : 10.00 AM to 01.00 PM

A.Y. : 2025-26

Branch	16-04-2026 (Thursday)	17-04-2026 (Friday)	20-04-2026 (Monday)	21-04-2026 (Tuesday)	22-04-2026 (Wednesday)	23-04-2026 (Thursday)
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: 02 APR 2026

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

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

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

B.Tech. (III Semester) Supplementary Examinations

20MC02-ENVIRONMENTAL SCIENCE

(AI&DS, ASE, CE, EEE and 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)	Explain the role of information and technology in protection of human health.	7M	CO1	L2
(b)	"Tribal populations and wildlife are more affected by resettlement and rehabilitation issues". Explain.	7M	CO1	L2
(OR)				
2(a)	Justify the statement "The student-centered approach and their participation process in environmental education is quite beneficial".	7M	CO1	L3
(b)	Summarize the modes of spread, effects and the control measures for HIV/AIDS.	7M	CO1	L2
3(a)	List out the impacts of fertilizers and pesticides.	7M	CO2	L1
(b)	What are the benefits and problems associated with large dams?	7M	CO2	L1
(OR)				
4(a)	What are the major consequences of over-exploitation of mineral resources? How can they be conserved?	7M	CO2	L1
(b)	Can you suggest some measures needed to be taken for conserving forest wealth?	7M	CO2	L1
5(a)	Define Ecological Pyramid and explain the 3 types of ecological pyramids with neat diagrams.	7M	CO3	L2
(b)	Explain the 3 major threats of bio diversity with case studies.	7M	CO3	L3
(OR)				
6(a)	Analyse the structure and functions of an ecosystem.	7M	CO3	L4
(b)	Explain the 7 Values of bio diversity with examples.	7M	CO3	L2
7(a)	Define greenhouse effect. List out any five greenhouse gases.	7M	CO4	L1
(b)	Suggest the mitigation measures to be taken for the earthquakes and landslides.	7M	CO4	L2
(OR)				
8(a)	Summarize the sources and effects of water pollution. Explain the treatment methods.	7M	CO4	L1
(b)	Find out the sources and effects of noise pollution and suggest the control methods.	7M	CO4	L1
9(a)	Define Environmental Impact Assessment (EIA) and explain various Steps in EIA methodology with a neat flow chart.	7M	CO5	L2
(b)	Discuss the various salient features of Forest Conservation Act, 1980 and the penalties given for the violation of forest act.	7M	CO5	L3
(OR)				
10(a)	Define Sustainable development and discuss the measures to achieve sustainable development goals.	7M	CO5	L3
(b)	Discuss the salient features of Environmental protection (EP) Act, 1986.	7M	CO5	L2

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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)	A bag contains 4 red, 5 green and 3 blue balls. Two balls are drawn at random. Find the probability that both are red.	7M	CO1	L3														
(b)	A random variable X has the following probability function <table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>P(x)</td><td>0.1</td><td>k</td><td>0.2</td><td>2k</td><td>0.3</td><td>k</td></tr></table> (i) Find the value of k (ii) Calculate the mean and Variance.	x	-2	-1	0	1	2	3	P(x)	0.1	k	0.2	2k	0.3	k	7M	CO1	L3
x	-2	-1	0	1	2	3												
P(x)	0.1	k	0.2	2k	0.3	k												
(OR)																		
2(a)	The contents of urns I, II and III are as follows: 1 white, 2 black and 3 red balls, 2 white, 1 black and 1 red balls and 4 white, 5 black and 3 red balls. One urn is chosen at random and two balls drawn from it. They happen to be white and red. What is the probability that they will come from urn I.	7M	CO1	L4														
(b)	Let X be random Variable with the following probability distribution <table><tr><td>x</td><td>-3</td><td>6</td><td>9</td></tr><tr><td>P(X=x)</td><td>1/6</td><td>1/2</td><td>1/3</td></tr></table> Find $E(2X+1)^2$	x	-3	6	9	P(X=x)	1/6	1/2	1/3	7M	CO1	L3						
x	-3	6	9															
P(X=x)	1/6	1/2	1/3															
(OR)																		
3(a)	Ten coins are thrown simultaneously. Find the probability of getting at least (i) seven heads (ii) six heads.	7M	CO2	L3														
(b)	Given that the mean height of students in a class is 158cms with SD of 20cms. Find how many students heights lie between 150cms and 170 cms, if there are 100 students in the class.	7M	CO2	L3														
(OR)																		
4(a)	If X is a Poisson variate such that $3p(x=4)=\frac{1}{2}p(x=2)+p(x=0)$ find (i) The mean of X (ii) $p(x\leq 2)$	7M	CO2	L3														
(b)	Eight coins are tossed together. Find the probability of getting 1 to 4 heads in a single toss.	7M	CO2	L3														
(OR)																		
5.	If the population is 3, 6, 9, 15, 27 (i) List all possible samples of size 3 that can be taken without replacement from the finite population. (ii) Calculate the mean of each of the sampling distribution of means (iii) Find the S.D of the sampling distribution of means.	14M	CO3	L4														
(OR)																		

20FE09-PROBABILITY AND STATISTICS

6(a)	In a sample of 200 students, 120 prefer online learning. Find the 95% confidence interval for population proportion.	7M	CO3	L3																						
(b)	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.	7M	CO3	L4																						
7(a)	The mean weekly sales of soap bars in departmental stores 146.3bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increased to153.7 and showed a SD of 17.2. Was the advertising campaign successful.	7M	CO4	L4																						
(b)	In a sample of 8 observations from a normal population, the sum of the squares of deviations of the sample values from the sample mean is 84.4 and in another sample of 10 observations it was 102.6. Test at 5% level whether the populations have the same variance.	7M	CO4	L4																						
(OR)																										
8(a)	To compare two kinds of bumper guards, 6 of each kind were mounted on a car and then the car has run into a concrete wall. The following are the costs of repairs: Guard 1: 107 148 123 165 102 119 Guard 2: 134 115 112 151 133 129 Use the 0.01 level of significance to test whether the difference between two sample means is significant?	7M	CO4	L4																						
(b)	In an experiment on immunization of cattle from tuberculosis the following results were obtained: <table style="margin-left: auto; margin-right: auto;"><tr><td></td><td>Affected</td><td>not affected</td></tr><tr><td>Inoculated</td><td>12</td><td>26</td></tr><tr><td>Not Inoculated</td><td>16</td><td>6</td></tr></table> Analyze and discuss the effect of vaccine in controlling susceptibility to tuberculosis.		Affected	not affected	Inoculated	12	26	Not Inoculated	16	6	7M	CO4	L4													
	Affected	not affected																								
Inoculated	12	26																								
Not Inoculated	16	6																								
9(a)	Calculate coefficient of correlation from the following heights (in inches) of fathers (X) and their Sons (Y) <table style="margin-left: auto; margin-right: auto;"><tr><td>X</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr><tr><td>Y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr></table>	X	65	66	67	67	68	69	70	72	Y	67	68	65	68	72	72	69	71	7M	CO5	L3				
X	65	66	67	67	68	69	70	72																		
Y	67	68	65	68	72	72	69	71																		
(b)	Obtain the rank correlation coefficient for the following data <table style="margin-left: auto; margin-right: auto;"><tr><td>X</td><td>68</td><td>64</td><td>75</td><td>50</td><td>64</td><td>80</td><td>75</td><td>40</td><td>55</td><td>64</td></tr><tr><td>Y</td><td>62</td><td>58</td><td>68</td><td>45</td><td>81</td><td>60</td><td>68</td><td>48</td><td>50</td><td>70</td></tr></table>	X	68	64	75	50	64	80	75	40	55	64	Y	62	58	68	45	81	60	68	48	50	70	7M	CO5	L3
X	68	64	75	50	64	80	75	40	55	64																
Y	62	58	68	45	81	60	68	48	50	70																
(OR)																										
10(a)	Obtain the equation of two lines of Regression for the following data. Also obtain the estimate of X for Y = 70 <table style="margin-left: auto; margin-right: auto;"><tr><td>X</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr><tr><td>Y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr></table>	X	65	66	67	67	68	69	70	72	Y	67	68	65	68	72	72	69	71	7M	CO5	L4				
X	65	66	67	67	68	69	70	72																		
Y	67	68	65	68	72	72	69	71																		
(b)	Calculate coefficient of correlation between X and Y for the following <table style="margin-left: auto; margin-right: auto;"><tr><td>x</td><td>1</td><td>3</td><td>4</td><td>5</td><td>7</td><td>8</td><td>10</td></tr><tr><td>Y</td><td>2</td><td>6</td><td>8</td><td>10</td><td>14</td><td>16</td><td>20</td></tr></table>	x	1	3	4	5	7	8	10	Y	2	6	8	10	14	16	20	7M	CO5	L3						
x	1	3	4	5	7	8	10																			
Y	2	6	8	10	14	16	20																			

17 APR 2026

H.T.No

R20

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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)	The population of a certain town is shown in the following table <table><tr><td>Year</td><td>1990</td><td>1995</td><td>2000</td><td>2005</td><td>2010</td></tr><tr><td>Population in thousands</td><td>40</td><td>60</td><td>79</td><td>102</td><td>130</td></tr></table> Using Newton's backward interpolation formula, find the population in 2007.	Year	1990	1995	2000	2005	2010	Population in thousands	40	60	79	102	130	7M	CO1	L3
Year	1990	1995	2000	2005	2010											
Population in thousands	40	60	79	102	130											
(b)	Find the value of (i) $\Delta^{10}[(1-x)(1-2x^2)(1-3x^3)(1-4x^4)]$ (ii) $\Delta^6[(1+x)(1+2x^2)(1+3x^3)]$	7M	CO1	L2												
(OR)																
2(a)	The following data gives the melting points of an alloy of lead and zinc <table><tr><td>Percentage of lead in the alloy</td><td>50</td><td>60</td><td>70</td><td>80</td></tr><tr><td>Temperature</td><td>205</td><td>225</td><td>248</td><td>274</td></tr></table> Find the melting point of alloy containing 54 percentage of lead, using Newton's Forward interpolation formula.	Percentage of lead in the alloy	50	60	70	80	Temperature	205	225	248	274	7M	CO1	L3		
Percentage of lead in the alloy	50	60	70	80												
Temperature	205	225	248	274												
(b)	Use Lagrange's interpolation to find u_4 given $u_0 = 648, u_2 = 704, u_3 = 729, u_6 = 792$.	7M	CO1	L3												
(OR)																
3(a)	Applying Regula-Falsi method, find a real root of the equation $f(x) = x^3 - 4x - 9 = 0$.	7M	CO2	L3												
(b)	Evaluate $I = \int_0^1 \frac{dx}{1+x}$ with $n= 6$ using Simpson's 1/3 rule.	7M	CO2	L3												
(OR)																
4(a)	Using Newton - Raphson method find the root of the equation $xe^x = 3$.	7M	CO2	L3												
(b)	Applying Trapezoidal rule, evaluate $\int_0^2 e^{-x^2} dx$, by taking $h = 0.25$.	7M	CO2	L3												
(OR)																
5(a)	Evaluate $\int_0^1 \int_x^{\sqrt{x}} x^2 y^2 (x+y) dy dx$	7M	CO3	L3												

20FE10-NUMERICAL METHODS AND INTEGRAL CALCULUS

(b)	By changing the order of integration, evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dy dx$	7M	CO3	L3
(OR)				
6(a)	Evaluate $\iint xy(x+y) dx dy$ over the region bounded by $y = x^2$ and $y = x$.	7M	CO3	L3
(b)	Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dz dy dx$	7M	CO3	L3
7(a)	Find the Fourier series to represent $f(x) = x^2$, in the interval $-l \leq x \leq l$	7M	CO4	L3
(b)	Find the half range Fourier sine series expansion of $f(x) = e^{ax}$ in $(0, 2)$.	7M	CO4	L3
(OR)				
8(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
9(a)	Find the value of 'a' if the vector $(ax^2y + yz)\bar{i} + (xy^2 - x^2z)\bar{j} + (2xyz - 2x^2y^2)\bar{k}$ has zero divergence. Find the curl of the vector which has zero divergence.	7M	CO5	L2
(b)	Show that the vector $\vec{F} = (-x^2 + yz)\bar{i} + (4y - z^2x)\bar{j} + (2xz - 4z)\bar{k}$ is solenoidal	7M	CO5	L3
(OR)				
10(a)	Find a unit vector normal to the surface $x^3 + y^3 + 3xyz = 3$ at the point $(1, 2, -1)$.	7M	CO5	L2
(b)	In what direction from $(3, 1, -2)$ is the directional derivative of $\phi = x^2y^2z^4$ maximum? Find also the magnitude of this maximum?	7M	CO5	L3

H.T.No

20 APR 2026

R20

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

B.Tech. (III Semester) Supplementary Examinations

**20CS05-PYTHON PROGRAMMING
(AI&DS)**

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 and explain different arithmetic operators supported by Python. Discuss about their precedence and associativity.	7M	CO1	L1
(b)	Explain Python bitwise operators with example.	7M	CO1	L2
(OR)				
2(a)	Write a short note on history and features of python.	7M	CO1	L1
(b)	Explain If _else statement in python with syntax, flowchart and example.	7M	CO1	L2
3(a)	Discuss the built-in methods of Sets with examples.	7M	CO2	L2
(b)	List out advantages of Tuples over Lists.	7M	CO2	L1
(OR)				
4(a)	Demonstrate Indexing, Slicing and basic operations on Tuples with suitable examples.	7M	CO2	L2
(b)	Write a python script to remove all duplicates from a list.	7M	CO2	L3
5(a)	Appraise the use of try and except block in python with syntax.	7M	CO3	L2
(b)	Construct a function that generate Fibonacci sequence using recursion.	7M	CO3	L3
(OR)				
6(a)	Demonstrate how to handle multiple exceptions in python.	7M	CO3	L2
(b)	Construct a function in python that return the highest as well as lowest values in the tuple.	7M	CO3	L3
7(a)	List out the String special operators in Python with examples.	7M	CO4	L1
(b)	Write a python script to accept a line of text and find the number of characters, number of vowels and number of blank spaces in it.	7M	CO4	L3
(OR)				
8(a)	Discuss the following methods supported by compiled regular expression objects. (i) search() (ii) match() (iii) findall() (iv) sub().	7M	CO4	L2
(b)	Tabulate and discuss different access modes for opening a file.	7M	CO4	L2
9(a)	Write a program that has a class Point with attributes as the X and Y co-ordinates. Make two objects of this class and find the midpoint of both the points.	7M	CO5	L3
(b)	Explain the following built-in class attributes. (i) __dict__ (ii) __doc__ (iii) __name__ (iv) __bases__	7M	CO5	L3
(OR)				
10(a)	What is Abstraction? Discuss about Abstract Base Class and Abstract Method with suitable example.	7M	CO5	L2
(b)	Compare and Contrast Procedure Oriented Programming and Object Oriented Programming.	7M	CO5	L2

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

20EE02-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

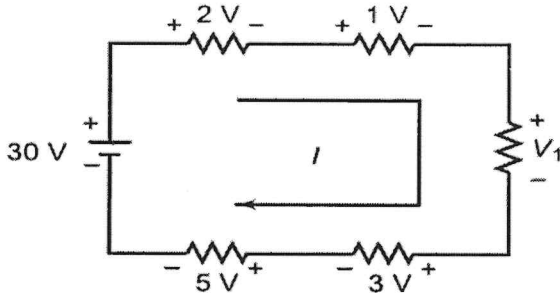
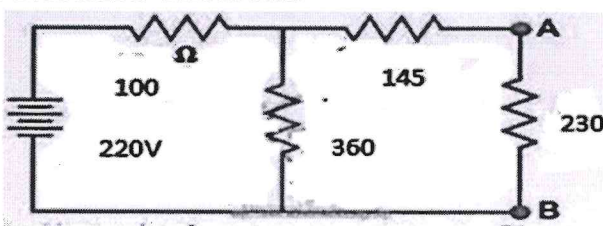
(ASE)

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)	Illustrate KVL and KCL with an example.	7M	CO1	L3
(b)	For the circuit shown in the fig, find the unknown voltage drop V_1 . 	7M	CO1	L3
(OR)				
2(a)	Discuss various types of elements with an example.	7M	CO1	L2
(b)	Three resistances $100\ \Omega$, $200\ \Omega$, and $300\ \Omega$ are connected in series to a 250 volt supply. Draw a suitable diagram and determine the total resistance and current in the circuit and the power dissipated in each resistor.	7M	CO1	L3
3(a)	State maximum power transfer theorem and Thevenin's theorem with an equivalent circuit diagram.	7M	CO1	L2
(b)	An alternating voltage is given by $v=14.14 \sin(377 t)$. Find (i) rms value of the voltage ii) the frequency (iii) the average value.	7M	CO1	L3
(OR)				
4(a)	State and explain the Thevenin's and Norton's Theorem.	7M	CO2	L3
(b)	Verify the Norton's Theorem. 	7M	CO2	L3
5(a)	Illustrate the constructional details of a DC machine.	7M	CO2	L2
(b)	Write short notes on back e.m.f of a DC Motor.	7M	CO2	L2
(OR)				

20EE02-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

6(a)	Derive the EMF equation of a DC generator.	7M	CO2	L3
(b)	Distinguish between core and shell-type transformers.	7M	CO2	L2
7(a)	Explain the operation of half wave rectifier circuit with corresponding circuit diagram and necessary input and output waveforms.	7M	CO3	L2
(b)	Explain how Zener diode works as a voltage regulator with neat diagrams.	7M	CO3	L2
(OR)				
8(a)	Explain how zener diode can be used as a voltage regulator.	7M	CO3	L1
(b)	Draw the circuit diagram of full-wave bridge rectifier and explain its operation.	7M	CO3	L1
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)	Draw the construction diagram, and explain the operation of JFET.	7M	CO4	L2
(b)	Explain the construction and working of Enhancement MOSFET.	7M	CO4	L1

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B.Tech. (III Semester) Supplementary Examinations

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)	State the purpose of differential U-tube manometer and how it is used in Fluid Mechanics.	7M	CO1	L2
(b)	Determine the capillary rise in a glass tube of 5 mm diameter when immersed vertically in (i) water (ii) mercury. Take surface tensions for water and mercury as 0.0725 N/m and 0.52 N/m respectively.	7M	CO2	L3
(OR)				
2(a)	Define absolute pressure, gauge pressure and vacuum pressure. Also give the relation among them.	7M	CO1	L2
(b)	A plate 0.05 mm distant from a fixed plate moves at 1.2 m/s and require a force of 2.2 N/m ² to maintain this speed. Determine the viscosity of the fluid between the plates.	7M	CO2	L3
3(a)	Derive an expression for total pressure and centre of pressure for an inclined plane surface immersed in a liquid.	7M	CO1	L2
(b)	For a two- dimensional flow, the velocity potential is given by $\phi = x(2y-1)$. Determine the corresponding stream function ψ .	7M	CO2	L3
(OR)				
4(a)	Derive the continuity equation for 3D-flow.	7M	CO1	L2
(b)	Explain stream function & velocity potential function and express the relation between them.	7M	CO2	L2
5(a)	Derive Bernoulli's expression from basic principles.	7M	CO1	L2
(b)	Derive the expression for finding the resultant force acting on pipe bend.	7M	CO1	L4
(OR)				
6(a)	What is Orifice meter? Derive the expression for the discharge through Orifice meter.	7M	CO1	L2
(b)	A pipe of diameter 400 mm carries water at a velocity of 20 m/s. The pressures at the points A and B are given as 30 N/cm ² and 20N/cm ² respectively while the datum head at A and B are 20 m and 30 m respectively. Determine the loss of head between A and B.	7M	CO3	L3
7(a)	Explain the following (i) Hydraulic gradient line (ii) Total energy line.	7M	CO1	L2
(b)	A 250 mm diameter 3 km long straight pipe runs between two reservoirs of surface elevations 135 m and 60 m. Determine the rate of flow assuming a friction factor as 0.02 for the given pipe.	7M	CO4	L3
(OR)				
8(a)	Derive Hazen-Poiseuille equation.	7M	CO1	L2
(b)	Explain Reynold's experiment with neat diagram.	7M	CO4	L2
9(a)	Explain the procedure of dimensional analysis by Rayleigh's method..	7M	CO1	L2
(b)	By using Buckingham's π - theorem method , show that the velocity through a circular orifice is given by $V = \sqrt{2gH} f\left\{\frac{\rho}{\rho_{vH}}, \frac{\mu}{\rho v H}\right\}$ where H is the head causing the flow, D is the diameter of the orifice, μ is the viscosity, ρ is the mass density and g is acceleration due to gravity.	7M	CO5	L3
(OR)				
10(a)	What is similitude and define Geometric, kinematic & dynamic similitude?	7M	CO1	L2
(b)	Explain Reynold's model law and it's applications.	7M	CO5	L2

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) 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)	Draw the truth tables for the following (i) $(P \rightarrow Q) \vee (P \wedge \sim Q)$ (ii) $(P \rightarrow (Q \vee R)) \wedge P \wedge \sim Q \wedge \sim R$.	7M	CO1	L1
(b)	Show that $(P \rightarrow (Q \vee R)) \wedge P \wedge \sim Q \wedge \sim R$ is a contradiction without using a truth table.	7M	CO1	L2
(OR)				
2(a)	Define NAND, NOR and XOR and give their truth tables.	7M	CO1	L1
(b)	Define Exclusive & inclusive disjunctions with an example.	7M	CO1	L1
3(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 primitive recursive.	7M	CO2	L3
(OR)				
4(a)	Illustrate Partition and covering of Sets in detail with an Example.	7M	CO2	L2
(b)	If $f(x) = x + 2$, $g(x) = x - 2$ and $h(x) = 3x$ for $x \in R$, where R is the set of real numbers. Find (i) $g \circ f$ (ii) $f \circ g$ (iii) $f \circ f$ (iv) $g \circ g$ (v) $f \circ h$ (vi) $h \circ g$; $h \circ f$ and (vii) $f \circ h \circ g$.	7M	CO2	L3
5(a)	Prove that a connected graph G is Euler graph if every vertex of G is of even degree.	7M	CO3	L2
(b)	Let $\delta(G)$ and $\Delta(G)$ denotes minimum and maximum degrees of all the vertices of G respectively. Then show that for a non-directed graph G , $\delta(G) \leq 2 (E / V) \leq \Delta(G)$.	7M	CO3	L2
(OR)				
6(a)	Prove that the number of vertices of odd degree in a graph is always even.	7M	CO3	L2
(b)	Prove that the maximum number of edges is a simple disconnected graph G with n vertices and k components is $(n-k)(n-k-1)/2$.	7M	CO3	L1
7(a)	List and explain the general properties of Algebraic system with examples.	7M	CO4	L3
(b)	Let $G = \{0,1,2,3,4,5\}$. P.T G is an abelian group.	7M	CO4	L4
(OR)				
8(a)	List the number of integers not exceeding 2000 are divisible by 7 or 11.	7M	CO4	L2
(b)	How many different strings can be made from the letters in ABRACADABRA, using all the letters?	7M	CO4	L3
9(a)	Solve the RR $a_{n+2} - 2a_{n+1} + a_n = 2^n$ with initial condition $a_0=2$ $a_1=1$.	7M	CO5	L3
(b)	Using generating function solve $a_n = 3a_{n-1} + 2$, $a_0 = 1$.	7M	CO5	L3
(OR)				
10(a)	Find the generating function for the sequence, 1,1,3,1,1,.....	7M	CO5	L3
(b)	Find the coefficient of x^{20} in $(x^2 + x^3 + x^4 + x^5 + x^6)^5$.	7M	CO5	L3

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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

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)	Explain the insertion and deletion operations of a single linked list with an example.	4M	CO1	L3
(b)	Make a comparison between a linked list and a linear array.	10M	CO1	L4
(OR)				
2(a)	Let <i>LIST</i> be a double linked list in memory. Write an algorithm to traverse all data items in <i>LIST</i> .	7M	CO1	L2
(b)	How do we represent List using arrays and also explain the algorithm for inserting an element in an Array?	7M	CO1	L2
3(a)	What is the role of Stack in evaluation of expressions?	7M	CO2	L3
(b)	Implement Stack Operations 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 DEQUEUE.	7M	CO2	L2
5(a)	What is a min-heap? Write algorithm for heap sort using min - heap.	7M	CO3	L2
(b)	Sort the elements 87,59,35,22, 9,43,66,91 using min – heap sort.	7M	CO3	L3
(OR)				
6(a)	Trace the data: 9, 7, 3, 1, 8, 6, and 11 Using Insertion sort technique.	7M	CO3	L3
(b)	Write the Insertion sort algorithm and discuss time complexities.	7M	CO3	L2
7(a)	Describe and discuss different Binary tree traversal techniques.	10M	CO4	L2
(b)	Distinguish between AVL Tree and Binary Search tree.	4M	CO4	L4
(OR)				
8(a)	What is an AVL tree? Explain the different rotations on AVL trees.	7M	CO4	L2
(b)	Show the results of inserting elements into an empty AVL tree 3, 2,1,4,5, 6, 7, 16, 15, 14, 13, 12, 11, 10, 8, 9.	7M	CO4	L3
9(a)	What is meant by Breadth First Search (BFS) Algorithm? What are its uses & drawbacks?	7M	CO5	L2
(b)	Examine the role of Queue in the implementation of BFS Algorithm.	7M	CO5	L2
(OR)				
10(a)	Given a set of keys {43, 23, 61, 99, 44, 96, 19, 3, 9,11} and a hash function $h(x) = x \bmod 10$. Fill the hash table using any 2 collision resolving techniques: (i) Linear probing (ii) Quadratic probing (iii) Separate chaining/Open Hashing.	7M	CO5	L3
(b)	Differentiate Hashing, Hash Table & Hash Function.	7M	CO5	L2

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

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

20/4/26

**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 pressure outside the droplet of water of diameter 0.04mm is 10.32 N/cm ² . calculate the pressure within the droplet if surface tension is given as 0.0725 N/m of water.	7M	CO1	L3
(b)	Formulate an expression for the capillary Rise and capillary fall of a liquid.	7M	CO1	L2
(OR)				
2(a)	What are the gauge pressure and absolute pressure at a point 3 m below the free surface of a liquid having a density of 1.53×10^3 kg/m ³ if the atmospheric pressure is equivalent to 750 mm of mercury? The specific gravity of mercury is 13.6 and density of water is 1000 kg/m ³ .	7M	CO1	L3
(b)	Illustrate the Newton's law of viscosity.	7M	CO1	L2
3(a)	Deduce an expression for the discharge for venturi meter.	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 mm and the 200 mm pipes be 2.5m/sec and 1 m/sec, calculate the velocity in the 250mm pipe.	7M	CO2	L3
(OR)				
4(a)	Define the following terms (i) streamline (ii) path line (iii) streak line.	7M	CO2	L1
(b)	Water under a pressure of 3.924×10^{-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°, find the magnitude and direction of the resultant force on the bend.	7M	CO2	L3
5(a)	What do you understand by Boundary Layer? Explain the development of Boundary layer over a flat plate.	7M	CO3	L2
(b)	A 150mm diameter jet moving at 30m/s impinges on a curved vane moving at 15m/s in the direction of the jet. The jet leaves the vanes at 60° with the direction of motion of the vanes. Calculate: (i) Force exerted by the jet in the direction of motion of vanes (ii) Work done by the jet per second.	7M	CO3	L3
(OR)				
6(a)	In a laminar boundary layer over a plate the velocity distribution is given by $(u/U_m) = (3/2)(y/d) - (1/2)(y^2/d^2)$. Find the boundary layer thickness, wall shear stress and coefficient of drag.	7M	CO3	L3

20ME03-FLUID MECHANICS AND HYDRAULIC MACHINERY

(b)	Find an expression for the efficiency of a series of moving curved vanes when a jet of water strikes the vanes at one of its tips. Prove that maximum efficiency is when $u = V$ and the value of maximum efficiency is 50%.	7M	CO3	L3
7(a)	Describe the construction and working of radial flow reaction turbines with neat sketches.	7M	CO4	L2
(b)	Draw the performance characteristics of turbine and explain it.	7M	CO4	L2
(OR)				
8(a)	Formulate an expression for the unit discharge.	7M	CO4	L2
(b)	What is the importance of a draft tube in a Francis turbine? Discuss different types of draft tubes.	7M	CO4	L2
9(a)	Explain various types of impellers used in centrifugal pump.	7M	CO5	L2
(b)	A single acting reciprocating pump has a piston diameter of 150mm and stroke length of 350mm. The center of the pump is 3.5m above the water surface in the sump and 22m below the delivery water level. If the pump is working at 30 rpm, determine the power required to drive the pump.	7M	CO5	L3
(OR)				
10(a)	A Centrifugal pump delivers water against a net head of 17.5 meters and a design speed of 1000 r.p.m. The vanes are curved back to an angle of 30° with the periphery. The impeller diameter is 300 mm and out let width is 60 mm. Determine the discharge of the pump if manometric efficiency is 95%.	7M	CO5	L3
(b)	Explain in detail about (i) percentage of slip (ii) negative slip of pump.	7M	CO5	L2

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(AUTONOMOUS)**

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

B.Tech. (III Semester) Supplementary Examinations

20CS07-DATABASE MANAGEMENT SYSTEMS

(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)	Discuss the main characteristics of the database approach and how it differs from traditional file systems.	7M	CO1	L2
(b)	Define ER model and explain the following kinds of constraints that can be specified in the ER diagram, and give an example of each: (i) key constraint (ii) participation constraint.	7M	CO1	L2
(OR)				
2(a)	What are the different types of attributes that occur in the ER model? Write their corresponding notations.	7M	CO1	L2
(b)	Explain the structure of a typical DBMS based on relational data model, with a neat diagram.	7M	CO1	L2
3(a)	Summarize the primary key, default, unique, check, not null constraints in SQL. Illustrate all the constraints using an appropriate schema.	7M	CO2	L3
(b)	For the following relation schema: employee(employee-name, street, city) works(employee-name, company-name, salary) company(company-name, city) manages(employee-name, manager-name) Write a query in SQL for each of the following queries. (i) Find the names, street address, and cities of residence for all employees who work for 'Indian Bank' and earn more than Rs. 10,000. (ii) Find the names of all employees in the database who live in the same cities as the companies for which they work.	7M	CO2	L3
(OR)				
4(a)	Outline the purpose of creating a View. How do you destroy, alter and update views.	7M	CO2	L3
(b)	Illustrate different aggregate functions in SQL with examples.	7M	CO2	L3
5(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
(OR)				

20CS07-DATABASE MANAGEMENT SYSTEMS

6(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
7(a)	What are the problems with concurrent execution of transactions? Explain each with an example.	7M	CO4	L2
(b)	Explain the 2phase locking protocol for 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.	Explain the insertion operation in B+ Tree. Build a B+ Tree with the keys : 34,67,2,90,76,45,87,104,256,200, 12, 29.	14M	CO5	L2
(OR)				
10(a)	What are the most important features of MongoDB?	7M	CO5	L2
(b)	When does a collision occur in hashing? Illustrate various collision resolution techniques.	7M	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

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)	Explain the following terms related to fluids. (i). Newtonian and Non-Newtonian fluids, (ii). Surface tension, (iii). Specific gravity, and (iv). Capillarity	7M	CO1	L2
(b)	Define viscosity. A plate having an area of 0.7 m ² is sliding down the inclined plane at 45° to the horizontal with a velocity of 0.45 m/s. There is a cushion of fluid 2 mm thick between the plane and the plate. Find the viscosity of the fluid if the weight of the plate is 300 N.	7M	CO1	L3
(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
(OR)				
3(a)	Analyze the equation of continuity for one dimensional flow, circulation and Vorticity.	7M	CO2	L4
(b)	A 40 cm diameter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3 m/s. Find the discharge in this pipe. Also, determine the velocity in 20 cm pipe if the average velocity in 30 cm diameter pipe is 2 m/sec.	7M	CO2	L3
(OR)				
4(a)	Derive Bernoulli's equation for the flow of an incompressible frictionless fluid from consideration of momentum.	7M	CO2	L2
(b)	An oil of specific gravity 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. Calculate the discharge of oil through the horizontal venturimeter. Take, Co-efficient of discharge as 0.98.	7M	CO2	L3
(OR)				
5(a)	Derive an expression for the loss of head due to friction in a pipe line. How is the pipe coefficient f dependent on Reynolds Number?	7M	CO4	L2
(b)	The rate of flow of water through a horizontal pipe is 0.25 m ³ /s. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller pipe is 11.772 N/cm ² . Determine: (i). Loss of head due to sudden enlargement, (ii). Pressure intensity in the large pipe, and (iii) Power lost due to enlargement.	7M	CO4	L3
(OR)				

6(a)	Explain method of repeating variables and Buckingham Pi theorem.	7M	CO4	L2
(b)	A pipe of diameter 500 mm and length 5000 metres connects two reservoirs A and B. The difference of water levels of these reservoirs is 20 metres. Half way along the pipe there is a branch through which water can be discharged to a third reservoir C. Find the rate of flow to the reservoir B when (i) no water is discharged to the reservoir C, (ii) the discharge to the reservoir C is $0.05 \text{ m}^3/\text{sec}$. Take friction co-efficient $(f) = 0.006$.	7M	CO4	L3
7(a)	Differentiate between reaction turbine and impulse turbine. Explain the importance of draft tube.	7M	CO5	L2
(b)	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
(OR)				
8(a)	Define unit head, unit discharge and unit power of a turbine and derive the expressions for the same.	7M	CO5	L1
(b)	A Kaplan turbine runner is to be designed to develop 9100 kW. The net available head is 5.6 m. If the speed ratio = 2.09, flow ratio = 0.68, overall efficiency = 86% and the diameter of the boss is $\frac{1}{3}$ of the diameter of the runner. Find the diameter of the runner, its speed and the specific speed of the turbine.	7M	CO5	L3
9(a)	Explain the principle and working of a Centrifugal pump with a neat sketch.	7M	CO5	L2
(b)	A single acting reciprocating pump has a plunger of diameter 250 mm and stroke of 350 mm. if the speed of the pump is 60 r.p.m. and it delivers 16.5 liters per second of water against a suction head of 5m and a delivery head of 20 m, find the theoretical discharge, coefficient of discharge, the slip, the percentage slip of the pump and the power required to drive the pump.	7M	CO5	L3
(OR)				
10(a)	Illustrate the working of reciprocating pump with neat diagram	7M	CO5	L2
(b)	A centrifugal pump discharge 560 liters of water per second has to develop a head of 10 meters, the speed of rotation of the impeller being 700rpm. The manometric efficiency is 85% and the loss of head in the pump due to friction is $0.025 V_1^2$ meters of water, where V_1 is the velocity with which the water leaves the impeller. Assume that the velocity of flow through the impeller is constant at 2.50 meters per second and that there is no velocity of whirl at inlet. Determine, (i) The diameter of the impeller (ii) the outlet area (iii) The vane angle at the outlet of the impeller.	7M	CO5	L3

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B.Tech. (III Semester) Supplementary Examinations

20CE06-SOLID MECHANICS

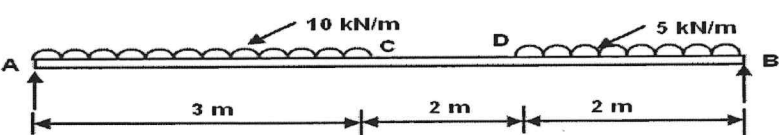
(CE)

Time : 3 hours

Max. Marks : 70

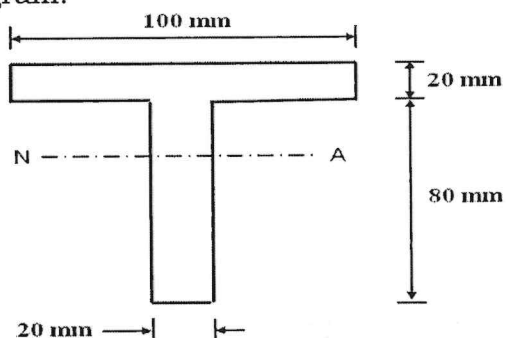
Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate the stress – strain curve for tension test on a ductile material and mark the significant points on it.	4M	CO1	L1
(b)	Two vertical rods one of steel and other copper are each rigidly fixed at the top and 500mm apart. Diameters and lengths of each rod are 20mm and 4000mm respectively. A cross bar fixed to the rods at the lower ends carries a load of 5000N such that the cross bar remains horizontal even after loading. Evaluate (i) stresses in each rod and (ii) the position of the load on the bar. Take $E_s=2 \times 10^5 \text{N/mm}^2$ and $E_c=1 \times 10^5 \text{N/mm}^2$.	10M	CO3	L3
(OR)				
2(a)	Define the terms strain energy, resilience and proof resilience.	4M	CO1	L1
(b)	The following data relate to a bar subjected to a tensile test: (i) Diameter of the bar, $d=30\text{mm}$ (ii) Tensile load $P=54\text{Kn}$ (iii) Gauge length $\ell=300\text{mm}$ (iv) Extension of the bar $=0.112\text{mm}$ (v) Change in diameter $=0.00366\text{mm}$ Calculate (i) Poisson's ratio and (ii) the value of three elastic moduli.	10M	CO3	L3
(OR)				
3(a)	Define the terms: principal planes and principal stresses.	4M	CO1	L1
(b)	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.	10M	CO5	L4
(OR)				
4(a)	A rectangular bar is subjected to two direct stresses (σ_1 and σ_2) in two mutually perpendicular directions. Prove that the normal stress (σ_n) and shear stress (τ) on an oblique plane which is inclined at an angle θ with the axis of minor stress are given by $\sigma_n = [(\sigma_1 + \sigma_2)/2] + [(\sigma_1 - \sigma_2)/2]\cos 2\theta$ and $\tau = [(\sigma_1 - \sigma_2)/2]\sin 2\theta$	7M	CO2	L2
(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° to the axis of the minor principal stress.	7M	CO3	L4
(OR)				
5(a)	Derive the relation between shear force, bending moment and rate of loading.	4M	CO2	L2
(b)	Draw the shear force and bending moment diagrams for the simply supported beam as shown in figure. 	10M	CO4	L3

(OR)

20CE06-SOLID MECHANICS

6(a)	Derive the bending equation $M/I = \sigma/y = E/R$.	7M	CO2	L2
(b)	A cast iron cantilever of length 1.5 meter fails when a point load 'W' is applied at the free end. If the section of the beam is 40mm x 60mm and the stress at the failure is 120N/mm ² , find the point load applied.	7M	CO3	L3
7(a)	Draw the shear stress distribution for rectangular, triangular and I section.	4M	CO1	L1
(b)	The shear force acting on a section of a beam is 50kN. The section of the beam is T – shaped of dimensions as shown in figure. The moment of inertia about the horizontal neutral axis is $314.221 \times 10^4 \text{ mm}^4$. Estimate the shear stress at the neutral axis and at the junction of the web and flange. Draw the shear stress distribution diagram. 	10M	CO4	L3
(OR)				
8(a)	Write the assumptions made in the derivation of torsion equation.	4M	CO1	L1
(b)	A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Compute the percentage saving in material, if the material to be used is also the same.	10M	CO3	L4
9(a)	Derive the expression for Euler's crippling load when one end fixed and other end free.	7M	CO2	L2
(b)	Compute the crippling load of a solid bar 3 m long and 50mm in diameter is used as a strut for the following conditions. (i) when both ends hinged and (ii) one end of the strut is fixed and other end is free	7M	CO5	L3
(OR)				
10(a)	Define the Core or Kernel of the section. Sketch the core of the following sections: (i) Rectangular section of dimensions bxd (ii) Circular section of diameter 'b'.	7M	CO1	L1
(b)	A concrete dam 25m high is trapezoidal in section and retains water to a maximum height of 24m. If the concrete weighs 23KN/m ³ and water 10KN/m ³ , find the maximum width at the base for no tension condition.	7M	CO5	L3

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

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

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)	Analyze CE amplifier without bypass capacitor in terms of current gain, input impedance, voltage gain and output impedance parameters using simplified method.	7M	CO3	L4
(b)	Classify FET amplifiers and illustrate the CS FET Amplifier with Bypass capacitor.	7M	CO2	L2
(OR)				
2(a)	Analyze the current gain, input impedance, voltage gain and output impedance parameters of a Common Collector amplifier using exact analysis.	7M	CO3	L4
(b)	A CE amplifier is driven by a voltage source of internal resistance $R_s = 800\Omega$, and the load resistance $R_L = 1000\Omega$. The h-parameters are $h_{ie} = 1\text{ k}\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu\text{A/V}$. Compute the current gain, input resistance output resistance and voltage gain using approximate analysis.	7M	CO4	L3
3.	Draw the circuit diagram, equivalent circuit of a Darlington pair and derive expressions for overall voltage gain and input impedance.	14M	CO2	L2
(OR)				
4(a)	Briefly explain about Cascode Amplifier Working and Its Applications.	10M	CO2	L2
(b)	What is the need for multistage amplifiers?	4M	CO2	L1
5(a)	Illustrate the classification of power amplifiers and compare between the voltage amplifiers and power amplifiers.	7M	CO3	L4
(b)	Derive the conditions for sustained oscillations of LC oscillators.	7M	CO3	L4
(OR)				
6(a)	What are the factors which effect frequency stability of an oscillator?	7M	CO3	L4
(b)	Explain the operation of a class B push-pull amplifier with a neat sketch. Derive the expressions for Efficiency and Power dissipation?	7M	CO3	L4
7(a)	Illustrate the response of RC High-pass circuit with Sinusoidal input signal and determine the cut-off frequency.	7M	CO4	L3
(b)	Derive the expression for the output of high pass RC circuit excited by a step input, and plot the output waveforms.	7M	CO4	L3
(OR)				
8(a)	Prove that RC low pass circuit will behave as an integrator. Apply the condition to be satisfied and plot the waveforms for step and square wave input.	7M	CO4	L2
(b)	Obtain the output equation of a low pass RC circuit when the pulse input is applied and also sketch the all input and output waveforms.	7M	CO4	L2
9(a)	Sketch the circuit diagram of Schmitt trigger and explain its operation.	7M	CO4	L2
(b)	Write notes on: (i) Astable relaxation circuits (ii) Monostable relaxation circuits.	7M	CO4	L1
(OR)				
10(a)	With a neat diagram, explain the operation of fixed bias bistable multivibrator.	7M	CO4	L1
(b)	Design self bias bistable multivibrator with neat sketch.	7M	CO4	L3

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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B.Tech. (III Semester) Supplementary Examinations

20EE05-ELECTRICAL CIRCUIT ANALYSIS

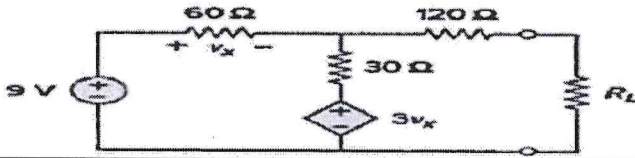
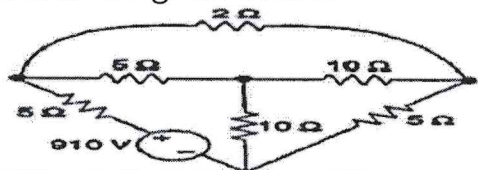
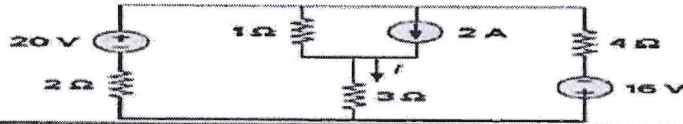
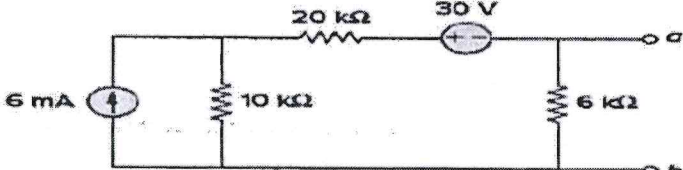
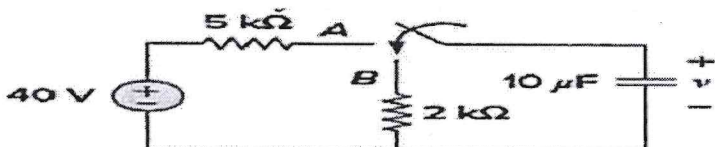
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Time : 3 hours

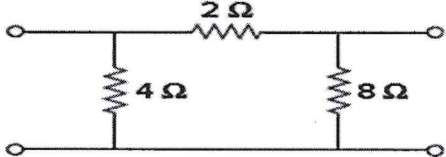
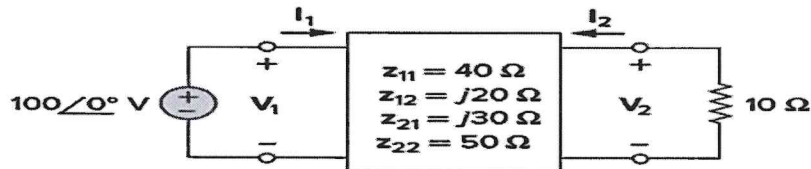
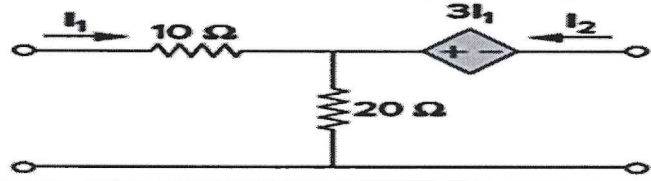
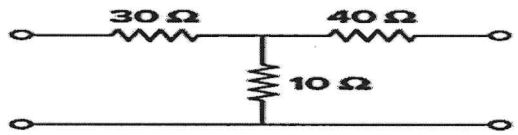
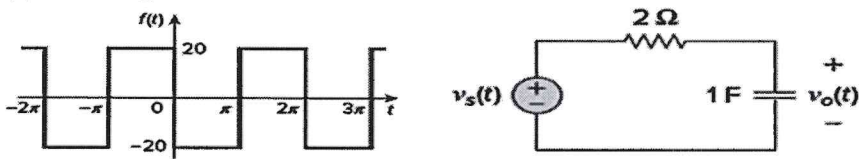
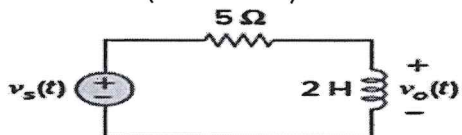
Max. Marks :70

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 R_L 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)	State the superposition theorem and Calculate the current 'I' in the circuit using Superposition theorem. 	7M	CO1	L3
(b)	State Thevenin and Norton theorems and determine the Norton equivalent circuit across terminals ab in the given circuit. 	7M	CO1	L3
3(a)	The switch in the given circuit has been in position A for along time. Assume the switch moves instantaneously from A to B at $t = 0$. Find v for $t > 0$. 	7M	CO2	L3
(b)	Derive the expression for $i(t)$ for $t > 0$ in the given circuit. 	7M	CO2	L3
(OR)				
4(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 $t=0$. Find an expression for current $i(t)$ in the circuit, when (i) $R=5\Omega$ (ii) $R=6\Omega$.	7M	CO2	L1

20EE05-ELECTRICAL CIRCUIT ANALYSIS

5(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 $V_{RY}=100\angle 0^\circ\text{V}$, $V_{YB}=100\angle -120^\circ\text{V}$, $V_{BR}=100\angle -240^\circ\text{V}$ respectively. If a balanced 3-phase delta connected load with impedance $10\angle 30^\circ\text{ohms}$ is connected, find the line and Phase currents.	7M	CO3	L3
6(a)	Three impedances $Z_a=6\angle 90^\circ$, $Z_b=6\angle 0^\circ$ and $Z_c=6\angle -90^\circ$ ohms are connected in star. Calculate the values of Z_x , Z_y and Z_z of the equivalent delta. Derive the formula used.	7M	CO3	L3
(b)	A balanced 3 - phase delta connected load of $(2+j3)/\text{phase}$ is connected across 400 V, 3- ϕ supply. Determine phase currents, line currents and power consumed by the load. Assume RYB phase sequence.	7M	CO3	L3
7(a)	Compute the Z and Y parameters for the given two-port network. 	7M	CO4	L3
(b)	Calculate I_1 and I_2 in the given two-port 	7M	CO4	L3
(OR)				
8(a)	Compute the Z and Y parameters for the given two-port network. 	7M	CO4	L3
(b)	If two copies of the circuit in Fig. are connected in cascade, Compute the overall transmission (ABCD)parameters. 	7M	CO4	L3
9.	If the periodic voltage as shown in figure is applied to the circuit. Find $V_o(t)$ in the given circuit. 	14M	CO5	L3
(OR)				
10(a)	Find the response $v_o(t)$ of the circuit if $v_s(t) = 24 + 192\cos 120\pi t + 96\cos(360\pi t - 30^\circ)$. 	7M	CO5	L3
(b)	Describe the low pass RC filter with frequency response.	7M	CO5	L3

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (III Semester) ~~Regular~~/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 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
(OR)				
2(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
3(a)	Apply the first law of thermodynamics for a closed system and prove that internal energy is a property of system.	7M	CO2	L3
(b)	State the limitations of first law of thermodynamics.	7M	CO2	L1
(OR)				
4(a)	Formulate the expression for work done in a polytropic process?	7M	CO2	L2
(b)	A gas in a piston-cylinder assembly undergoes an expansion process for which the relationship between pressure and volume is given by $PV^n = \text{constant}$. The initial pressure is 0.5 MPa, the initial volume is 0.5 m ³ and the final volume is 0.2 m ³ . Determine the work transfer for different process in KJ if (i) $n = 1.4$, (ii) $n = 1$ and (iii) $n = \text{infinity}$ and analyze the problem with valid conclusions	7M	CO2	L3
5(a)	Show that the entropy is a property of a system.	7M	CO3	L2
(b)	A heat engine receives reversibly 420 kJ/cycle of heat from a source at 327°C, and rejects heat reversibly to a sink at 27°C. There are no other heat transfers. For each of the three hypothetical amounts of heat rejected, in (i), (ii), and (iii) below, compute the cyclic integral of dQ/T . from these results show which case is irreversible, which reversible, and which impossible: (i) 210 kJ/cycle rejected (ii) 105 kJ/cycle rejected (iii) 315 kJ/cycle rejected	7M	CO3	L3
(OR)				
6(a)	State and explain the Kelvin-Planck and Clausius statements of second law of thermodynamics.	7M	CO3	L1

20ME04-THERMODYNAMICS

(b)	Distinguish between irreversible and reversible processes. Also, provide three examples for each process.	7M	CO3	L1
7(a)	Discuss about the Ideal gas mixtures? Explain the Dalton's law and Amagat's law of gas mixtures.	7M	CO4	L1
(b)	0.45 kg of CO and 1 kg of air is contained in a vessel. Air has 23.3% of Oxygen and 76.7% of Nitrogen by mass. Estimate the mass and mole fractions of the each component in the mixture.	7M	CO4	L3
(OR)				
8(a)	Define dryness fraction. Prove that the dryness fraction at saturated liquid state and saturated vapour states are 0 and 1 respectively.	7M	CO4	L2
(b)	Compute the volume, enthalpy and internal energy of 2 kg of steam at 10 bar pressure in each of the following states (i) Dryness fraction of 0.85 (ii) Dry and saturated steam	7M	CO4	L3
9(a)	Illustrate the working of simple VCR cycle.	7M	CO5	L2
(b)	Interpret the working of Rankine cycle with the help of P-V and T-S diagrams.	7M	CO5	L2
(OR)				
10(a)	Derive the expression for thermal efficiency of Otto cycle with the help of P-V and T-S diagrams.	7M	CO5	L2
(b)	In an air standard Diesel cycle, the compression ratio is 15. Compression begins at 0.1MPa, 40°C. The heat added is 1.675MJ/kg. Find (i) the maximum temperature of the cycle (ii) the work done per kg of air (iii) the cycle efficiency (iv) the cut-off ratio.	7M	CO5	L3

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

B.Tech. (III Semester) Supplementary Examinations

20AD02-COMPUTER ARCHITECTURE

(AI&DS, 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)	Design a common bus using Tri- state buffers.	7M	CO1	L3
(b)	Discuss various Addressing Modes with examples.	7M	CO1	L2
(OR)				
2(a)	Describe the phases of instruction cycle.	7M	CO1	L2
(b)	Evaluate the arithmetic expression $X=(A+B)*(C+B)$ using Three Address and two address Instruction Format	7M	CO1	L3
3(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
(OR)				
4(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
5(a)	Discuss the basic concepts of pipelining.	7M	CO3	L2
(b)	Distinguish between Hardwired control unit and Micro-programmed control unit.	7M	CO3	L2
(OR)				
6(a)	Explain the Flynn's classification to accomplish Parallel Processing?	7M	CO3	L2
(b)	Explain the design of Hardwired control unit in detail.	7M	CO3	L2
7(a)	Define and Discuss the types of Replacement Algorithms.	7M	CO4	L2
(b)	Discuss about associative memory? Give applications of associative memory.	7M	CO4	L2
(OR)				
8(a)	What is virtual memory? With a neat block diagram explain the virtual memory address translation.	7M	CO4	L2
(b)	Explain about (i) Magnetic Disc (ii) Magnetic Tape.	7M	CO4	L2
9(a)	Illustrate the concept of DMA controller in a computer.	7M	CO5	L2
(b)	Briefly explain about the techniques to handle a hardware priority interrupt.	7M	CO5	L2
(OR)				
10(a)	What is the need of I/O interfaces? Explain their role in data transfer.	7M	CO5	L1
(b)	Write short note on various data transfer modes.	7M	CO5	L2

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

B.Tech. (III Semester) Supplementary Examinations

20AE03-ENGINEERING THERMODYNAMICS

(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)	What is a thermodynamic system? Discuss different thermodynamic systems with examples	7M	CO1	L1															
(b)	Two thermometers, one Centigrade, and other Fahrenheit are immersed in a fluid. After the thermometers reach equilibrium with the fluid, it is noted that both the thermometers indicate same numerical value. Find that identical numerical value shown by the thermometers.	7M	CO1	L3															
(OR)																			
2(a)	Define work from thermodynamics point of view and derive an expression for displacement work for a closed system undergoing a process.	7M	CO1	L1															
(b)	A mass of 1.5kg of air is compressed in a quasistatic process from 0.1MPa to 0.7 MPa for which $Pv=\text{constant}$. The initial density of air is 1.16 kg/m^3 . Find the work done by the piston to compress the air.	7M	CO1	L3															
3.	A closed system undergoes a thermodynamic cycle consisting of four separate and distinct processes. The heat and work transferred in such a process are as tabulated below.<table><tr><th>Process</th><th>Heat Transfer in kJ/min</th><th>Work Transfer in kJ/min</th></tr><tr><td>1-2</td><td>20,000</td><td>0</td></tr><tr><td>2-3</td><td>-10,000</td><td>30,000</td></tr><tr><td>3-4</td><td>0</td><td>20000</td></tr><tr><td>4-1</td><td>15,000</td><td>-25,000</td></tr></table>Show that the data is consistent with the first law of thermodynamics. Also evaluate the network output in kW and change in internal energy for each process and for cycle.	Process	Heat Transfer in kJ/min	Work Transfer in kJ/min	1-2	20,000	0	2-3	-10,000	30,000	3-4	0	20000	4-1	15,000	-25,000	14M	CO2	L3
Process	Heat Transfer in kJ/min	Work Transfer in kJ/min																	
1-2	20,000	0																	
2-3	-10,000	30,000																	
3-4	0	20000																	
4-1	15,000	-25,000																	
(OR)																			
4(a)	Illustrate I law of thermodynamics applied to a flow process and apply it to (i) compressor and (ii) turbine.	7M	CO2	L3															
(b)	A steam nozzle is supplied with 2400 kg/h of steam at 15 bar and exit conditions of steam are $V_1= 1800 \text{ m/min}$ and $v_{s1}= 0.15 \text{ m}^3/\text{kg}$, $u_1= 2600 \text{ kJ/kg}$. $P_2= 1\text{bar}$, $v_{s2}=1.7 \text{ m}^3/\text{kg}$ and $u_2= 2500 \text{ kJ/kg}$. Calculate the exit velocity of the steam.	7M	CO2	L3															
5(a)	Explain Kelvin Planck statement of II law of thermodynamics and prove that it is equivalent to Clausius statement also.	7M	CO3	L2															

20AE03-ENGINEERING THERMODYNAMICS

(b)	The COP of a refrigerator operating on Carnot cycle is 5.4 when it maintains -5°C in the evaporator. Calculate the condenser temperature and refrigerating effect if the power required to drive the unit is 5 kW.	7M	CO3	L3
(OR)				
6(a)	Define entropy and prove that it is a property of the system.	7M	CO3	L1
(b)	1 kg of water at 273 K is brought in contact with a heat reservoir at 373 K, when the water has reached 373 K, find the entropy change of water, of the heat reservoir and of the universe.	7M	CO3	L3
7(a)	Define (i) Mass fraction (ii) Mole fraction.	4M	CO4	L1
(b)	An ideal gas of molecular weight 30 and $\gamma=1.3$ occupies a volume of 1.5 m^3 at 100 kPa and 77°C . The gas is compressed according to the law $PV^{1.25}=\text{constant}$ to a pressure of 3 MPa. Calculate the volume and temperature at the end of compression and heating, work done, heat transferred and the total change of entropy.	10M	CO4	L3
(OR)				
8(a)	Define (i) Sensible heat of water (ii) Dryness fraction (iii) Latent heat of vaporization (iv) Heat of superheat	7M	CO4	L1
(b)	Using steam tables, find the following at a pressure of 1.2MPa: (i) Saturation temperature (ii) Change in specific volume; (iii) change in entropy during evaporation and (iv) Latent heat of vaporization of steam.	7M	CO4	L3
9(a)	Develop an expression for thermal efficiency of Diesel cycle in terms of standard parameters.	7M	CO5	L4
(b)	In an air standard Otto cycle the compression ratio is 7 and compression begins at 0.1 MPa, 35°C . The maximum temperature of the cycle is 1100°C . Find (i) the work done per kg of air (ii) the cycle efficiency and (iii) the mean effective pressure.			
(OR)				
10(a)	Explain the working Bell-Coleman cycle with the help of P-V and T-s diagrams.	7M	CO5	L2
(b)	Air is compressed in an air standard Bell Coleman refrigerator from 1 bar, 5°C to 5 bar. The inlet temperature of the air before it enters the expansion cylinder is 20°C . Determine the maximum and minimum temperature of the air in the refrigerator and the COP.	7M	CO5	L3

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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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)	Describe briefly the following tests on aggregate (i) Crushing test and (ii) Impact test	7M	CO1	L2
(b)	Define Alkali-Aggregate Reaction and state the factors promoting it.	7M	CO1	L1
(OR)				
2(a)	What is rapid hardening cement? Explain how it differs from ordinary Portland cement.	7M	CO1	L1
(b)	Discuss the effects of impurities in the mixing water on concrete.	7M	CO1	L2
3(a)	Define Creep and explain how creep is measured.	7M	CO2	L2
(b)	Write about the thermal properties of concrete.	7M	CO2	L2
(OR)				
4(a)	What is creep of concrete and what are the factors affecting creep?	7M	CO2	L1
(b)	What are the different factors affecting shrinkage of concrete?	7M	CO2	L1
5(a)	Explain the functions of admixtures in concrete.	7M	CO1	L2
(b)	What is the quality of water mixed in concrete?	7M	CO2	L1
(OR)				
6.	What are admixtures? Write about chemical admixtures and mineral admixtures.	14M	CO2	L2
7(a)	What is pre-packed concrete? Mention its applications.	7M	CO4	L1
(b)	Differentiate between High density of Concrete and High strength of Concrete.	7M	CO4	L2
(OR)				
8(a)	Define polymer concrete. State its advantages.	7M	CO4	L1
(b)	Discuss ready mixed concrete and its advantages in concrete construction.	7M	CO4	L2
9(a)	Explain the selection criteria of ingredients used in mix design in brief.	7M	CO5	L2
(b)	Write down the principles of concrete mix design.	7M	CO5	L1
(OR)				
10(a)	Explain importance of mix design in concrete.	7M	CO5	L2
(b)	Discuss the step by step procedure of mix design by BIS method.	7M	CO5	L6

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

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)	Discuss various fundamental properties of Boolean algebra.	7M	CO1	L2
(b)	Illustrate karnaugh maps.	7M	CO1	L3
(OR)				
2(a)	Convert (i) Decimal number 12345 to hexadecimal number (ii) Binary number 11100101 to hexadecimal number.	7M	CO1	L2
(b)	Describe (r-1) s complement.	7M	CO1	L2
3(a)	Design a 4 bit combinational logic to subtract one bit from the other. Draw the logic diagram using NAND and NOR Gates.	7M	CO2	L3
(b)	Explain the operation of a JK flip-flop with the truth table.	7M	CO2	L2
(OR)				
4(a)	Design and draw a full subtractor which will use two half subtractors.	7M	CO2	L3
(b)	Define multiplexer. Construct 4-to-1 multiplexer using logic gates.	7M	CO1	L1
5(a)	Illustrate the phases of an instruction cycle with the help of flowchart.	7M	CO3	L2
(b)	Design a Booth multiplication algorithm to perform multiplication between two signed 2's complement numbers.	7M	CO3	L3
(OR)				
6(a)	With the help of a flowchart, briefly explain instruction cycle.	7M	CO3	L2
(b)	Perform multiplication of -3 and -5 using Booth multiplication algorithm.	7M	CO3	L3
7(a)	Formulate a four segment instruction pipeline for a computer. Specify the operation to be performed in each segment.	7M	CO4	L2
(b)	Draw the instruction format of a instruction. What is direct and indirect addressing with example?	7M	CO4	L2
(OR)				
8(a)	List the different methods for designing a control unit and give the general configuration of a hardwired control unit for a basic computer.	7M	CO4	L1
(b)	Write a short notes on (i) Speed up (ii) Throughput (iii) Flynn's classification.	7M	CO4	L1
9(a)	Explain input – output sub systems.	7M	CO5	L2
(b)	Explain the operation of DMA controller with neat diagram.	7M	CO5	L2
(OR)				
10(a)	Discuss how blocks of main memory are addressed through the cache blocks.	7M	CO5	L2
(b)	Explain cache memory.	7M	CO5	L2

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B.Tech. (III Semester) Supplementary Examinations

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)	Discuss the classification of periodic and non periodic signals and obtain the fundamental period of signal $x(t)=30\cos(2t)+4\sin(3t)$.	7M	CO1	L2
(b)	Determine the convolution of the signals $x_1(t) = e^{-at}u(t)$ and $x_2(t) = e^{-bt}u(t)$	7M	CO2	L3
(OR)				
2(a)	Describe the mathematical and graphical representation of signum, sampling, sinc and exponential signals.	7M	CO1	L2
(b)	Illustrate the operations performed on continuous time signals with suitable examples.	7M	CO2	L3
(OR)				
3(a)	Show that the following signals are orthogonal over the interval $[0,1]$ where $f(t)=1$ and $x(t)=\sqrt{3}(1-2t)$	7M	CO2	L3
(b)	Derive the relationship between Trigonometric and Exponential Fourier series coefficients.	7M	CO4	L4
(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 $0 \leq t \leq 2\pi$	7M	CO4	L4
(OR)				
5(a)	Obtain the Fourier transform of the following signals (i) $x(t) = 1$ (ii) $\delta(t)$ (iii) $\text{Sgn}(t)$.	7M	CO1	L1
(b)	Examine the time shifting and frequency shifting properties of Fourier Transform.	7M	CO4	L2
(OR)				
6(a)	State and prove the following properties of Fourier Transform (i) Time Shifting (ii) Convolution in time domain.	7M	CO2	L3
(b)	What is Paley - Wiener criterion? What is its significance?	7M	CO4	L2
(OR)				
7(a)	Explain about signal and system bandwidth.	4M	CO3	L2
(b)	The following are the impulse responses of the LTI systems in continuous time. Determine whether each system is stable and/or causal. Justify your answer (i) $h(t) = e^{-3t}u(t)$ (ii) $h(t) = \log(t)$.	10M	CO3	L3
(OR)				
8(a)	The step response $s(t)$ of a continuous-time LTI system is given by $s(t) = \cos \omega_0 t u(t)$. Find the impulse response of the system.	7M	CO3	L2
(b)	Discuss the Causality and Poly-Wiener criterion for physical realization.	7M	CO3	L2
(OR)				
9(a)	State and prove the initial and final value theorems of Laplace transform.	7M	CO4	L3
(b)	Analyze the signal $x(t)$ from its s-domain representation if (i) $\text{Re}\{s\} > -2$ (ii). $\text{Re}\{s\} < -2$ given $X(s) = \frac{s+1}{(s+2)(s+3)}$	7M	CO4	L4
(OR)				
10(a)	Interpret the concept of ROC and discuss its 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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (III Semester) Supplementary Examinations

20EE06-DIGITAL ELECTRONICS

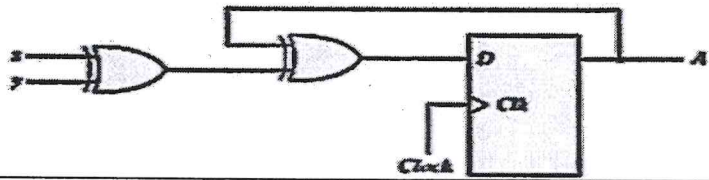
(EEE)

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) Given the two binary numbers $X=1010100$ and $Y=1000011$, perform the subtraction $X-Y$ using 2's complement . (ii) Find the BCD sum : $(370)_{10}+(-250)_{10}$. Use 2's complement method to represent a negative number.	7M	CO1	L3																																																																						
(b)	Find the complement of the Boolean function: $F(A,B,C)=A'BC'+A'B'CF$ in simplified SOP form .	7M	CO2	L2																																																																						
(OR)																																																																										
2(a)	Explain SOP and POS forms with examples.	7M	CO1	L2																																																																						
(b)	Simplify a Boolean expression using K-map (4 variables) .	7M	CO1	L3																																																																						
3(a)	Implement the Boolean function $F=xz+ x'z'+ x'y$ using NAND and inverter gates.	7M	CO2	L4																																																																						
(b)	Draw the multiple level NOR circuit for the following expression: <u>$CD.(B+C).A+(BC+DE)$</u> .	7M	CO2	L4																																																																						
(OR)																																																																										
4.	Explain AND, OR, NOT, NAND, NOR Gates with logic symbol and truth tables.	14M	CO2	L2																																																																						
5(a)	Explain half adder and full adder with truth tables.	7M	CO3	L2																																																																						
(b)	Explain the working of a multiplexer (MUX).	7M	CO3	L2																																																																						
(OR)																																																																										
6(a)	Write the truth table of a full subtractor and implement it using two 4x1 multiplexers.	7M	CO3	L3																																																																						
(b)	The following is a truth table of a three-input, four-output combinational circuit: <table><tr><th colspan="3">Inputs</th><th colspan="4">Outputs</th></tr><tr><th>x</th><th>y</th><th>z</th><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table> Tabulate the PAL programming table for the circuit.	Inputs			Outputs				x	y	z	A	B	C	D	0	0	0	0	1	0	0	0	0	1	1	1	1	1	0	1	0	1	0	1	1	0	1	1	0	1	0	1	1	0	0	1	1	1	0	1	0	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	0	1	1	1	7M	CO3	L4
Inputs			Outputs																																																																							
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7.	Explain triggering methods (edge and level) and master-slave flip-flop.	14M	CO4	L2																																																																						
(OR)																																																																										
8(a)	Explain the differences among a truth table, a state table, a characteristic table, and an excitation 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																																																																						
9(a)	Derive the state diagram for the circuit shown below. 	7M	CO4	L2																																																																						
(b)	Draw the ASM chart for the state diagram derived in 9(a).	7M	CO4	L2																																																																						
(OR)																																																																										
10(a)	Define finite state machine (FSM) and its types.	7M	CO4	L1																																																																						
(b)	Compare Mealy and Moore models.	7M	CO4	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

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)	Explain in detail about the mechanism of crystallization of metals.	7M	CO1	L1
(b)	Explain the governing rules for the formation of substitutional solid solutions.	7M	CO1	L2
(OR)				
2(a)	Discuss in detail about the crystal structures.	7M	CO1	L2
(b)	What are Hume-Rothery rules? Explain.	7M	CO1	L2
3(a)	Discuss in detail about (i) lever rule (ii) coring.	7M	CO2	L2
(b)	Write eutectic, peritectic, eutectoid and peritectoid reactions	7M	CO2	L2
(OR)				
4(a)	Draw Bi-Cd phase diagram and label the important reactions and regions.	7M	CO2	L3
(b)	Explain in detail about equilibrium heating and cooling of alloys.	7M	CO2	L2
5(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
(OR)				
6(a)	Draw the Fe-Fe ₃ C equilibrium diagram and explain it.	7M	CO3	L2
(b)	Give a few applications where Aluminium and its alloys are exclusively used.	7M	CO3	L3
7(a)	Differentiate between normalizing and hardening.	7M	CO4	L3
(b)	Discuss in detail about the cold working.	7M	CO4	L2
(OR)				
8(a)	Discuss in detail about the surface hardening methods.	7M	CO4	L2
(b)	Write about (i) Recrystallization (ii) recovery (iii) grain growth.	7M	CO4	L3
9(a)	Explain in detail about the various methods of component manufacture of fibre reinforced composites.	7M	CO5	L3
(b)	Write about metal ceramic mixtures.	7M	CO5	L2
(OR)				
10.	What are metal matrix composites? Explain how you make them. What are their typical applications?	14M	CO5	L3

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

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

B.Tech. (III Semester) 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)	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
(OR)				
2(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)				
3(a)	Write a JAVA program to implement constructor overloading.	7M	CO2	L1
(b)	What are the types of Nested classes? Explain the difference between nested class and inner class in Java.	7M	CO2	L1
(OR)				
4(a)	Explain importance of “static”- keyword and state the difference between static and non-static member of the class with an example.	7M	CO2	L2
(b)	What is the difference between static and non-static method? Explain with an example.	7M	CO2	L1
(OR)				
5(a)	What is Interface and explain with an example?	7M	CO3	L1
(b)	What is multiple inheritance and how can you implement this?	7M	CO3	L1
(OR)				
6(a)	Explain the creation of packages with sample program. Explain how to access a package and hide classes with packages.	7M	CO3	L2
(b)	Demonstrate nested Try and finally Statements.	7M	CO3	L3
(OR)				
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)	Write a java program to apply synchronization keyword for a method.	7M	CO4	L1
(b)	When the seek() is used and why?	7M	CO4	L1
(OR)				
9(a)	What is Delegation Event handling? Write a Java program that demonstrates handling of all the key Events.	7M	CO5	L2
(b)	Write a java program to demonstrate Grid Layout.	7M	CO5	L2
(OR)				
10(a)	Write an applet to display a smiley with a greeting message to the user.	7M	CO5	L1
(b)	Discuss various methods present in Window listener interface.	7M	CO5	L2

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

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

B.Tech. (III Semester) Supplementary Examinations

20AE04-STRENGTH OF MATERIALS

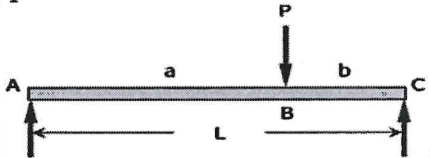
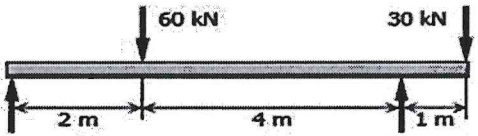
(ASE)

Time : 3 hours

Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1.	The following data refer to a mild steel specimen tested in a laboratory. Diameter of the specimen: 25mm Length of the specimen: 300mm Extension under a load of 15 KN: 0.045mm Load at yield point: 127.65KN Maximum load: 208.60KN Length of the specimen after failure: 375mm Neck diameter: 17.75mm Determine: Young's modulus, Yield point, Ultimate stress, Percentage of elongation, Percentage reduction in area, safe stress adopting a factor safety of 2.	14M	CO1	L3
(OR)				
2(a)	An elastic rod 25mm in diameter, 200mm long extends by 0.2mm under a tensile load of 40KN. Find the intensity of stress, strain and the elastic modulus of for the material of the rod.	7M	CO1	L2
(b)	A straight bar 60cm long consists of three portions: the first 18cm length is 30mm diameter, the middle 26cm length is of 20mm diameter and the remaining 16cm length is of 25cm diameter if it is subjected to an axial pull of 100kN find the total extension of the bar. Find also the stresses, strains and changes in length of different portions. Take $E = 200\text{GPa}$.	7M	CO1	L3
3(a)	Draw shear force and bending moment diagrams for the given simply supported beam as shown in figure. 	7M	CO2	L3
(b)	A cantilever beam with a length of 2m. A point loads of 500N, 800N, 300N, 400N is acting at free end, 0.5m, 1m, and 1.5m respectively. Draw the shear force and bending moment diagram.	7M	CO2	L3
(OR)				
4(a)	Draw SFD and BMD for given Overhanging Beam. 	7M	CO2	L3

20AE04-STRENGTH OF MATERIALS

(b)	Classify the beams and explain them with neat sketches.	7M	CO2	L2
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)	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
(OR)				
8(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
9(a)	A spherical container of 1m diameter has 15mm thick plates. Calculate the change in its diameter, if it contains a fluid under a pressure of 2 MPA. Take $E=200\text{Gpa}$ and $\mu=0.28$.	7M	CO5	L3
(b)	A cylinder has an internal diameter of 230mm, has walls 5mm thick and is 1m long. It is found to change in internal volume by $12 \times 10^{-6}\text{m}^3$ when filled with a liquid at a pressure P. If $E=200\text{GN/m}^2$ and $\nu = 0.25$, and assuming rigid end plates, determine: the values of hoop and longitudinal stresses.	7M	CO5	L3
(OR)				
10(a)	Derive the relation between slope, deflection and radius of curvature.	7M	CO2	L3
(b)	A simply supported beam of length L is subjected to a central load of W. Find the maximum slope and deflection of the beam.	7M	CO2	L3

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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

**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)	Explain the concept of continental drift and plate tectonics.	7M	CO1	L1
(b)	How do these geological phenomena influence the Earth's structure and composition?	7M	CO1	L2
(OR)				
2(a)	Discuss the significance of geology in civil engineering.	7M	CO1	L1
(b)	How does the knowledge of geology contribute to the planning and execution of civil engineering projects?	7M	CO1	L2
3(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
(OR)				
4(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
5(a)	Differentiate Gneiss and Schist.	7M	CO2	L2
(b)	Interpret different forms of intrusive igneous rocks briefly with figures wherever necessary.	7M	CO2	L2
(OR)				
6(a)	Outline the formation of sedimentary rocks.	7M	CO2	L1
(b)	Identify the following rock types and summarize their important features: (i) Marble (ii) Granite.	7M	CO2	L2
7(a)	Define and explain the concepts of outcrop, dip, and strike.	10M	CO3	L1
(b)	Explain the role of structural geology in mitigating environmental risks associated with geological structures.	4M	CO3	L1
(OR)				
8(a)	Explain the formation of fold structures in geological settings.	7M	CO3	L2
(b)	Provide examples of well-known fold structures and their implications.	7M	CO3	L1
9(a)	Explain the Electromagnetic method in detail.	7M	CO3	L2
(b)	Illustrate the following: (i) Over break (ii) Gravity method.	7M	CO3	L2
(OR)				
10(a)	Illustrate the geological consideration for folded strata at the dam site.	7M	CO4	L2
(b)	Discuss principle, field procedure and applications of self-potential method.	7M	CO3	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (III Semester) 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)	State the properties of probability density function (pdf) of a random variable X.	7M	CO1	L2										
(b)	For a uniform distributed random variable with $f_x(x)=1/10$ for $-5 \leq x \leq 5$, calculate variance and standard deviation.	7M	CO1	L3										
(OR)														
2(a)	A density function of a random variable X is defined as follows: $f_X(x) = k(1 + X) \quad \text{for } 2 \leq x \leq 5$ $= 0 \text{ elsewhere}$ find the value of k (ii) find its distribution function.	7M	CO1	L3										
(b)	Discuss about binomial and Poisson density functions of a random variable.	7M	CO1	L2										
3(a)	The joint probability between two random variables X and Y is given in the following table. <table border="1"> <tr> <td>(x,y)</td><td>(0,0)</td><td>(1,2)</td><td>(2,3)</td><td>(3,2)</td></tr> <tr> <td>P(X=x,Y=y)</td><td>0.2</td><td>0.3</td><td>0.4</td><td>0.1</td></tr> </table> (i) Find joint distribution function $F_{XY}(x,y)$ (ii) Find marginal distribution function $F_X(x)$ (iii) Find marginal distribution function $F_Y(y)$	(x,y)	(0,0)	(1,2)	(2,3)	(3,2)	P(X=x,Y=y)	0.2	0.3	0.4	0.1	7M	CO3	L3
(x,y)	(0,0)	(1,2)	(2,3)	(3,2)										
P(X=x,Y=y)	0.2	0.3	0.4	0.1										
(b)	Prove the density function of sum of two random variables is the convolution between individual density functions.	7M	CO3	L3										
(OR)														
4(a)	Explain joint moments about origin between two random variables X and Y.	7M	CO3	L2										
(b)	If X_1, X_2 are two Gaussian random variables with mean as 2 and -1, variance as 16 and 9. The covariance is 4. If X_1 and X_2 are transformed into Y_1 and Y_2 using the transformation $Y_1 = -2X_1 + 2X_2$ and $Y_2 = 2X_1 - 3X_2$, find (i) $E[X_1^2]$ (ii) $E[X_2^2]$ (iii) $\rho_{x_1x_2}$ (iv) $C_{y_1y_2}$.	7M	CO3	L3										
5.	State and prove the properties of auto correlation of a wide sense stationary random process $X(t)$.	14M	CO2	L3										
(OR)														
6(a)	Discuss about cross covariance of random process and its properties.	7M	CO2	L2										
(b)	An Auto correlation function of a stationary random process is defined as $R_{xx}(\tau) = \frac{29\tau^2 + 64}{7.25\tau^2 + 4}$. Find the following: (i) mean of $X(t)$ (ii) Mean square value of $X(t)$ (iii) Variance.	7M	CO2	L3										

20EC05-RANDOM VARIABLES AND STOCHASTIC PROCESSES

7(a)	A Random Process $X(t) = A$, where 'A' is an uniform distributed random variable in the range $[0,1]$. Comment on stationary of $X(t)$.	7M	CO2	L3
(b)	State and prove any three properties of cross power spectral density between random process $X(t)$ and $Y(t)$.	7M	CO2	L3
(OR)				
8(a)	The power spectral density of a random process is defined as $S_{xx}(\omega) = A \text{ for } -K \leq \omega \leq K$ $= 0 \text{ elsewhere}$ Find its autocorrelation $R_{xx}(\tau)$.	7M	CO2	L3
(b)	Check whether following power spectrum density functions are valid or not (i) $S_{xx}(\omega) = \frac{\sin(8\omega)}{16+\omega^2}$ (ii) $S_{xx}(\omega) = e^{-(\omega-1)^4}$ (iii) $S_{xx}(\omega) = \frac{\omega^3}{16+3\omega^2+\omega^4}$	7M	CO2	L3
9(a)	For an LTI system with a wide sense stationary random process $X(t)$ as input and $H(\omega)$ as frequency response, prove that the cross power spectral density between $X(t)$ and response $Y(t)$ is given as $S_{xy}(\omega) = S_{xx}(\omega)H(\omega)$	7M	CO4	L3
(b)	An Auto correlation of input $X(t)$ of an LTI system is $5\delta(\tau)$. The frequency of response $H(\omega) = \frac{1}{6+j\omega}$. Find the following: (i) Output power spectral density of $S_{yy}(\omega)$ (ii) Auto correlation of $Y(t)$, $R_{yy}(\tau)$.	7M	CO4	L3
(OR)				
10(a)	Derive the expression for effective noise temperature of cascaded system in terms of its individual input noise temperature.	7M	CO1	L3
(b)	Explain the terms effective noise temperature, noise figure.	7M	CO1	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (III Semester) 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)	Define coulombs law & Explain the vector form of coulombs law.	7M	CO1	L2
(b)	Determine the force between 2 charges 3×10^{-4} cat point P (1, 2, 3) and another charge -10^{-4} coulombs at Q (2, 0, 5) in vacuum conditions.	7M	CO1	L3
(OR)				
2(a)	Derive the Electric Field Intensity due to Surface charge.	7M	CO1	L3
(b)	A charge is distributed on X-axis of Cartesian system having a line charge density of $3X^2 \mu\text{C/m}$. find the total charge over the length (L) of 10m.	7M	CO1	L3
3(a)	Derive the Expression for Torque on Electric Dipole in an Electric field.	7M	CO2	L3
(b)	Compute the torque for a dipole consisting of $1 \mu\text{C}$ charge in an Electric field $\vec{E} = 10^3(\vec{z}\vec{a}_x - \vec{a}_y - \vec{a}_z)\text{V/m}$ which is separated by a distance 1mm and which is located at the Z-axis at the origin.	7M	CO2	L3
(OR)				
4(a)	Derive the expression for capacitance of a spherical capacitor.	7M	CO2	L3
(b)	An air capacitor consists of parallel square plates of 50cm side and is charged to a potential difference of 250V, when plates are 1mm apart. Find the work done in separating the plates from 1mm to 3mm.	7M	CO2	L3
5(a)	State and Explain Bio-savarts law.	7M	CO3	L2
(b)	Find the incremental field strength at P_2 due to the current element of $2[\vec{a}_z \mu\text{A/m}]$ at P_1 . the coordinates of P_1 and P_2 are (4,0,0), (0,3,0) respectively.	7M	CO3	L3
(OR)				
6(a)	Derive the expression for Electric field due to a Circular loop.	7M	CO3	L3
(b)	Derive the expression for Maxwell's 3 rd equation.	7M	CO3	L3
7(a)	Derive the equation for force between Two long parallel current carrying conductors placed in magnetic field.	7M	CO4	L3
(b)	2 long parallel conductors are separated by 2cm in air carrying current of 100A flowing in opposite directions. Find the force per meter length of the conductor.	7M	CO4	L3
(OR)				
8(a)	Explain the concept of co-efficient of coupling between 2 circuits $M = K\sqrt{L_1 L_2}$.	7M	CO4	L2
(b)	If the coil of 800 μH is magnetically coupled to another coil of 200 μH . the co-efficient of coupling between 2 coils is 0.05 weber. Calculate the inductance if 2 coils are connected in (i) series Aiding (ii) series opposing (iii) parallel Aiding (iv) parallel opposing.	7M	CO4	L3
9(a)	A plane wave propagating in free space has a peak electric field of 750m v/m. find the average power through a square area of 12cm on a side perpendicular to the direction of propagation.	4M	CO4	L3
(b)	Derive the expression for integral and point forms of Poynting theorem.	10M	CO4	L3
(OR)				
10(a)	Derive the expression for Displacement current (J_c) and Displacement current Density (J_D).	7M	CO4	L3
(b)	Find the conduction & displacement current densities in a material having conductivity of $10^{-3} \Omega / \text{m}$ & $\epsilon_r = 2.5$ if the electric field in material is $\vec{E} = 5.8 \times 10^{-6} \sin(9.0 \times 10^9 t) \text{V/m}$.	7M	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

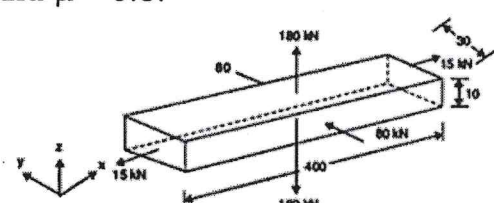
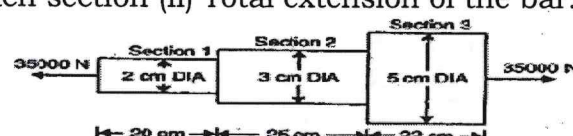
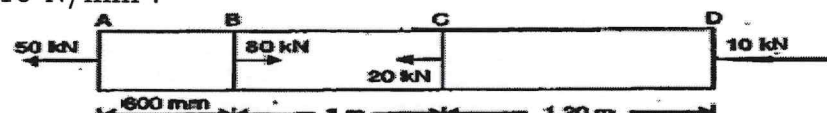
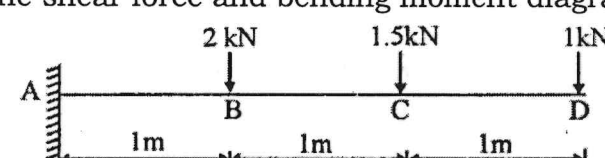
**20ME06-MECHANICS OF SOLIDS
(ME)**

Time : 3 hours

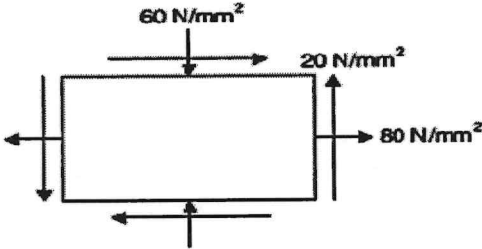
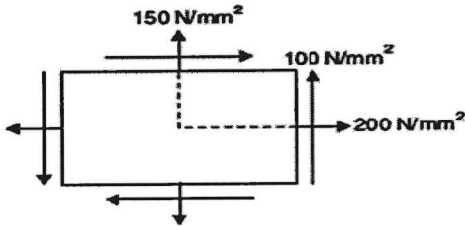
Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	A 400mm long bar has rectangular cross-section 10mm×30mm. This bar is subjected to (i) 15kN tensile force on 10mm × 30mm faces, (ii) 80kN compressive force on 10mm × 400mm faces, and (iii) 180kN tensile force on 30mm × 400mm faces. Find the change in volume if $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.3$. 	7M	CO1	L3
(b)	A compound bar of length 600mm consists of a strip of aluminium 40mm wide and 20mm thick and a strip of steel 60mm wide×15mm thick rigidly joined at the ends. If elastic modulus of aluminium and steel are $1 \times 10^5 \text{ N/mm}^2$ and $2 \times 10^5 \text{ N/mm}^2$, determine the stresses developed in each material and the extension of the compound bar when axial tensile force of 60kN acts.	7M	CO1	L3
(OR)				
2(a)	An axial pull of 35000N is acting on a bar consisting of three lengths as shown in fig. If the Young's modulus = $2.1 \times 10^5 \text{ N/mm}^2$. Determine (i) stresses in each section (ii) Total extension of the bar. 	7M	CO1	L3
(b)	A steel bar having Cross sectional area of 1500 mm^2 is subjected to axial forces as shown in fig. Find total elongation of the bar, Take $E = 2.1 \times 10^5 \text{ N/mm}^2$. 	7M	CO1	L3
3(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 $30^\circ, 45^\circ$, and 60° 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
(OR)				
4.	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

20ME06-MECHANICS OF SOLIDS

5(a)	Draw the shear stress distributions for following cross sections. (i) Rectangular Section (ii) T-Section	4M	CO3	L3
(b)	An I-section beam 350 mm x 150 mm has a web thickness of 10 mm and a flange thickness of 20 mm. If the shear force acting on the section is 40 kN, find the maximum shear stress developed in the I-section. Also sketch the shear stress distribution across the section.	10M	CO3	L4
(OR)				
6(a)	Derive the bending equation from fundamentals $M/I = f/y = E/R$.	7M	CO3	L4
(b)	A steel plate is bent into a circular arc of radius 12 metres. If the plate section be 100 mm wide and 20 mm thick. Find the maximum stress induced and the bending moment which can produce this stress. Take $E = 2 \times 10^5 \text{ N/mm}^2$.	7M	CO3	L3
7.	The state of stress in a material stressed to two-dimensional state of stress is as shown in Figure. Determine principal stresses and maximum shear stress and the planes on which they act.	14M	CO4	L3
				
(OR)				
8.	The state of stress at a point in a strained material is as shown in Figure. Determine (i) the direction of principal planes (ii) the magnitude of principal stresses and (iii) the magnitude of maximum shear stress.	14M	CO4	L3
				
9(a)	A cylindrical pipe of diameter 1m and thickness 10mm is subjected to internal fluid pressure of 0.8 N/mm^2 . Evaluate (i) circumferential stress developed in the pipe and (ii) longitudinal stress.	7M	CO1	L3
(b)	A thick cylinder of internal diameter 150mm is subjected to an internal fluid pressure of 50 N/mm^2 . Compute the thickness of metal necessary for the cylinder, if the maximum hoop stress in the section is not to exceed 150 N/mm^2 . Sketch also the radial pressure distribution and hoop stress distribution across the section.	7M	CO1	L3
(OR)				
10(a)	Find an expression for the slope at the supports of a simply supported beam carrying a point load at the center.	7M	CO5	L3
(b)	A cantilever of length 30m carries a uniformly distributed load of 24 N/mm length over the entire length. If the moment of inertia of the beam is 10^8 mm^4 and the modulus of elasticity is $2 \times 10^5 \text{ N/mm}^2$, determine the slope and deflection at the free end.	7M	CO1	L3
