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. (IV Semester) (R17) Semester End Examinations (Supplementary) - April 2026

(2018, 2019 Regular admitted batches and 2020 Lateral Entry admitted batch only)

R17

TIME TABLE

Time : 02.00 PM to 05.00 PM **A.Y. : 2025-26**

Branch	10-04-2026 (Friday)	13-04-2026 (Monday)	15-04-2026 (Wednesday)	16-04-2026 (Thursday)	17-04-2026 (Friday)	18-04-2026 (Saturday)	20-04-2026 (Monday)
ASE	17FE03 - Environmental Science	17FE08 - Probability and Statistics	17AE05 - Thermal Engineering	17AE06 - Manufacturing Technology	17AE07 - Aerodynamics-I	17AE08 - Aircraft Structures-I	---
CE	17FE03 - Environmental Science	17FE08 - Probability and Statistics	17CE08 - Strength of Materials – II	17CE09 - Hydraulics and Hydraulic Machinery Systems	17CE10 - Structural Analysis – I	17CE11 - Geo Technical Engineering – I	---
CSE	17FE11 - Linear Algebra and Numerical Applications	17CI07 - OOPs Through Java	17CI08 - Design and Analysis of Algorithms	17CS01 - Linux Programming	17CI09 - Data Base Management Systems	17CI10 - Software Engineering	17PD03 - Professional Ethics and Human Values
ECE	17FE03 - Environmental Science	17FE09 - Functions of Complex Variables	17EC09 - Electromagnetic Fields and Waves	17EC10 - Digital Signal Processing	17EC11 - Digital System Design	17EC12 - Analog Communications	---
EEE	17FE03 - Environmental Science	17FE10 - Complex Variables and Statistical Methods	17EE06 - Control Systems	17EE07 - Network Theory - II	17EE08 - Electronic Circuit Analysis	17EE09 - Electrical Machines – I	---
EIE	17ME52 - Fundamentals of Fluid Mechanics	17FE09 - Functions of Complex Variables	17EI03 - Electrical and Electronics Measurements	17EI04 - Industrial Instrumentation	17EC05 - Signals and Systems	17EC07 - Pulse and Switching Circuits	17PD03 - Professional Ethics and Human Values
IT	17CI14 - Web Technologies	17FE08 - Probability and Statistics	17CI06 - Computer Architecture	17CI03 - Discrete Mathematical Structures	17CI04 - Python Programming	17IT02 - Object Oriented Analysis and Design	17PD03 - Professional Ethics and Human Values
ME	17ME06 - Operations Research	17FE08 - Probability and Statistics	17ME07 - Fluid Mechanics and Hydraulic Machinery	17ME08 - Production Technology	17ME09 - Applied Thermodynamics	17ME10 - Kinematics of Machines	17PD03 - Professional Ethics and Human Values

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

Date: 24 MAR 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

H.T.No										

13 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

17FE08-PROBABILITY AND STATISTICS

(ASE,CE,IT&ME)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	If p(A) $=\frac{1}{3}$; p(B) $=\frac{1}{4}$; $p(A\cup B)=\frac{1}{2}$; then determine (i)$p(B/A)$ (ii)$p(A/\bar{B})$	6M	CO1	L2
(b)	Suppose that the number of cars X that pass through a car wash between 4:00 P.M. and 5:00 P.M. on any sunny Friday has the following probability distribution. x: 4, 5, 6, 7, 8, 9 p(x): 1/12, 1/12, 1/4, 1/4, 1/6, 1/6 Estimate (i) E(x), Average number of cars that pass through. (ii) V(x), Variance of the number of cars that pass through.	6M	CO1	L2
	(OR)			
2(a)	State and prove Baye's theorem of probability.	6M	CO1	L2
(b)	Let X be a random variable with density function $f(x)=\frac{x^2}{3}, -1<x<2$, Compute (i) E(X) (ii) V(X).	6M	CO1	L2
3(a)	Derive the mean and variance of Binomial distribution.	6M	CO2	L2
(b)	Suppose that a manufactured product has an average of 2defects per unit of product inspected. Calculate the probability of finding a product (i) with zero defects (ii) 3defects and (iii) 4 defects.	6M	CO2	L3
	(OR)			
4(a)	The incidence of occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, (i) Exactly two (ii) at least one, will suffer from it?	6M	CO2	L3
(b)	Suppose the weights of 800 male students are normally distributed with mean 140 pounds and standard deviation 10 pounds. Estimate the number of students whose weights are (i) between 138 and 148 pounds (ii) more than 152 pounds. (iii) Less than 150 pounds.	6M	CO2	L3
5.	Samples of size 2 are taken from the population {4,8,12,16,20, 24} without replacement, Calculate i)mean of the population ii)standard deviation of population iii) mean of sampling distribution of means iv) standard deviation of sampling distribution of means.	12M	CO3	L2
	(OR)			
6(a)	The heights of a random sample of 50 college students showed a mean of 174.5 cm and a standard deviation of 6.9 cm. Construct a 90% and 99% confidence interval for the mean height of all college students.	6M	CO3	L3

<table>
<tr><td>(b)</td><td>Calculate 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14.</td><td>6M</td><td>CO3</td><td>L3</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>7(a)</td><td>Summarize the steps in the procedure for testing of hypothesis.</td><td>4M</td><td>CO4</td><td>L2</td></tr>
<tr><td>(b)</td><td>A stenographer claims that she can take dictation at a rate of 120 words per minute. Can we reject her claim based on 100 trials in which she demonstrates a mean of 116 words with a standard deviation of 15 words? Analyse at 1% and 5% level of significance.</td><td>8M</td><td>CO4</td><td>L4</td></tr>
<tr><td colspan="5">(OR)</td></tr>
<tr><td>8(a)</td><td>A sample of 25 bulbs gives a mean life of 990 hours with a S.D of 20 hrs. The manufacturer claims that the mean life of bulbs is 1000 hrs. Is the sample not up to the standard? (Test at 0.05 level of significance)</td><td>6M</td><td>CO4</td><td>L4</td></tr>
<tr><td>(b)</td><td>Based on the information given below about the treatment of 200 patients suffering from a disease, conclude whether their opinion is independent of the type of treatment. (Use 0.05 level of significance)
<table>
<tr><td></td><td>Favourable</td><td>Not Favourable</td></tr>
<tr><td>New treatment</td><td>60</td><td>30</td></tr>
<tr><td>Conventional treatment</td><td>40</td><td>70</td></tr>
</table></td><td>6M</td><td>CO4</td><td>L4</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>9.</td><td>The following data pertain to the demand for a product (in thousands of units) and its price (in dollars) charged in five different market areas
<table>
<tr><td>Price(X)</td><td>20</td><td>15</td><td>10</td><td>11</td><td>14</td></tr>
<tr><td>Demand (Y)</td><td>22</td><td>41</td><td>80</td><td>67</td><td>50</td></tr>
</table>
(i) Calculate the coefficient of correlation between the price and demand. (ii) Determine the two lines of regression (iii) Estimate the demand when price is 16 dollars.</td><td>12M</td><td>CO5</td><td>L2</td></tr>
<tr><td colspan="5">(OR)</td></tr>
<tr><td>10(a)</td><td>Determine the rank correlation coefficient form the following data about 10 students, ranked according to their achievements in both the laboratory and lecture proportions of an engineering course.
<table>
<tr><td>Laboratory</td><td>7</td><td>3</td><td>6</td><td>9</td><td>10</td><td>8</td><td>4</td><td>2</td><td>5</td><td>1</td></tr>
<tr><td>Lecture</td><td>6</td><td>8</td><td>4</td><td>7</td><td>9</td><td>10</td><td>5</td><td>3</td><td>2</td><td>1</td></tr>
</table></td><td>6M</td><td>CO5</td><td>L3</td></tr>
<tr><td>(b)</td><td>The equations of two lines of regression obtained in a correlation analysis are as follows2X+3Y-8=0 and X+2Y-5=0. Obtain (i) the mean values of X and Y (ii) the regression coefficients (iii) the correlation coefficient.</td><td>6M</td><td>CO5</td><td>L2</td></tr>
</table>

****

H.T.No.										

13 APR 2026

R17

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

B.Tech. (IV Semester) Supplementary Examinations

17CI07-OOPs THROUGH JAVA
(CSE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the Primitive Data Types supported by Java.	6M	CO1	L2
(b)	What would result if an expression consists of various operators with different priority? Illustrate with an example.	6M	CO1	L3
	(OR)			
2(a)	Explain various operators supported by JAVA.	6M	CO1	L2
(b)	Write a Java program to demonstrate String class with any six methods.	6M	CO1	L3
3(a)	Differentiate between method overloading and method overriding.	6M	CO2	L2
(b)	What is the purpose of the final keyword in Java.	6M	CO2	L1
	(OR)			
4(a)	Develop a java application to implement runtime polymorphism.	6M	CO2	L3
(b)	Write a java program to calculate area of different shapes using method over loading.	6M	CO2	L3
5(a)	Explain Thread life cycle with neat sketch.	8M	CO3	L2
(b)	Write a Java program to demonstrate the Null pointer Exception.	4M	CO3	L3
	(OR)			
6(a)	Write a java program to demonstrate the Array Index Out of Bounds exception.	8M	CO3	L3
(b)	List out different Thread Priority Constants.	4M	CO3	L1
7(a)	What is the significance of init() method in Applet?	6M	CO4	L1
(b)	What are the ways to resize an Applet?	6M	CO4	L1
	(OR)			
8.	Elaborate on the following terms. (i) Events (ii) Event sources (iii) Event Listeners interfaces (iv) Eventclasses.	12M	CO4	L2
9(a)	Write a Java program to create a login form using AWT controls.	8M	CO5	L3
(b)	Develop a java application using Button & Label AWT components.	4M	CO5	L3
	(OR)			
10(a)	Discuss about text components.	6M	CO5	L2
(b)	Develop a java application using swing component.	6M	CO5	L3

****

15 APR 2026

H.T.No										

R17

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

B.Tech. (IV Semester) Supplementary Examinations

17CE08-STRENGTH OF MATERIALS-II
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	At a point in an elastic material under strain, there are normal stresses of 50N/mm^2 and 30N/mm^2 (both tensile) respectively at right angles to each other with a shearing stress of 25N/mm^2. Determine the principal stresses and the position of the principal planes.	6M	CO1	L3
(b)	A bolt is under an axial thrust of 7.2 kN together with a transverse shear force of 3.6 kN. Evaluate the diameter of the bolt according to (i) Maximum principal stress theory and (ii) Maximum strain energy theory. Take elastic limit in simple tension = 202 N/mm^2, factor of safety = 3 and Poisson's ratio = 0.3.	6M	CO1	L3
	(OR)			
2(a)	Derive the formulae for the normal and tangential stresses on an inclined plane in case of bi-axial stress system accompanied with simple shear.	6M	CO1	L6
(b)	The principal stresses at a point in an elastic material are 1.5P (tensile), P (tensile) and P/2 (compressive). The elastic limit in simple tension is 200 N/mm^2.Evaluate the value of P at failure, according to (i) Maximum principal stress theory, (ii) Maximum principal strain theory and (iii) Maximum shear stress theory. μ = 0.3.	6M	CO1	L5
3(a)	Derive buckling load for column with one end fixed other free.	6M	CO2	L2
(b)	A solid round bar of 60mm diameter and 2.5m long is used as a strut. Find the safe compressive load for the strut using Euler's formula if both ends are hinged. Take E=2x105N/mm2 and factor of safety =3.	6M	CO2	L3
	(OR)			
4(a)	Derive the equation for the Euler's crippling load for a column with one end fixed and other end hinged.	6M	CO2	L6
(b)	Determine the section of a cast iron hollow cylindrical column 5 m long with ends firmly built-in if it carries an axial load of 300 kN. The ratio of internal to external diameter is ¾. Use factor of safety 8. Take yield stress = 567 N/mm^2 and Rankine's constant a = 1/1600.	6M	CO2	L3
5(a)	A cantilever beam of length 30m carries a uniformly distributed load of 24 kN/m length over the entire length. If moment of inertia I=10^8 mm^4 and value of E=2x10^5 N/mm^2, calculate the slope and deflection at the free end.	6M	CO3	L3

(b)	A beam of length 20 m is simply supported at its ends and carries two point loads of 4 kN and 10 kN at a distance of 8 m and 12 m from left end respectively. Evaluate : (i) deflection under each load (ii) maximum deflection using Macaulay's method. Take E = 2 x 10^5 N/mm^2 and I = 1 x 10^8 mm^4.	6M	CO3	L5
	(OR)			
6(a)	Derive the differential equation for deflection of elastic curve.	6M	CO3	L3
(b)	Find maximum slope and deflection of simply supported beam of span 'L' and central load 'W'.	6M	CO3	L3
7.	A fixed beam of 5 m span carries 20 kN/m uniformly distributed load over the entire span. The right support sinks by 5 mm. Analyse the beam by using Clapeyron's theorem. Draw the shear force and bending moment diagrams by indicating all salient values. The Young's modulus of elasticity and moment of inertia of the beam cross section are 210 GPa and 9000 cm^4 respectively.	12M	CO4	L3
	(OR)			
8(a)	Derive an expression for the fixing moments, when one of the supports of a fixed beam sinks down by δ from its original position.	6M	CO4	L2
(b)	A fixed beam AB of length 5 m carries a point load of 20 kN at a distance of 2 m from A. Determine the fixed end moments and support reactions, if the flexural rigidity of the beam is 1 x 10^4 kNm^2.	6M	CO4	L3
9.	A steel channel section of 250 mm deep, 125 mm wide and 20 mm thick is carrying a vertical shear of 3 kN. Compute the shear stress and locate the shear center.	12M	CO5	L3
	(OR)			
10(a)	Determine the position of principal axes and the values of the principal moments of inertia for an equal angle 80 mm by 80mm by 5 mm.	6M	CO5	L3
(b)	Evaluate the position of shear centre of a channel having dimensions : flanges 120 mm x 20 mm and web 160 mm x 10 mm.	6M	CO5	L5

****

H.T.No										

15 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

17ME07-FLUID MECHANICS AND HYDRAULIC MACHINERY

(ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Illustrate the different types of fluids.	6M	CO1	L2
(b)	An oil of viscosity 5 poises is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5m and it rotates at 200rpm. Find the power lost in oil for a sleeve length of 100mm. the thickness of oil film is 1.0mm.	6M	CO1	L3
	(OR)			
2(a)	The right limb of a simple U-tube manometer containing mercury is open to atmospheric while the left is connected to a pipe in which a fluid of sp.gr. 0.9 is flowing. The centre of the pipe is 12cm below the level of mercury in the right limb. find the pressure of the fluid in the pipe if the difference of mercury level in the two limbs is 20cm.	6M	CO1	L3
(b)	Deduce an expression for the inverted U-tube differential manometer.	6M	CO1	L2
3(a)	Elucidate assumptions made in Bernoulli's equation.	4M	CO2	L2
(b)	A 20cm*10cm venturimeter is inserted in a vertical pipe carrying oil of specific gravity 0.8, the flow of oil is in upward direction. The difference of levels between the throat and inlet section is 50 cm. the oil mercury differential manometer gives a reading of 30 cm of mercury. Find the discharge of oil. neglect losses.	8M	CO2	L3
	(OR)			
4(a)	Differentiate between major and minor energy losses in pipes.	4M	CO2	L2
(b)	Deduce an expression for the loss of head due to sudden enlargement.	8M	CO2	L2
5(a)	Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.	6M	CO3	L2
(b)	Derive an expression for the force exerted by a jet of water on a fixed inclined plate in the direction of the jet.	6M	CO3	L2
	(OR)			
6(a)	Formulate an expression for the force exerted by the jet on the curved plate when the plate is moving in the direction of jet.	6M	CO3	L2
(b)	A jet of water of diameter 75mm moving with a velocity of 25m/s strikes a fixed plate in such a way that the angle between the jet and plate is 60^0. Determine the force exerted by the jet on the plate (i) in the direction normal to the plate and (ii) in the direction of the jet.	6M	CO3	L3
7(a)	A pelton wheel is having a mean bucket diameter is 1 m and is running at 1000 r.p.m. the net head on the pelton wheel is 700m. If the clearance angle is 15^0 and discharge through nozzle is 0.1 m^3/s, find (i) power available at the nozzle (ii) hydraulic efficiency of the turbine.	6M	CO4	L3
(b)	Illustrate the Kaplan turbine.	6M	CO4	L2
	(OR)			
8(a)	Define the terms unit power, unit speed and unit discharge.	6M	CO4	L1
(b)	Illustrate the radial flow reaction turbine.	6M	CO4	L2
9(a)	Define the following terms (i) Manometric efficiency (ii)Mechanical efficiency	6M	CO5	L2
(b)	Formulate an expression for work done by the centrifugal pump.	6M	CO5	L2
	(OR)			
10(a)	Illustrate the operating characteristic curves for centrifugal pumps.	6M	CO5	L2
(b)	Define suction head, delivery head, static head and manometric head.	6M	CO5	L3

****

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

16 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

Recd 16/4/26

17CE09-HYDRAULICS AND HYDRAULIC MACHINERY SYSTEMS

(CE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine the expression for the most economical trapezoidal section in terms of side slope.	6M	CO1	L1
(b)	Write a brief note on channel transition with reduction in width of a rectangular channel with neat sketch.	6M	CO1	L1
	(OR)			
2(a)	Derive an expression for discharge through the open channel flow by chezy's constant.	8M	CO1	L3
(b)	Find the diameter of a circular sewer pipe which is laid at a slope of 1 in 8000 and carries a discharge of 820 lit/sec when flowing half full. Take the value of manning's N=0.022.	4M	CO1	L2
3.	What is hydraulic jump and derive the expression for depth of hydraulic jump.	12M	CO2	L2
	(OR)			
4(a)	Explain the terms specific energy of a flowing liquid, minimum specific energy, critical depth, critical velocity and alternate depth applied to non-uniform flow.	6M	CO2	L2
(b)	What are the classifications of channel bottom slopes and briefly explain chrematistics of surface profiles?	6M	CO2	L2
5(a)	Derive the impulse–momentum equation for a steady flowing fluid. Apply this equation to determine the force exerted by a jet on a stationary flat plate.	6M	CO3	L3
(b)	A jet of water with velocity 40 m/s strikes a curved vane moving at 15 m/s. The vane deflects the jet by 150°. The mass flow rate is 20 kg/s. Draw velocity triangles at inlet and outlet. Determine: (i) Force in the direction of motion (ii) Work done.	6M	CO3	L2
	(OR)			
6(a)	Derive the condition for maximum efficiency when a jet strikes a moving plate.	6M	CO3	L3
(b)	A jet of water of diameter 8cm strikes a curved plate at its center with a velocity of 25m/sec. The curved plate is moving with a velocity of 7.5m/sec in the direction of the jet. The jet is deflected through an angle of 160 degree. Assuming the plate smooth find (i) force exerted on the plate in the direction of jet (ii) power of the jet (iii) efficiency of the jet.	6M	CO3	L2
7(a)	What is a turbine and give the classification in detail? Give the various efficiencies.	6M	CO4	L2

(b)	A reaction turbine works at 500rpm under a head of 110m. The diameter of the inlet is 1.3m and the flow area is 0.55m^3. At the inlet, absolute and the relative velocities make angles of 20° and 60° respectively with the tangential velocity. Determine (i) The power output (ii) Hydraulic efficiency. Assume the velocity of whirl at the outlet to be zero.	6M	CO4	L3
	(OR)			
8(a)	List the two basic categories of dynamic turbines and highlight their differences in terms of energy conversion and flow characteristics.	6M	CO4	L2
(b)	A Francis turbine has: Head = 60 m, Discharge = 8 m^3/s, Speed = 250 rpm and Efficiency = 90%. Draw velocity triangles and determine: (i) Whirl velocity (ii) Flow velocity and (iii) Power output.	6M	CO4	L3
9(a)	Explain manometric efficiency, mechanical efficiency and overall efficiency of a centrifugal pump.	6M	CO5	L2
(b)	Centrifugal pump whose efficiency is 75% is required to handle a liquid of specific gravity 1.18. The quantity of liquid to be pumped is 10m^3/min against a total head of 18m. Find (i) the pressure developed in kg /cm2. (ii) HP required by the pump.	6M	CO5	L2
	(OR)			
10(a)	A single acting reciprocating pump has a plunger of diameter 0.3m and stroke of length 0.4m. If the speed of the pump is 60 rpm and coefficient of discharge is 0.97, determine the percentage slip and actual discharge of the pump.	6M	CO5	L2
(b)	Differentiate between centrifugal pump and reciprocating pump.	6M	CO5	L2

****

H.T.No.										

16 APR 2026

R20

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

16/4/26

20MC02-ENVIRONMENTAL SCIENCE

(CSE, CSE(AI&ML), ECE 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)	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
	(OR)			
2(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
3(a)	Define a Energy Resource and discuss the types of energy resources with suitable examples.	7M	CO2	L4
(b)	Define a rain water harvesting structure, and explain a case study of rain water harvesting structure with a neat diagram.	7M	CO2	L3
	(OR)			
4(a)	Define a Forest resource and explain the Uses and Overexploitation of forest resources.	7M	CO2	L2
(b)	Discuss the Conflicts of water in relation to interlinking of rivers with a case study.	7M	CO2	L4
5(a)	Explain the criteria to select a biodiversity hotspot. Name the biodiversity hotspots in India.	7M	CO3	L2
(b)	Recall the in-situ methods for conservation of biodiversity with examples.	7M	CO3	L1
	(OR)			
6(a)	Can you explain what species extinction is? Mention the types of biological extinctions that happened on the earth.	7M	CO3	L1
(b)	Draw a neat sketch and explain the oxygen cycle.	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 floods and landslides.	7M	CO4	L2
	(OR)			
8(a)	What are the sources and effects of water pollution and explain the treatment methods?	7M	CO4	L1
(b)	What is an earthquake? Write the measures to be taken to mitigate an earthquake.	7M	CO4	L1
9(a)	Define Climate disruption and explain the causes, impacts and control measures of Climate Change.	7M	CO5	L2
(b)	Explain the salient features of Water (prevention and control of Pollution) Act, 1974 and the penalties given to the industries for violation of the water act, 1974.	7M	CO5	L2
	(OR)			
10(a)	Define Sustainable Development and explain the measures to achieve sustainable development goals.	7M	CO5	L4
(b)	Define Environmental Impact Assessment (EIA) and explain various stages of EIA methodology with a neat flow chart.	7M	CO5	L2

****

16 APR 2026

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

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

Bcseef 16/4/26

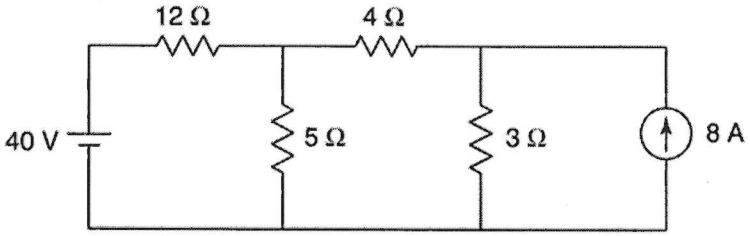
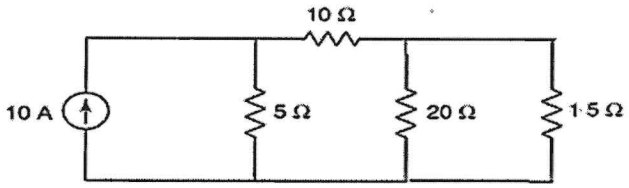
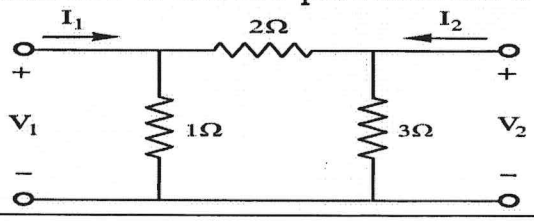
17EE07-NETWORK THEORY-II

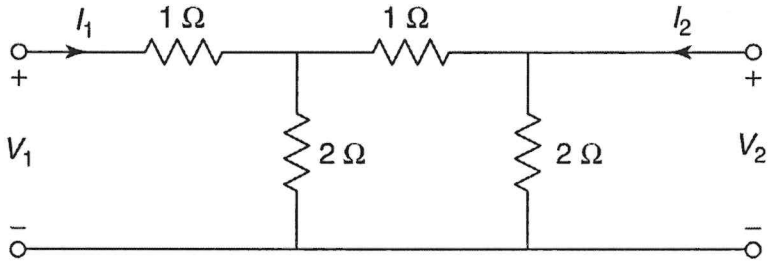
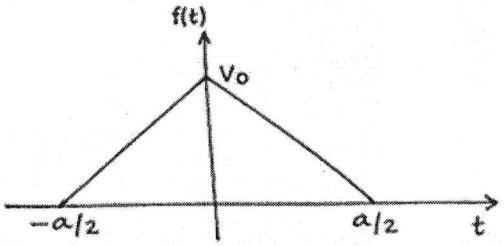
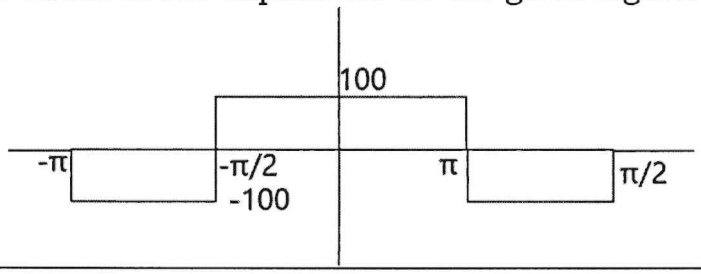
(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Find the current through the 3 Ω resistor using super position theorem in Fig. 	8M	CO1	L3
(b)	Explain millman theorem with simple example.	4M	CO1	L2
	(OR)			
2(a)	Find the current through 20ohm resistor using Nortons theorem in Fig. 	6M	CO1	L3
(b)	Explain compensation theorem with example.	6M	CO1	L2
3.	Three coils, each having a resistance of 8Ω and an inductance of 0.02 H, are connected in delta to a three-phase, 400 V, 50 Hz supply. Calculate the (i) Phase currents (ii) Line currents and (iii) power absorbed.	12M	CO1	L3
	(OR)			
4(a)	Derive the relationship between line and phase voltages and currents in a star connected three phase system.	6M	CO1	L4
(b)	Two wattmeters connected to measure the input to a balanced, three-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit (i) when both readings are positive and (ii) when the latter is obtained after reversing the connection to the current coil of one instrument.	6M	CO1	L3
5(a)	Find the y-parameters of the two-port network shown in Fig. 	6M	CO2	L3

(b)	The Z-parameters of a two-port network are given as: $Z_{11} = 20\,\Omega$, $Z_{22} = 30\,\Omega$, $Z_{12} = Z_{21} = 10\,\Omega$. Find the ABCD parameters of the network.	6M	CO2	L3
	(OR)			
6(a)	Find Z-parameters for the network shown in Fig. 	6M	CO2	L3
(b)	Derive the expression for equivalent ABCD parameters when two port networks are connected in cascade.	6M	CO2	L4
7(a)	What is Fourier transform? What are its properties?	6M	CO3	L2
(b)	Find the Fourier transform of the triangular wave shown in figure. 	6M	CO3	L3
	(OR)			
8(a)	Derive the Fourier series in trigonometric form and State and explain about the Fourier theorem.	6M	CO3	L3
(b)	Find the Fourier series expansion for the given signal. 	6M	CO3	L4
9(a)	What are the properties of positive real functions?	6M	CO4	L2
(b)	Explain, how to synthesize a RC network by Foster method.	6M	CO4	L3
	(OR)			
10.	Realize foster forms of the following LC impedance function. $Z(s) = \frac{(S^2+1)(S^2+3)}{S(S^2+2)(S^2+4)}$	12M	CO4	L3

****

H.T.No										

16 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

16/4/26

17CI03-DISCRETE MATHEMATICAL STRUCTURES

(IT)

Time : 3 hours Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define conditional proposition and logical equivalence with suitable examples.	6M	CO1	L1
(b)	Demonstrate the disjunctive normal form of the formula: $P\rightarrow ((P\rightarrow Q)\wedge\sim(\sim Q\vee\sim P))$.	6M	CO1	L1
	(OR)			
2(a)	Obtain the PCNF and PDNF of the following compound proposition. $(\neg P\rightarrow Q)\wedge(Q\rightleftarrows P)$.	6M	CO1	L3
(b)	Show that $R\wedge(PVQ)$ is a valid conclusion from the following premises. PVQ, $Q\rightarrow R$, $P\rightarrow M$, $\neg M$.	6M	CO1	L1
3(a)	Let A={1,2} and B={p,q,r,s}and let R be a relation from A to B defined by R={(1,q),(1,r),(2,p),(2,q),(2,s)} Find the matrix and digraph of R.	6M	CO2	L1
(b)	Construct the hasse diagram represented with positive divisors of 36.	6M	CO2	L2
	(OR)			
4(a)	Show that the divisibility relation (/) is a partial ordering the set of positive integers.	6M	CO2	L1
(b)	Explain about various types of permutation functions.	6M	CO2	L2
5(a)	Show that K_5, $K_{3,3}$ are not planar graphs.	6M	CO3	L2
(b)	What is chromatic number? What are the applications of graph coloring?	6M	CO3	L2
	(OR)			
6(a)	Construct Eulerian and Hamiltonian graphs with example.	6M	CO3	L3
(b)	Define Euler's formula. How many vertices will the graph have if it contains 21 edges, 3 vertices of degree 4, and the other vertices of degree 3.	6M	CO3	L3
7(a)	Show that a group G is abelian iff $(ab)^{-1} = a^{-1}b^{-1}$ for all a, b € G.	6M	CO5	L2
(b)	On the set Q of all rational numbers, the operation * is defined by a * b= a+ b- ab. Show that, under this operation Q forms a commutative monoid.	6M	CO5	L2
	(OR)			
8(a)	Solve that (Z,*) is an abelian group where Z is a set of integers and the binary operations * is defined as a*b = a+b-3.	6M	CO5	L1
(b)	If o is an operation on Z defined by xoy=x+y+1, Prove that <Z,o> is an abelian group.	6M	CO5	L2
9(a)	Evaluate the sequences generated by the following functions: (i) $(3+x)^3$ (ii) $3x^3+e^{2x}$.	6M	CO5	L2
(b)	Solve the Recurrence Relation $a_n-6a_{n-1}+9a_{n-2}=0$ for $n\geq 2$, with $a_0=5$, $a_1=5$, $a_1=12$.	6M	CO5	L3
	(OR)			
10(a)	Solve the Recurrence Relation $a_n+4a_{n-1}+4a_{n-2} = 8$ for $n \geq 2$, with $a_0=1$, $a_1=2$.	6M	CO5	L3
(b)	Calculate the coefficient of $x^2y^4z^6$ in the expansion of $(5x+2y-4z)^{12}$.	6M	CO5	L2

****

17 APR 2026

H.T.No										

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

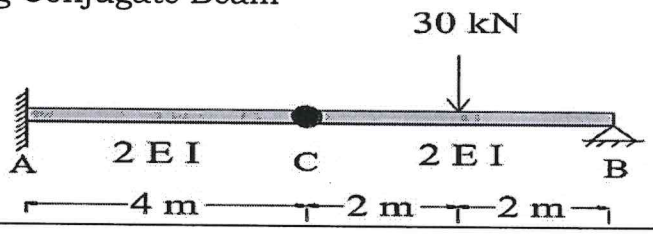
17CE10-STRUCTURAL ANALYSIS-I

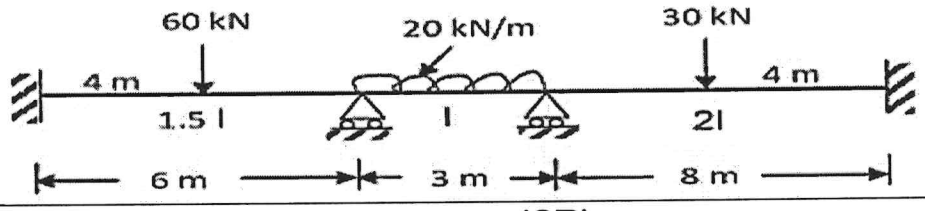
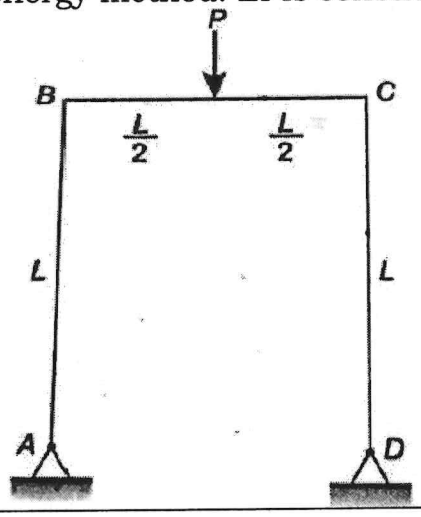
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1.	Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 10 m, which is carrying a point load of 10 kN at a distance 6 m from the left end. Take E = 2×10^5 N/mm^2 and I = 1×10^8 mm^4. using conjugate beam method.	12M	CO1	L4
	(OR)			
2.	Determine the Deflection and Rotation at C for Beam Below by using Conjugate Beam 	12M	CO1	L4
3.	A suspension cable is supported at two points 20 m apart. The left support is 2 m above the right support. The cable is loaded with a uniformly distributed load of 10 kN/m throughout the span. The maximum dip in the cable from left support level is 4 m. Find the maximum tension in the cable.	12M	CO2	L4
	(OR)			
4.	A suspension cable 100 m span and 15 m dip is stiffened with a three-hinged girder and carries a dead load of 10KN/m of span. If a uniform moving load of 60 kN/m longer than the span travels slowly across the span, determine the maximum tension in the cable, and the greatest B.M and S.F in the stiffening girder.	12M	CO2	L4
5.	A continuous beam ABC are of spans AB=6m and BC=8m. The span AB carries a point load of 110KN at 5m from C. The supports A,B and C are simply supported, find support moments and reactions.	12M	CO3	L4
	(OR)			
6.	A portal frame ABCD is fixed at A and hinged at D. The height of the column AB and DC is 4m. The span of the beam BC is 6m. A UDL of 30 KN/m is acting on the whole span BC and a point load of 40KN also acts at center of BC. All members have the same flexural rigidity. Analyze the frame using moment distribution method.	12M	CO3	L4

7.	Analyse the continuous beam shown in fig by using Kani's method. 	12M	CO4	L4
	(OR)			
8.	Analyze the portal frame using Kani's procedure. The two columns of AB and CD of 5m height, Beam BC of span 8m, with EI constant. The column AB carries an udl of 15KN/m. The supports at A and D are fixed.	12M	CO4	L4
9(a)	Derive an expression for strain energy stored in a member due to bending moment.	6M	CO5	L3
(b)	State and prove Castigliano's first theorem.	6M	CO5	L2
	(OR)			
10.	Analyse the portal frame shown in the figure and draw BMD. Use strain energy method. EI is constant 	12M	CO5	L4

****

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

17 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech (IV Semester) Supplementary Examinations

17EE08-ELECTRONIC CIRCUIT ANALYSIS

(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define f_T and derive an expression for it.	6M	CO1	L2
(b)	Derive the expression for output conductance of Hybrid –π model.	6M	CO1	L3
	(OR)			
2(a)	Explain different Hybrid-π capacitances and derive necessary expressions.	6M	CO1	L2
(b)	Derive the expression for CE short-circuit current gain with resistive load.	6M	CO1	L3
3(a)	What is meant by distortion in power amplifiers, explain the different types of distortions?	6M	CO2	L2
(b)	Construct Class AB power amplifier circuit and explain its operation.	6M	CO2	L3
	(OR)			
4(a)	Derive the expression for efficiency of a direct coupled Class A power amplifier.	6M	CO2	L3
(b)	Explain the operation of class B Push-Pull power amplifier.	6M	CO2	L2
5(a)	Explain the concept of feedback with block diagram. What are the characteristics of negative feedback amplifier?	6M	CO3	L2
(b)	Draw the block diagram of Current Shunt feedback system and derive the expressions for R_{if} and R_{of}.	6M	CO3	L3
	(OR)			
6(a)	What are the different types of feedback amplifiers? Give their equivalent circuits.	6M	CO3	L2
(b)	Draw the circuit diagram of voltage series feedback and derive expressions for input and output resistance.	6M	CO3	L3
7(a)	What is Barkhausan criteria for the oscillations? Establish the condition for frequency of oscillations.	4M	CO4	L2
(b)	Derive the expression for frequency of oscillation and conditions of oscillation of a BJT RC phase-shift oscillator.	8M	CO4	L3
	(OR)			
8(a)	Derive the expression frequency of oscillation and condition for sustained oscillations of a Hartley oscillator.	8M	CO4	L3
(b)	In an Hartley oscillator, if L1=0.2mH, L2=0.3mH and C=0.003μF, calculate the frequency of its oscillation.	4M	CO4	L3
9(a)	Explain the response of high pass RC circuit for a step input signal.	6M	CO5	L4
(b)	Explain how a high-pass circuit acts as differentiator.	6M	CO5	L2
	(OR)			
10(a)	Classify different types of clipper circuits. Given their circuit and explain their operation with the aid of transfer characteristics.	6M	CO5	L4
(b)	Explain the steps to analyze a clamping network with an example.	6M	CO5	L3

****

17 APR 2026

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

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

17ME09-APPLIED THERMODYNAMICS

(ME)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the working of a steam power plant with a neat sketch and state its advantages and disadvantages.	6M	CO1	L2
(b)	In a Rankine cycle the steam at inlet to turbine is saturated at a pressure of 35bar and exhaust pressure is 0.2bar. Determine (i) The pump work (ii) The turbine work (iii) The Rankine efficiency. Take a flow rate of 10kg/sec.	6M	CO1	L3
	(OR)			
2(a)	Explain the working of Reheating cycle and list its merits and demerits.	6M	CO1	L2
(b)	What are the various types of fuels used in a thermal power plant? Also, explain the essential Characteristics of a good fuel.	6M	CO1	L2
3(a)	Illustrate the functions of Super heater, Economizer and Air preheater in thermal power plant.	6M	CO2	L2
(b)	Differentiate fire tube and water tube boilers.	6M	CO2	L2
	(OR)			
4(a)	Derive an expression for the height of chimney with suitable sketch.	6M	CO2	L3
(b)	What do you understand by the term "boiler draught"? Discuss the advantages of artificial draught over natural draught.	6M	CO2	L2
5(a)	Comment on the necessity of the nozzles and their configurations in a vapour power cycle.	6M	CO3	L2
(b)	In a steam nozzle, the steam expands from 4 bar to 1 bar. The initial velocity is 60 m/s and the initial temperature is 200°C. Determine the exit velocity if the nozzle efficiency is 92%.	6M	CO3	L3
	(OR)			
6(a)	Differentiate the surface condensers and Jet condensers.	6M	CO3	L2
(b)	Draw the line diagram of a steam condensing plant and locate all the key components.	6M	CO3	L2
7(a)	What do you mean by a compounding of steam turbines? Discuss pressure compounding method.	6M	CO4	L2
(b)	Steam leaves the nozzle of a single-stage impulse turbine at 840m/s. The nozzle angle is 18° and the blade angles are 29° at the inlet and outlet. The friction coefficient is 0.9. Calculate blade velocity (ii) steam mass flow rate in kg/h to develop 300 kW power.	6M	CO4	L3
	(OR)			
8(a)	Differentiate between impulse and reaction turbine.	6M	CO4	L2
(b)	Define the term 'Degree of reaction' as applied to a steam turbine. Show that Parson's reaction turbine the degree of reaction is 50 %.	6M	CO4	L3
9(a)	Classify the compressors and illustrate the working of Reciprocating compressor.	6M	CO5	L2
(b)	Explain multistage compression. Write its Advantages.	6M	CO5	L2
	(OR)			
10(a)	Compare rotary compressors and reciprocating compressors.	6M	CO5	L2
(b)	Elucidate the working of a centrifugal compressor with a suitable diagram.	6M	CO5	L2

****

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

18 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV) Semester Supplementary Examinations

18/4/26

17EE09-ELECTRICAL MACHINES-I

(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the concept of energy conversion in electromechanical systems with suitable examples.	6M	CO1	L2
(b)	A 4-pole DC generator has a wave-wound armature with 400 conductors. The flux per pole is 0.02 Wb. The generator runs at 600 rpm. Calculate the generated EMF.	6M	CO2	L3
	(OR)			
2(a)	Discuss the construction and working principle of a DC generator.	6M	CO2	L2
(b)	Explain the methods of improving commutation in DC machines.	6M	CO2	L2
3.	Explain the voltage build-up process in a DC shunt generator and derive the condition for critical field resistance.	12M	CO2	L2
	(OR)			
4(a)	Analyze the load characteristics of DC series generator with suitable curves.	6M	CO2	L4
(b)	Explain the causes and remedies for failure of voltage build-up in DC generators.	6M	CO2	L2
5(a)	Derive the torque equation of a DC motor and explain its significance.	6M	CO2	L3
(b)	A DC shunt motor takes an armature current of 20 A from a 220 V supply. The armature resistance is 0.5 Ω. Calculate: (i) Back EMF (ii) Power developed by the armature.	6M	CO2	L3
	(OR)			
6(a)	Describe the working of 3-point starter with neat diagram.	6M	CO2	L2
(b)	Compare Swinburne's test and Hopkinson's test for DC machines.	6M	CO2	L4
7(a)	Derive the EMF equation of a single-phase transformer.	6M	CO2	L3
(b)	A single-phase transformer has 500 primary turns and 100 secondary turns. The primary is connected to a 230 V supply. Calculate: (i) Secondary voltage (ii) Turns ratio.	6M	CO2	L3
	(OR)			
8(a)	Describe the procedure of conducting open circuit and short circuit tests on a transformer.	6M	CO2	L2
(b)	Analyze the condition for maximum efficiency of a transformer.	6M	CO2	L4
9(a)	Explain the working principle of an auto-transformer and its advantages.	6M	CO3	L2
(b)	Compare Y-Δ and Δ-Y connections of three-phase transformers.	6M	CO3	L4
	(OR)			
10(a)	Describe Scott connection and its application in phase conversion.	6M	CO3	L2
(b)	Explain the concept of tap changing in transformers and its necessity.	6M	CO3	L2

****

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

18 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

17IT02-OBJECT ORIENTED ANALYSIS AND DESIGN

(IT)

Time : 3 hours | Max.Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain the Object Model in Object-Oriented Design and discuss its key elements with suitable examples.	6M	CO1	L2
(b)	Explain the process of identifying use cases in object-oriented analysis. Illustrate with a real-time example (e.g., ATM system).	6M	CO1	L3
	(OR)			
2(a)	Describe the Object-Oriented System Development Life Cycle (OOSDLC) and compare it with the traditional development approach.	8M	C01	L3
(b)	Explain Use-Case Driven Object-Oriented Analysis and its importance in software development.	4M	C01	L2
3(a)	Explain the need for Unified Modeling Language (UML) and describe the difference between static and dynamic models.	6M	C02	L2
(b)	Describe different types of UML diagrams and explain their role in software development.	6M	C02	L2
	(OR)			
4(a)	Draw and explain a Use Case Diagram for an ATM system, identifying actors, use cases, and system boundaries.	6M	C02	L3
(b)	Explain various use case relationships such as *include, extend, generalization,* and *communication association* with suitable examples.	6M	C02	L4
5(a)	Explain different types of class relationships such as *association, generalization (super–sub class), and aggregation (part-of relationship)* with suitable examples.	6M	C03	L2
(b)	Describe the process of identifying classes, attributes, and methods from a problem statement. Explain how class responsibility is assigned.	6M	C03	L3
	(OR)			
6(a)	Draw and explain a UML Class Diagram for a Bank ATM system, including classes, interfaces, packages, and relationships.	6M	C03	L3
(b)	Analyze how use cases and UML diagrams help in identifying attributes and methods of a class. Illustrate with an example.	6M	C03	L4
7(a)	Explain the components of a UML Sequence Diagram such as object, lifeline, activation bar, and types of messages. Illustrate with an example.	6M	C04	L2
(b)	Draw and explain a Sequence Diagram for a Net Banking ATM transaction, showing interaction between objects.	6M	C04	L3
	(OR)			
8(a)	Draw and explain an Activity Diagram for a Net Banking ATM system, including activity states, transitions, swim lanes, synchronization, and branching.	6M	C04	L3
(b)	Explain the UML State Chart Diagram and its components such as states, transitions, initial and final states. Illustrate with a real-time example.	6M	C04	L2
9(a)	Explain the UML Component Diagram and its elements such as components, interfaces, and dependencies. Illustrate with an example.	6M	C05	L2
(b)	Draw and explain a Deployment Diagram for a Net Banking ATM system, including nodes and communication associations.	6M	C05	L3
	(OR)			
10(a)	Explain the process of designing classes, including class visibility, attributes refinement, and method design. Illustrate with an example.	6M	C05	L3
(b)	Explain the concepts of UML extensibility and UML meta-model. Discuss their importance in object-oriented design.	6M	C05	L4

****

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

18 APR 2026

R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (IV Semester) Supplementary Examinations

Proof 18/4/26

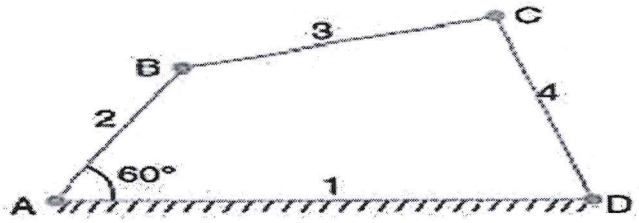
17ME10-KINEMATICS OF MACHINES

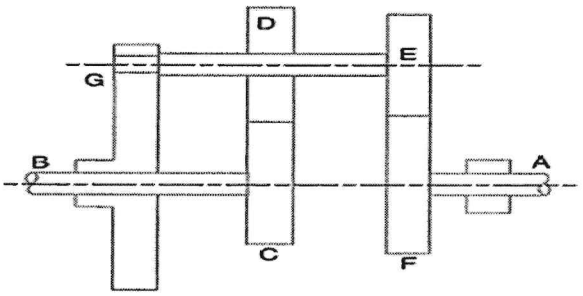
(ME)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain Harts mechanism through a neat sketch. Show that it generates a straight-line motion.	6M	CO1	L2
(b)	Explain scott-Russel mechanism through a neat sketch.	6M	CO1	L2
	(OR)			
2.	What do you mean by constrained motion? What are different types of constrained motions? Explain each type with examples and neat sketches.	12M	CO1	L2
3.	Describe the working of a hooke's joint with a neat sketch. Also prove that the ratio of angular velocity of the driven shaft to that of the driving shaft with a hooke's joint.	12M	CO2	L2
	(OR)			
4.	Locate all the instantaneous centers for a four bar mechanism as shown in figure. The lengths of various links are: AD=125 mm; AB=62.5 mm; BC=CD=75 mm. If the link AB rotates at a uniform speed of 10 rpm in the clockwise direction, find the angular velocity of the links BC and CD. 	12M	CO2	L3
5(a)	Deduce expressions for the velocity and acceleration of the follower when it moves with simple harmonic motion.	6M	CO3	L2
(b)	Derive relations for velocity and acceleration for a convex cam with a flat- faced follower.	6M	CO3	L2
	(OR)			
6.	A cam is to give the following motion to a knife-edged follower : (i) Outstroke during 60° of cam rotation ; (ii) Dwell for the next 30° of cam rotation ; (iii) Return stroke during next 60° of cam rotation, and 4. Dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the pro file of the cam when the axis of the follower is offset by 20 mm from the axis of the cam shaft.	12M	CO3	L3

7(a)	Obtain an expression for the length of a belt in 1. an open belt drive.	6M	CO4	L3
(b)	Discuss briefly the various types of belts used for the transmission of power.	6M	CO4	L3
	(OR)			
8.	2.5 kW of power is transmitted by an open-belt drive. The linear velocity of the belt is 2.5 m/s. The angle of lap on the smaller pulley is 165^0.The coefficient of friction is 0.3.Detrmine the effect on power transmission in the following cases: (i) Initial tension in the belt is increased by 8% (ii) Initial tension in the belt is decreased by 8%.	12M	CO5	L5
9(a)	Derive an equation to determine the length of path of contact by a pair of mating spur gear.	12M	CO5	L5
(b)	Two 20^0 involute spur gears have a module of 10 mm. The addendum is one module. The larger gear has 50 teeth and the pinion has 13 teeth. Does Interference occurs? If it occurs, to what valve should the pressure angle be Changed to eliminate interference?	12M	CO5	L3
	(OR)			
10.	10. In an epicyclic gear train, as shown in figure, the wheel C is keyed to the shaft B and wheel F is keyed to shaft A. The wheels D and E rotate together on a pin fixed to the arm G. The number of teeth on wheels C, D, E and F are 35, 65, 32 and 68 respectively. If the shaft A rotates at 60 rpm and the shaft B rotates at 28 rpm in the opposite direction, find the speed and direction of rotation of arm G.  	12M	CO5	L3

****