



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. (II Semester) (R20) Semester End Examinations (Supplementary) May 2026

TIME TABLE

R20

Time : 02.00 PM to 05.00 PM

A.Y. : 2025-26

Branch	11-05-2026 (Monday)	12-05-2026 (Tuesday)	13-05-2026 (Wednesday)	14-05-2026 (Thursday)	15-05-2026 (Friday)	16-05-2026 (Saturday)
AI & DS	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE07 - Applied Physics	20CS04 - Discrete Mathematical Structures	20CS03 - Data Structures	20MC01 - Constitution of India
ASE	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE08 - Engineering Physics	20CS01 - Programming for Problem Solving using C	20AE01 - Elements of Aerospace Engineering	20MC01 - Constitution of India
CE	20FE02 - Professional Communication -II	20FE04 - Linear Algebra and Transformation Techniques	20FE08 - Engineering Physics	20CS01 - Programming for Problem Solving using C	20CE03 - Applied Mechanics	20MC01 - Constitution of India
CSE	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE06 - Engineering Chemistry	20CS05 - Python Programming	20CS03 - Data Structures	20MC01 - Constitution of India
CSE (AI & ML)	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE06 - Engineering Chemistry	20CS05 - Python Programming	20CS03 - Data Structures	20MC01 - Constitution of India
ECE	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE06 - Engineering Chemistry	20CS01 - Programming for Problem Solving Using C	20EC02 - Digital Logic Circuits	20MC01 - Constitution of India
EEE	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE05 - Applied Chemistry	20CS01 - Programming for Problem Solving using C	20EE04 - Fundamentals of Electrical Engineering	20MC01 - Constitution of India
IT	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE07 - Applied Physics	20CS05 - Python Programming	20CS03 - Data Structures	20MC01 - Constitution of India
ME	20FE02 - Professional Communication-II	20FE04 - Linear Algebra and Transformation Techniques	20FE08 - Engineering Physics	20CS01 - Programming for Problem Solving using C	20ME02 - Engineering Mechanics	20MC01 - Constitution of India

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

Date: **25 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
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L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.: A.P.

B.Tech. (II Semester) Supplementary Examinations

20FE04-LINEAR ALGEBRA AND TRANSFORMATION TECHNIQUES

(Common to All)

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)	Reduce the matrix into its Echelon form and hence find its rank $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$	7M	CO1	L3
(b)	Investigate the values of λ and μ so that the simultaneous equations $2x + 3y + 5z = 9$, $7x + 3y - 2z = 8$, $2x + 3y + \lambda z = \mu$ have (i) no solution (ii) a unique solution (iii) an infinite number of solutions.	7M	CO1	L3
(OR)				
2(a)	Find non – singular matrices P and Q, PAQ is in the normal form for the matrix $\begin{bmatrix} 1 & -1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$	7M	CO1	L3
(b)	Solve completely the system of equations $x + 3y - 2z = 0$, $2x - y + 4z = 0$, $x - 11y + 4z = 0$.	7M	CO1	L3
3.	Verify Cayley- Hamilton theorem for $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ and hence find (i) A^{-1}	14M	CO2	L3
(OR)				
4(a)	Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	7M	CO2	L3
(b)	If λ is an Eigen value of a non singular matrix A, then show that $\frac{1}{\lambda}$ is an Eigen value of the matrix A^{-1} .	7M	CO2	L3
5(a)	Find $L[te^{2t} \sin 3t]$	7M	CO3	L3

20FE04-LINEAR ALGEBRA AND TRANSFORMATION TECHNIQUES

(b)	Find $\left(\frac{1 - \cos 3t}{t}\right)$	7M	CO3	L3
(OR)				
6(a)	Find $L(e^{2t} + 4t^3 - 2 \sin 3t + 3 \cos 3t)$	7M	CO3	L3
(b)	Evaluate $\int_0^{\infty} \frac{\sin mt}{t} dt$	7M	CO3	L3
7(a)	Find $L^{-1}\left(\frac{s^2 - 3s + 4}{s^3}\right)$	7M	CO4	L3
(b)	Find inverse Laplace transform of $\frac{2s^2 - 6s + 5}{s^3 - 6s^2 + 11s - 6}$ by converting them into partial fractions.	7M	CO4	L3
(OR)				
8(a)	Applying Convolution theorem, find $L^{-1}\left[\frac{1}{(s^2+4)(s^2+9)}\right]$.	7M	CO4	L3
(b)	Solve $\frac{d^2x}{dt^2} - 2\frac{dx}{dt} + x = e^t$ given that $x(0) = 2, x'(0) = -1$ by applying Laplace transform.	7M	CO4	L3
9(a)	Find Z-transform of $(\cos\theta + i\sin\theta)^n$ and hence deduce the values of $Z(\cos n\theta)$ and $Z(\sin n\theta)$.	7M	CO5	L3
(b)	Apply inverse Z-transform for the function $\frac{z}{(z-5)(z-3)}$	7M	CO5	L3
(OR)				
10(a)	State Convolution theorem and hence find $Z^{-1}\left[\frac{z^2}{(z-a)(z-b)}\right]$	7M	CO5	L3
(b)	Using Z - Transform solve the difference equation $u_{n+2} - 5u_{n+1} + 6u_n = 5^n, u_0 = u_1 = 0$.	7M	CO5	L3

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

20FE07-APPLIED PHYSICS

(AI&DS 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)	Distinguish interference and diffraction.	7M	CO1	L1
(b)	Interpret diffraction due to circular aperture. Deduce an expression for the radius of central bright disc.	7M	CO1	L3
(OR)				
2(a)	Discuss in detail the interference phenomenon in thin film by reflected system.	7M	CO1	L2
(b)	What are the conditions necessary to observe good interference pattern?	7M	CO1	L1
3(a)	Explicate the structure and working principle of an optical fiber.	7M	CO2	L2
(b)	The numerical aperture of an optical fiber is 0.5. If the refractive index of core is 1.55. Evaluate the acceptance angle and refractive index of cladding.	7M	CO2	L3
(OR)				
4(a)	Expand the term LASER. Using neat energy level diagrams, explain stimulated absorption, spontaneous emission, stimulated emission processes.	7M	CO1	L2
(b)	What is the working principle of OFC? Draw a neat diagram of OFC indicating acceptance angle and acceptance cone, and propagation of ray of light.	7M	CO2	L3
5(a)	What are the primary assumptions of free electron theory? Mention its drawbacks.	7M	CO3	L1
(b)	Evaluate Fermi function for an energy kT above the Fermi energy.	7M	CO3	L3
(OR)				
6(a)	Write the normalized wave function for a particle confined in a 1D deep potential well of width 'a'. Hence plot the wave function and probability density function for ground state.	7M	CO1	L1
(b)	Define the term Fermi level (EF). Write the Fermi Dirac distribution function and hence determine the $f(E)$, at a the level 0.5 eV above Fermi level at 1000K.	7M	CO2	L2
7(a)	Discuss the drift and diffusion currents in a semiconductor.	7M	CO4	L2
(b)	Distinguish direct and indirect band gap semiconductors.	7M	CO4	L1
(OR)				
8(a)	Define drift and diffusion currents and derive expressions for drift and diffusion currents.	7M	CO4	L3
(b)	Obtain Einstein's relations in terms of drift and diffusion coefficients.	7M	CO4	L3
9(a)	What are domains? Explain the hysteresis curve based on domain theory.	7M	CO5	L2
(b)	Define permeability and susceptibility of magnetic materials. Obtain the relations $B = \mu_0(H+I)$ and $\mu_r = (1+\chi)$.	7M	CO5	L2
(OR)				
10(a)	Obtain an expression for the internal field experienced by an atom inside a dielectric material by using Lorentz method.	10M	CO5	L2
(b)	The dielectric constant of He gas is 1.0000684. Find the electronic polarizability of He atoms if the gas contains 2.7×10^{25} atoms per m^3 .	4M	CO5	L2

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

**20FE08-ENGINEERING PHYSICS
(ASE,CE&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)	Discuss about bending of a beam. Obtain an expression for bending moment of a beam.	7M	CO1	L3
(b)	Write a short note on cantilever and Mention its uses.	7M	CO1	L2
(OR)				
2(a)	Define three elastic modules and write the equations.	7M	CO1	L1
(b)	Explain the classification of beams. Find the work done in stretching a wire of cross-section 1.25 mm ² and length 0.14 mm. the Young's modulus of wire is 45 GN/m ² .	7M	CO1	L3
3(a)	Define numerical aperture and acceptance angle. Deduce expressions for numerical aperture and acceptance angel of an optical fiber.	7M	CO2	L3
(b)	Mention some important application of optical fibers.	7M	CO2	L2
(OR)				
4(a)	Explain about absorption, spontaneous and stimulated emission of radiation in laser light.	7M	CO2	L1
(b)	Illustrate the construction and working of He-Ne laser.	7M	CO2	L2
5(a)	Describe how ultrasound can be produced using he magnetostriction principle.	7M	CO3	L2
(b)	Describe the ultrasound pulse-echo system. Mention some of its advantages and disadvanges.	7M	CO3	L2
(OR)				
6(a)	Illustrate the pulse echo method used in NDT technique.	7M	CO3	L2
(b)	List out the applications of nondestructive testing in various fields.	7M	CO3	L2
7(a)	Derive an equation for internal field for a dielectric material having cubic symmetry.	7M	CO4	L3
(b)	Mention various applications of dielectric materials.	7M	CO4	L2
(OR)				
8(a)	Classify dia, para and ferro magnetic materials and discuss their temperature dependence.	7M	CO4	L2
(b)	List out various applications of magnetic materials.	7M	CO4	L2
9(a)	Classify various types of nano materials in detail.	7M	CO5	L2
(b)	List out the applications of nano materials in various fields.	7M	CO5	L2
(OR)				
10(a)	Explain how the superconductivity changes with magnetic field and temperature with suitable equations.	7M	CO5	L2
(b)	Give the applications of superconductors in different fields.	7M	CO5	L2

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B.Tech. (II Semester) Supplementary Examinations

20FE06-ENGINEERING CHEMISTRY

(CSE, CSE(AI&ML) and 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)	Derive Nernst equation with its applications. The standard reduction potentials of Zn^{+2}/Zn and Cu^{+2}/Cu are $-0.76V$ and $+0.34 V$ respectively. Calculate EMF of the cell? $Zn(s)/Zn^{+2}(0.05M) // Cu^{+2}(0.005M) Cu(s)$.	7M	CO1	L3
(b)	Explain the construction and working principle of H_2-O_2 Fuel cell with reactions.	7M	CO1	L2
(OR)				
2(a)	Describe the construction of calomel electrode. How the potential of calomel electrode vary with concentration of KCl?	7M	CO1	L2
(b)	Explain the construction and working of lead-acid battery. Write the discharging, charging reactions and limitations of lead acid battery.	7M	CO1	L2
3(a)	Explain mechanism of electro chemical corrosion.	7M	CO2	L2
(b)	Illustrate concentration cell corrosion.	7M	CO2	L2
(OR)				
4(a)	State the principle of cathodic protection. How the sacrificial anodic protection controls corrosion?	7M	CO2	L2
(b)	Discuss effect of environment on rate of corrosion.	7M	CO2	L2
5(a)	Discuss the structural features of rotaxanes and catenanes.	7M	CO3	L2
(b)	List out the applications of nanomaterials.	7M	CO3	L2
(OR)				
6(a)	Why rotaxanes and catenanes are used as artificial molecular machines?	7M	CO3	L2
(b)	How to prepare nano-materials using gas phase synthesis?	7M	CO3	L2
7(a)	How thermotropic liquid crystals are formed? Explain types of thermotropic liquid crystals.	7M	CO4	L2
(b)	Summarize applications of liquid crystals in various fields.	7M	CO4	L2
(OR)				
8(a)	Differentiate thermosets and thermoplasts.	7M	CO4	L2
(b)	How conduction occur in doped conducting polymers?	7M	CO4	L2
9(a)	Explain conductometric titration curve of weak acid versus strong base.	7M	CO5	L2
(b)	How to carry potentiometric titration of strong acid versus strong base to determine the endpoint of a titration?	7M	CO5	L2
(OR)				
10(a)	Describe the conductometric curve of strong acid versus strong base.	7M	CO5	L2
(b)	How to estimate the concentration of Fe^{+3} using KCNS as complexing agent by colorimetry?	7M	CO5	L2

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B.Tech. (II Semester) Supplementary Examinations

20FE05-APPLIED CHEMISTRY

(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)	Which minerals are responsible for hard and soft water? Write any four methods for prevention of scale formation in boilers0	7M	CO1	L2															
(b)	Write a note on caustic embrittlement and boiler corrosion.	7M	CO1	L2															
(OR)																			
2(a)	How does the anion and cation exchangers are responsible for obtaining soft water and write the merits of this process?	7M	CO1	L2															
(b)	What is osmosis? What do you understand about the reverse osmosis process?	7M	CO1	L2															
3(a)	What is calorific value of a fuel? Define gross calorific value and net calorific value of a fuel and write down the relation between them.	7M	CO2	L2															
(b)	What is the necessity and significance of proximate analysis of coal?	7M	CO2	L2															
(OR)																			
4(a)	What is synthetic petrol? Explain the Fischer –Tropsch process for the manufacture of the same.	7M	CO2	L2															
(b)	What is biomass? Discuss the various methods of obtaining power from biomass.	7M	CO2	L2															
5(a)	What are reference electrodes? Describe the construction and working of a glass electrode.	7M	CO3	L3															
(b)	Write any four applications of electrochemical series? Calculate the standard EMF of a cell containing Sn ²⁺ /Sn and Br ₂ /Br ⁻ electrodes. [E ° (Sn ²⁺ /Sn) = -0.14 V, E ° (Br ₂ /Br ⁻) = 1.08 V].	7M	CO3	L3															
(OR)																			
6(a)	What are the chemical components involved in Pb-Acid battery? Write the reactions involved during discharge and charge processes.	7M	CO3	L3															
(b)	What is a reserve battery? Explain about Mg-Cu reserve battery.	7M	CO3	L3															
7(a)	What do you mean by ‘dry corrosion’ or ‘chemical corrosion’? Explain the mechanism with the help of a well-labeled diagram.	7M	CO4	L3															
(b)	What is Pilling-Bedworth rule? Arrange the following in the order of increasing their corrosion rate. <table><tr><td>Metal</td><td>Metal oxide</td><td>Pilling –Bedworth ratio</td></tr><tr><td>Co</td><td>CoO</td><td>1.9</td></tr><tr><td>Cu</td><td>CuO</td><td>1.7</td></tr><tr><td>Al</td><td>Al₂O₃</td><td>1.3</td></tr><tr><td>Li</td><td>Li₂O</td><td>0.6</td></tr></table>	Metal	Metal oxide	Pilling –Bedworth ratio	Co	CoO	1.9	Cu	CuO	1.7	Al	Al ₂ O ₃	1.3	Li	Li ₂ O	0.6	7M	CO4	L3
Metal	Metal oxide	Pilling –Bedworth ratio																	
Co	CoO	1.9																	
Cu	CuO	1.7																	
Al	Al ₂ O ₃	1.3																	
Li	Li ₂ O	0.6																	
(OR)																			
8(a)	Why metals undergo corrosion? Explain impressed current cathodic protection method to prevent corrosion.	7M	CO4	L3															
(b)	Explain the following: electroplating and cladding. What is the necessity to do them?	7M	CO4	L3															
9(a)	What are the various steps involved in addition polymerisation? Explain taking the example of cationic polymerisation reactions.	7M	CO5	L2															
(b)	Write the preparation, properties and applications of PVC.	7M	CO5	L2															
(OR)																			
10(a)	Write notes on cloud and pour point; flash and fire point.	7M	CO5	L2															
(b)	Explain the gas-phase synthesis of nano materials.	7M	CO5	L2															

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B.Tech. (II Semester) Supplementary Examinations

20CS04-DISCRETE MATHEMATICAL STRUCTURES

(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)	Define NAND, NOR and XOR and give their truth tables.	7M	CO1	L1
(b)	Define Exclusive & inclusive disjunctions with an example.	7M	CO1	L1
(OR)				
2(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)				
3(a)	Discuss about operations on sets with examples.	7M	CO2	L2
(b)	If $A = \{1, 2, 3, 4\}$ and R, S are relations on A defined by $R = \{(1, 2), (1, 3), (2, 4), (4, 4)\}$ $S = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 3), (2, 4)\}$. Find ROS, SOR, R^2, S^2 and write down their matrices.	7M	CO2	L3
(OR)				
4(a)	Assume $A = \{1, 2, 3, 4\}$ and f and g be functions from A to A given by $f = \{(1, 4), (2, 1), (3, 2), (4, 3)\}$ and $g = \{(1, 2), (2, 3), (3, 4), (4, 1)\}$. Prove that f and g are inverse of each other.	7M	CO2	L3
(b)	If $A = \{1, 2, 3, 4\}$ and R, S are relations on A defined by $R = \{(1, 2), (1, 3), (2, 4), (4, 4)\}$ $S = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 3), (2, 4)\}$. Find ROS, SOR, R^2, S^2 and write down their matrices.	7M	CO2	L2
(OR)				
5(a)	Define Spanning tree and explain the algorithm for Depth First Search (DFS) traversal of a graph with suitable example.	7M	CO3	L1
(b)	A graph G has 21 edges, 3 vertices of degree 4 and the other vertices are of degree 3. Find the number of vertices in G .	7M	CO3	L3
(OR)				
6(a)	Prove that a connected graph G is Euler graph if and only if every vertex of G is of even degree.	7M	CO3	L2
(b)	Show that isomorphism of that simple graphs is an equivalent relation.	7M	CO3	L2
(OR)				
7(a)	List and explain the general properties of Algebraic system with examples.	7M	CO4	L2
(b)	Show that the set of all positive rational numbers forms an abelian group under the composition $*$ defined by $a * b = (ab)/2$.	7M	CO4	L2
(OR)				
8(a)	Define Homomorphism. Let $(Z, +)$ be a group and $(G, *)$ be a another group, G can be defined as $G = \{2^n, n \in \mathbb{Z}\}$. A function $f: Z \rightarrow G$ by $f(n) = 2^n, \forall n \in \mathbb{Z}$. Show that $f: Z \rightarrow G$ is Homomorphism.	7M	CO4	L2
(b)	In a group $(G, *)$, Prove that $(a * b)^{-1} = b^{-1} * a^{-1}$ for all $a, b \in G$.	7M	CO4	L2
(OR)				
9(a)	Solve the Recurrence Relation $a_n + a_{n-1} - 8a_{n-2} - 12a_{n-3} = 0$ for $n \geq 3$, with $a_0 = 1, a_1 = 5, a_2 = 1$.	7M	CO5	L3
(b)	Solve the Recurrence Relation $a_n + a_{n-1} - 6a_{n-2} = 0$ for $n \geq 2$, with $a_0 = -1, a_1 = 8$.	7M	CO5	L3
(OR)				
10(a)	Construct the generating function for the following sequences: (i) 1, 0, 1, 2, 0, 1, (ii) 1, 0, 3, -2,	7M	CO5	L3
(b)	Solve the recurrence relation Using generating function $a_n + 3a_{n-1} - 10a_{n-2} = 0, n \geq 2$ where $a_0 = 1, a_1 = 4$.	7M	CO5	L3

H.T.No

14 MAY 2026

R20

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (II Semester) Supplementary Examinations

20CS01-PROGRAMMING FOR PROBLEM SOLVING USING C

(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)	Draw a Flowchart for finding roots of quadratic equation.	7M	CO1	L2
(b)	Distinguish between while and do-while loops in C with syntax and suitable examples.	7M	CO1	L3
(OR)				
2(a)	Design an algorithm to find largest among three numbers.	7M	CO1	L4
(b)	Give examples for each type of control statements in C.	7M	CO1	L1
3(a)	Write a C program to accept 'N' numbers as input and find out the smallest element in the array.	7M	CO2	L3
(b)	Define a string. List out any six string handling functions with example.	7M	CO2	L1
(OR)				
4(a)	Define array. Explain it by inserting 10 elements into it.	7M	CO2	L2
(b)	Define searching. Explain any searching procedure with a suitable example.	7M	CO2	L2
5(a)	Write a C program to find sum of array elements using functions.	7M	CO3	L3
(b)	Define a pointer. How is it declared and initialized?	7M	CO3	L1
(OR)				
6(a)	Explain about call by value parameter passing technique with an example.	7M	CO3	L2
(b)	Describe any two dynamic memory management functions in C-language.	7M	CO3	L2
7(a)	Is it possible to create an array of structure? Explain with the help of an example.	7M	CO4	L2
(b)	Write a C program to create employee structure with suitable fields and read 5 employees data dynamically and display them.	7M	CO4	L3
(OR)				
8(a)	Differentiate structure and array.	7M	CO4	L3
(b)	How are user defined data types defined? Illustrate with suitable examples.	7M	CO4	L2
9(a)	Can we create a file using fopen() function? Justify your answer.	7M	CO5	L4
(b)	What is the difference between file opening modes "r" and "r+"?	7M	CO5	L1
(OR)				
10(a)	Explain about fread() and fwrite() functions.	7M	CO5	L2
(b)	Write a C program to display number of characters, words and lines in given file.	7M	CO5	L3

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

20CS05-PYHTON PROGRAMMING

(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)	List the various operators supported in Python.	7M	CO1	L1
(b)	Write a program that prompts users to enter two integers x and y. the program then calculates and displays x^y .	7M	CO1	L3
(OR)				
2(a)	Explain with example bitwise operators in Python.	7M	CO1	L1
(b)	Assume a suitable value for distance between two cities (in km.). Write a program to convert and print this distance in meters, feet, inches and centimeters.	7M	CO1	L3
3.	Write a program to find the greatest number from three numbers.	14M	CO2	L1
(OR)				
4(a)	Explain the different types of loops in Python with example.	7M	CO2	L1
(b)	Write a Python program to input a number from user and swap first and last digit of the given number. Example Input Input any number: 12345 Output Number after swapping first and last digit: 52341	7M	CO2	L3
5(a)	Write a program that creates a list of numbers from 1 to 20 that are either divisible by 2 or divisible by 4.	7M	CO3	L3
(b)	Explain map(), filter() and reduce() functions with example.	7M	CO3	L3
(OR)				
6(a)	Write a program that has a dictionary of states and their codes. Add another state in the predefined dictionary. Print all the items in the dictionary, and try to print code for a state that does not exist. Set a default value prior to printing.	7M	CO3	L3
(b)	Explain the process of adding and modifying an item in a dictionary with example.	7M	CO3	L3
7(a)	Write a program that accepts a string from user and redisplay the same string after removing vowels from it.	7M	CO4	L3
(b)	Explain local and global variables with an example.	7M	CO4	L3
(OR)				
8(a)	Define a function. Write a program to subtract two numbers using a function.	7M	CO4	L3
(b)	Write a program that finds whether a given character is present in a string or not. In case it is present it prints the index at which it is present. Do not use built-in find function to search the character.	7M	CO5	L3
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) <code>__dict__</code> (ii) <code>__doc__</code> (iii) <code>__name__</code> (iv) <code>__bases__</code>	7M	CO5	L3
(OR)				
10(a)	Write a program that uses class to store the name and marks of students. Use list to store the marks in three subjects.	7M	CO2	L1
(b)	Explain the following built-in functions. (i) <code>hasattr(obj, name)</code> (ii) <code>getattr(obj, name[, default])</code> (iii) <code>setattr(obj, name, value)</code> (iv) <code>delattr(obj, name)</code>	7M	CO2	L3

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (II Semester) Supplementary Examinations

20CS03-DATA STRUCTURES

(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)	Define a data structure. Draw and explain the classification of data structures.	7M	CO1	L1
(b)	Explain Binary Search procedure for the following list of elements and assume the key element is 49. 12, 23, 34, 45, 55, 62, 71, 85, 96.	7M	CO1	L3
(OR)				
2(a)	Define Recursion. Give examples for linear and non-linear recursion.	7M	CO1	L1
(b)	Explain linear search procedure for the following list of elements and assume the key element is 96. 12, 23, 34, 45, 55, 62, 71, 85, 96.	7M	CO1	L3
(OR)				
3(a)	Develop a C program to implement Stack ADT using Linked List.	7M	CO2	L2
(b)	Verify whether the following symbols are balanced or not using a stack. {{()}}.	7M	CO2	L3
(OR)				
4(a)	Write a program for implementing Queue with arrays.	7M	CO2	L2
(b)	Write an algorithm for evaluating postfix notation.	7M	CO2	L2
(OR)				
5(a)	Apply the bubble sort algorithm for {5,2,3,7,1,0,4,6}.	7M	CO3	L3
(b)	Write down an algorithm for Bubble Sort.	7M	CO3	L2
(OR)				
6(a)	What is sorting? Write algorithm for quick sort.	7M	CO3	L2
(b)	Sort the elements 77,49,25,12, 9,33;56,81 using quick sort.	7M	CO3	L3
(OR)				
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
(OR)				
9(a)	Define Collision. Explain the various techniques to resolve a collision.	7M	CO5	L2
(b)	What is a Hash Function? Explain different types of Hash functions.	7M	CO5	L2
(OR)				
10(a)	Demonstrate DFS traversal on the following graph. Take A as starting vertex.	7M	CO5	L3
(b)	Discuss types of graphs & describe various ways of representing graphs.	7M	CO5	L1

15 MAY 2026

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(AUTONOMOUS)**

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

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

**20AE01-ELEMENTS OF AEROSPACE 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)	Write down the principle difference ranging from lighter than air and heavier than air-planes.	7M	CO1	L1
(b)	List the major components of conventional airplane and their functions with a neat sketch.	7M	CO1	L1
(OR)				
2(a)	Derive the hydrostatic equation with the neat sketch.	7M	CO1	L3
(b)	Explain the temperature variation with altitude of standard atmosphere and classify the atmospheric layers.	7M	CO1	L2
3(a)	Sketch and explain the definitions of (i) Lift, drag, moments angle of attack and relative wind (ii) Normal and axial force.	7M	CO2	L2
(b)	Describe in detail about the different types of drag that are induced on an airfoil.	7M	CO2	L2
(OR)				
4(a)	Explain the distribution of pressure coefficient and derive the equation.	7M	CO2	L2
(b)	Illustrate the induced drag and calculate by considering finite wing.	7M	CO2	L3
5.	Derive the thrust equation for jet propulsion.	14M	CO2	L3
(OR)				
6(a)	Illustrate the elements of a turbofan engine with the suitable diagram.	7M	CO3	L3
(b)	Explain the solid propellant burning configuration and list the advantages of solid propellant.	7M	CO3	L2
7(a)	Discuss the form of stress exerted on solid materials.	7M	CO3	L2
(b)	Explain with neat sketch the components of an airplane and their functions.	7M	CO3	L2
(OR)				
8(a)	Describe the applications of composite materials in recent aircrafts.	7M	CO3	L2
(b)	Explain the advantages and disadvantages aluminium alloy and titanium.	7M	CO3	L2
9(a)	Illustrate the primary sequential phases of a space mission.	7M	CO4	L3
(b)	State the Keplers first and second law. Prove the Keplers second law.	7M	CO4	L1
(OR)				
10(a)	Elaborate the concept of communication and telemetry systems of a satellite.	7M	CO4	L2
(b)	Discuss in detail about the concept of space mission objectives.	7M	CO4	L2

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

20CE03-APPLIED MECHANICS

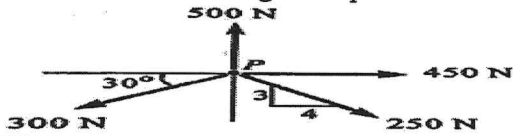
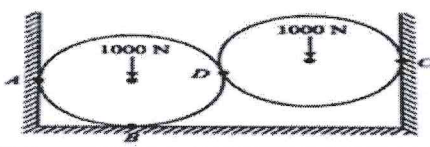
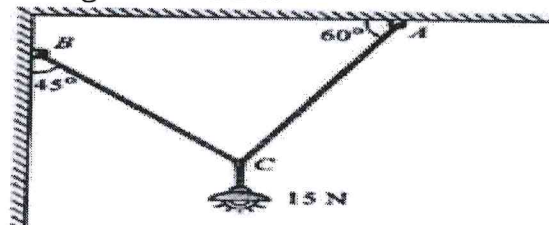
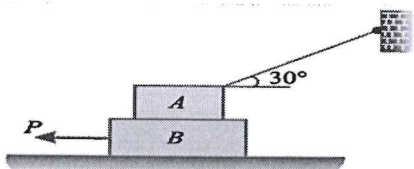
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Time : 3 hours

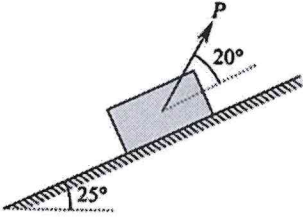
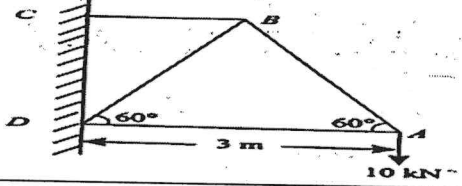
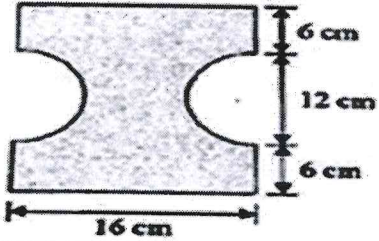
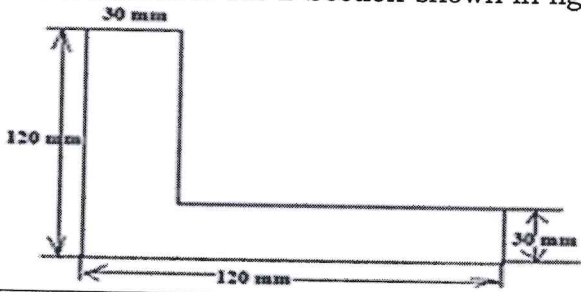
Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Explain how you will reduce the system of coplanar, non-concurrent forces to a force and a couple.	7M	CO1	L2
(b)	Two forces of 80N and 70N act simultaneously at a point. Find the resultant force, if the angle between them is 150° .	7M	CO1	L3
(OR)				
2(a)	What is resolution of forces? Distinguish clearly between resolution of forces and composition of forces.	7M	CO1	L1
(b)	Find the resultant of the force acting on a particle P shown in figure. 	7M	CO1	L3
3(a)	State and prove lami's theorem.	4M	CO2	L2
(b)	Two spheres each of 1000N and of radius 25cm rest in a horizontal channel of width 90cm as shown in Figure. Find the reaction at the point of contact A, B and C. 	10M	CO2	L3
(OR)				
4(a)	Explain the construction of free body diagram with an example.	7M	CO2	L2
(b)	An electrical light weighing 15N hangs from a point C by the two strings AC and BC as shown in the Figure. AC is inclined at 60° to the horizontal and BC at 45° to the vertical. Using Lami's theorem, find the forces in the strings AC and BC. 	7M	CO2	L3
5(a)	Two blocks A and B of weights 1 kN and 2 kN respectively are in equilibrium position as shown below. If the coefficient of friction between the two blocks as well as the block B and the floor is 0.3, find the force (P) required to move the block B. 	7M	CO3	L2

20CE03-APPLIED MECHANICS

(b)	A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction.	7M	CO3	L2
(OR)				
6(a)	(i) State Coulomb's laws of dry friction (ii) Define ladder friction and discuss the sense of frictional forces acting at the contact points.	7M	CO3	L1
(b)	A block of 75 kg mass is pulled up an inclined plane as shown in Figure. If the coefficient of friction between the contact surfaces is 0.2, determine the force P required to just make the block move.	7M	CO3	L2
				
7.	A cantilever truss of 3m span is loaded as shown in fig. Find the forces in the various members of the frames truss and tabulate the results from both methods of sections and joints	14M	CO4	L3
				
(OR)				
8(a)	Describe the Assumptions made for Forces in the Members of a perfect Frame.	4M	CO4	L3
(b)	List out in detail about Types of Frames with a neat sketch.	10M	CO4	L3
9(a)	Find the moments of inertia of the cut section shown about the centroidal axes. Two semicircular portions are cut from a rectangular plate.	7M	CO5	L3
				
(b)	Determine the Mass moment of inertia of circular lamina of radius 'r' about its diameter.	7M	CO5	L3
(OR)				
10(a)	From the first principles determine the centroid of the following basic sections. i) Quarter circular area ii) Circular sector	7M	CO5	L3
(b)	Find the moment of inertia of the L-Section shown in figure	7M	CO5	L3
				

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

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

20EC02-DIGITAL LOGIC CIRCUITS

(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)	Utilize the Even parity phenomena and generate Hamming code for the data 1100.	7M	CO1	L3
(b)	Convert Binary code 101011 to Gray code and Gray code 110011 to Binary code.	7M	CO1	L3
(OR)				
2(a)	Given the 8bit data word 01011011, generate the 12-bit composite word for the hamming code that corrects and detects single errors.	7M	CO2	L3
(b)	(i) Rewrite the decimal number (215) ₁₀ as an octal number (ii) Find (3250 - 72532) ₁₀ using 9's complement (iii) Change (1001011101) ₂ to a hexadecimal number.	7M	CO1	L2
3(a)	Find the reduced Boolean expression for the following functions: (i) $F = (\overline{X} \cdot \overline{Y} + Z) + Z + XY + WZ$ (ii) $F = \overline{A} \cdot \overline{C} + ABC + A \cdot \overline{C} + A \cdot \overline{B}$	7M	CO3	L3
(b)	Choose best minimization method to get minimal SoP and implement $F = \sum m(0,1,2,3,4,8,9,12)$ using NOR gates.	7M	CO3	L3
(OR)				
4(a)	Prove, NOR gate as universal gate with three examples.	7M	CO2	L3
(b)	Minimize to Sum of Products and realize using basic gates $F = \sum m(0,1,4,5,6,7,9,11,15) + d(10,14)$.	7M	CO3	L3
5(a)	Prepare a combinational logic circuit for 2 bit magnitude comparator.	7M	CO4	L4
(b)	Realize the given functions using Multiplexer (i) $F_1(P,Q,R) = \sum m(2,3,4,6,7)$ (ii) $F_2(P,Q,R) = \sum m(1,3,5,7)$.	7M	CO3	L3
(OR)				
6(a)	Design a full-adder with two half-adders and basic gates.	7M	CO3	L4
(b)	Design and draw a full subtractor which will use two half subtractors.	7M	CO3	L4
7(a)	What is excitation table? Write the excitation tables for SR and T flip-flops.	7M	CO2	L2
(b)	Compare Sequential and Combinational circuits.	7M	CO2	L2
(OR)				
8(a)	Differentiate combinational and sequential circuits. Explain with the help of a block diagram, the basic components of a Sequential Circuit.	7M	CO2	L2
(b)	Define clocked flip-flop. Explain SR and JK flip flop with neat diagram.	7M	CO2	L2
9(a)	What is ASM? Describe the features of Algorithmic State Machine.	7M	CO4	L2
(b)	Demonstrate system design using data path and control sub systems.	7M	CO3	L2
(OR)				
10(a)	What are the capabilities and limitations of finite state machines? Explain.	7M	CO4	L4
(b)	Explain the procedure of Mealy to Moore conversion.	7M	CO4	L4

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

20EE04-FUNDAMENTALS OF ELECTRICAL ENGINEERING

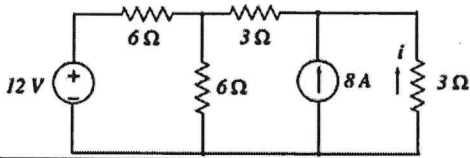
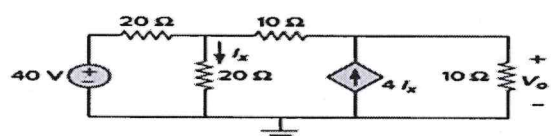
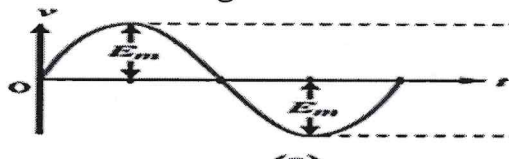
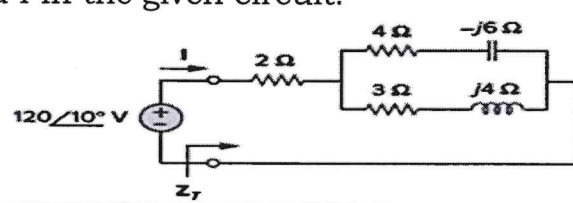
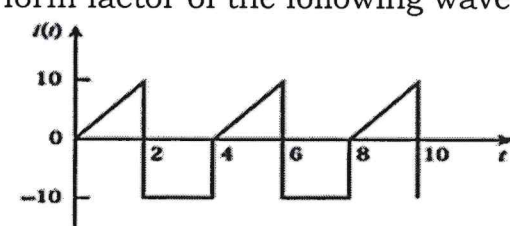
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Time : 3 hours

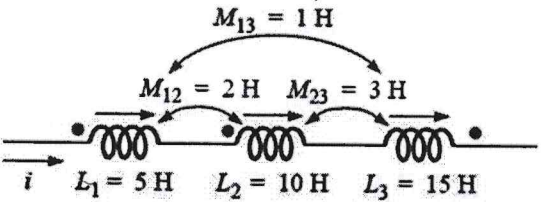
Max. Marks :70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Classify types of electric circuit elements depending on their characteristics and explain in detail.	4M	CO1	L2
(b)	Apply nodal analysis and calculate the current flowing through 3 Ohms element for the network shown in figure below. 	10M	CO1	L3
(OR)				
2(a)	Illustrate Linear and Nonlinear elements.	7M	CO1	L1
(b)	Compute V_o using nodal analysis and power drawn by 10Ω resistor. 	7M	CO2	L3
3(a)	Compute Form Factor of the given source. 	7M	CO2	L2
(b)	Find Z_T and I in the given circuit. 	7M	CO2	L3
(OR)				
4(a)	Compute the form factor of the following wave form. 	7M	CO2	L2
(b)	Three impedances $Z_1=10+j31.4\Omega$, and $Z_2 = 6+j8 \Omega$, are connected in parallel across a 200V AC supply. Calculate (i) Total impedance (ii) Total current.	7M	CO2	L3

20EE04-FUNDAMENTALS OF ELECTRICAL ENGINEERING

5(a)	Define Magnetic flux, Flux density, Field Intensity, Reluctance, Self Inductance, Mutual Inductance and Coefficient of coupling.	7M	CO3	L2
(b)	Two coupled coils, with $L_1 = 10 \text{ mH}$, $L_2 = 30 \text{ mH}$, and $k = 0.75$, are connected two different ways: series aiding and series opposing, Obtain the equivalent inductances of the two connections.	7M	CO3	L2
(OR)				
6(a)	Derive the expression for co-efficient of coupling helps in identifying how strongly two coils are coupled.	7M	CO3	L2
(b)	Find the total inductance of series coil shown in figure below. 	7M	CO3	L2
7(a)	Explain the principle of basic slide wire DC potentiometer with neat diagram.	7M	CO4	L1
(b)	During the measurement of a low resistance using a potentiometer the following readings were obtained. Voltage drop across the low resistance under test = 0.4221 V, voltage drop across a 0.1 ohm standard resistance connected in series with the unknown = 1.0235V. Find the value of the unknown resistor.	7M	CO4	L2
(OR)				
8(a)	Describe the construction and theory of operation of a single phase electrodynamicometer type wattmeter.	7M	CO4	L2
(b)	Explain the working principle of PT and errors in PT.	7M	CO4	L2
9(a)	Derive equation for balance for schering capacitance bridge.	7M	CO5	L3
(b)	Demonstrate the circuit of a Wheat Stone's bridge used for measurement of medium resistance.	7M	CO5	L3
(OR)				
10(a)	Demonstrate the circuit of a Kelvin's double bridge used for measurement of low resistance.	7M	CO5	L3
(b)	Derive equation of balance for an Maxwell's inductance bridge.	7M	CO5	L3

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

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

20ME02-ENGINEERING MECHANICS

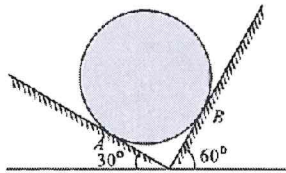
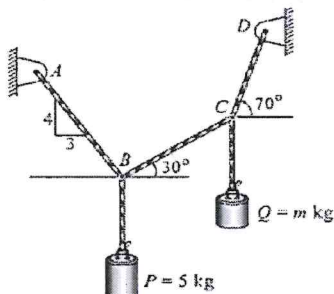
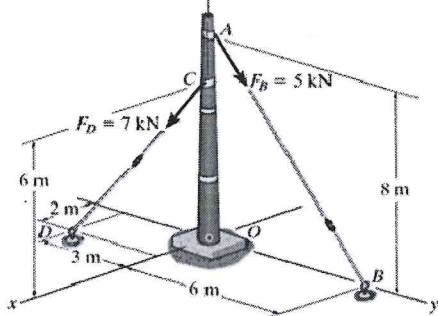
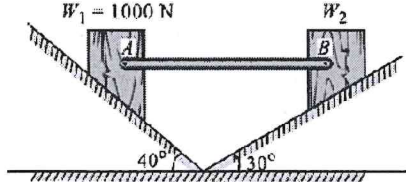
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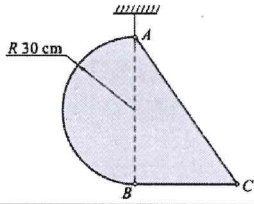
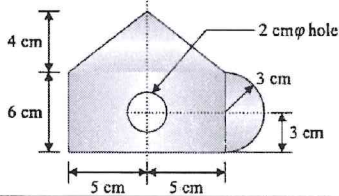
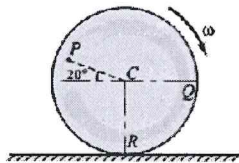
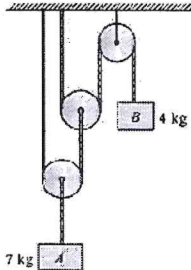
Time : 3 hours

Max. Marks :70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	A cylinder of mass 50 kg is resting on a smooth surface, which is inclined at 30° and 60° to horizontal as shown in Figure. Determine the reaction at contact A and B. 	7M	CO1	L2
1(b)	Block P 5 kg and block Q of mass m kg are suspended through the chord which is in the equilibrium position, as shown in Figure. Determine the mass of block Q. 	7M	CO1	L2
(OR)				
2.	The tower is held in place by two cables and replace the two forces acting on the post by a resultant force and couple moment at point O. 	14M	CO1	L3
3.	Two blocks W_1 and W_2, resting on two inclined planes, are connected by a horizontal bar AB, as shown in Figure. If W_1 equals 1000 N, determine the maximum value of W_2 for which the equilibrium can exist. The angle of limiting friction is 20° at all rubbing faces. 	14M	CO2	L2
(OR)				
4(a)	(i) Discuss the merits and demerits of friction (ii) Explain why is the coefficient of static friction greater than the coefficient of kinetic friction.	7M	CO2	L1
(b)	Describe the following terms (i) Angle of friction (ii) Angle of repose (iii) Cone of friction.	7M	CO2	L1

5(a)	Derive the Centroid of Triangular Area with base b and height h .	7M	CO3	L2
(b)	A thin homogenous composite plate formed by a semicircular and triangular shape as shown in Figure, is freely suspended from point A. If the side BC remains horizontal in equilibrium condition, then find side BC. 	7M	CO3	L4
(OR)				
6.	Determine the mass moment of inertia of a thin steel plate of 4 mm thickness shown in Figure about its base. Take density of steel to be 7850 kg/m^3. 	14M	CO3	L3
7(a)	In Asian games, for 100 m event an athlete accelerates uniformly from the start to his maximum velocity in a distance of 4 m and runs the remaining distance with that velocity. If the athlete finishes the race in 10.4 seconds, determine (i) his initial acceleration and (ii) his maximum velocity	7M	CO4	L3
(b)	A fly wheel starts from rest and after half a minute rotates at 2000 rpm. Calculate the (i) angular acceleration and (ii) number of revolutions made by the wheel within this period.	7M	CO4	L4
(OR)				
8(a)	A helicopter is moving horizontally at a height of 360 m above the ground. When the helicopter is at point O its speed is 100 m/s and it has an acceleration of 4 m/s^2 . At the same instant, a packet is released from the helicopter. Find the position, velocity and acceleration of the particle w.r.t. the helicopter after 3 sec.	7M	CO4	L3
(b)	A wheel moves on a surface without slipping such that its center has a velocity of 4 m/s towards horizontally. The angular velocities of the wheel is 4 rad/s clockwise. Determine the velocities of points P, Q and R shown on the wheel in figure. 	7M	CO4	L3
9.	Two weights $W = 400 \text{ N}$ and $W = 100 \text{ N}$ are connected by a string and move along a horizontal plane under the action of force $P = 200 \text{ N}$ applied horizontally to the weight W . The coefficient of friction between the weights and the plane is 0.25. Determine the acceleration of the weights and the tension in the string. Will the acceleration and tension in the string remain the same if the weights are interchanged?	14M	CO5	L4
(OR)				
10.	Determine the tension developed in chords attached to each block and the accelerations of the blocks when the system, shown in figure, is released from rest. Neglect the mass of the pulleys and chords. 	14M	CO5	L4

16 MAY 2026

H.T.No.

R20

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

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

B.Tech. (II Semester) Supplementary Examinations

20MC01-CONSTITUTION OF INDIA

(Common to All)

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 about Right to Freedom of Religion.	7M	CO1	L2
(b)	Elucidate making Indian Constitutional history.	7M	CO1	L2
(OR)				
2(a)	Write down the Preamble and its purpose of Indian Constitution.	7M	CO1	L2
(b)	Illustrate the characteristics of a federal Constitution.	7M	CO1	L2
3(a)	Summarize the Powers and responsibilities of Indian president.	7M	CO2	L2
(b)	Describe the functions of Supreme court in India.	7M	CO2	L2
(OR)				
4(a)	Illustrate the Structure of Union government.	7M	CO2	L2
(b)	Discuss the Powers and functions of Rajya Sabha.	7M	CO2	L2
5(a)	Discuss the role and eligibility of the governor of state.	7M	CO3	L1
(b)	Describe the role of the chief minister in state government.	7M	CO3	L2
(OR)				
6(a)	Interpret the functions of the state council of ministers.	7M	CO3	L2
(b)	Classify the departments in the state secretariat according to the norms of the state government.	7M	CO3	L2
7(a)	Classify the functioning categories of municipal corporations.	7M	CO4	L2
(b)	Determine about Panchayati Raj system of local self-government.	7M	CO4	L2
(OR)				
8(a)	Paraphrase the importance of local government in contemporary society.	7M	CO4	L2
(b)	Illustrate the duties and responsibilities of mayor and deputy mayor.	7M	CO4	L2
9(a)	Discuss the role of National commission for Scheduled tribes.	7M	CO5	L2
(b)	Summarize the women empowerment schemes available for women development.	7M	CO5	L2
(OR)				
10(a)	Elucidate the Powers of Election Commission of India.	7M	CO5	L2
(b)	Describe the procedure for conducting general elections.	7M	CO5	L2
