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) (R23) Semester End Examinations (Regular & Supplementary) - July 2026

TIME TABLE

R23

A.Y. : 2025-26

Branch	01-07-2026 (Wednesday)		02-07-2026 (Thursday)		04-07-2026 (Saturday)	06-07-2026 (Monday)	08-07-2026 (Wednesday)	10-07-2026 (Friday)
Time	10.00 AM to 01.00 PM	02.00 PM to 05.00 PM	10.00 AM to 01.00 PM	02.00 PM to 05.00 PM	10.00 AM to 01.00 PM	10.00 AM to 01.00 PM	10.00 AM to 01.00 PM	10.00 AM to 01.00 PM
AI & DS	--	--	23ME01-Engineering Graphics	--	23FE05-Differential Equations & Vector Calculus	23FE04-Engineering Physics	23EE01-Basic Electrical & Electronics Engineering	23CS02-Data Structures
ASE	--	--	23FE06-Engineering Chemistry	--	23FE05-Differential Equations & Vector Calculus	23CS01-Introduction to Programming	23EE01-Basic Electrical & Electronics Engineering	23ME02-Engineering Mechanics
CE	--	--	23FE06-Engineering Chemistry	--	23FE05-Differential Equations & Vector Calculus	23CS01-Introduction to Programming	23EE01-Basic Electrical & Electronics Engineering	23ME02-Engineering Mechanics
CSE	23ME01-Engineering Graphics (A,B,C & D Sections) **(Regular only)**	23ME01-Engineering Graphics (E, F, G & H Sections) **(Regular & Suppl.)**	--	--	23FE05-Differential Equations & Vector Calculus	23FE04-Engineering Physics	23EE01-Basic Electrical & Electronics Engineering	23CS02-Data Structures
CSE (AI & ML)	--	--	23ME01-Engineering Graphics	--	23FE05-Differential Equations & Vector Calculus	23FE04-Engineering Physics	23EE01-Basic Electrical & Electronics Engineering	23CS02-Data Structures
ECE	--	--	23FE02-Chemistry	--	23FE05-Differential Equations & Vector Calculus	23CS01-Introduction to Programming	23CM01-Basic Civil & Mechanical Engineering	23EC01-Network Analysis
EEE	--	--	23FE02-Chemistry	--	23FE05-Differential Equations & Vector Calculus	23CS01-Introduction to Programming	23CM01-Basic Civil & Mechanical Engineering	23EE02-Electrical Circuit Analysis-I
IT	--	--	--	23ME01-Engineering Graphics	23FE05-Differential Equations & Vector Calculus	23FE04-Engineering Physics	23EE01-Basic Electrical & Electronics Engineering	23CS02-Data Structures
ME	--	--	23FE06-Engineering Chemistry	--	23FE05-Differential Equations & Vector Calculus	23CS01-Introduction to Programming	23EE01-Basic Electrical & Electronics Engineering	23ME02-Engineering Mechanics

Note(s): 1. Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately. 2. There is no objective paper for Engineering Graphics subject.

Date: 13 JUN 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										

01 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

B.Tech. (II Semester) Regular Examinations

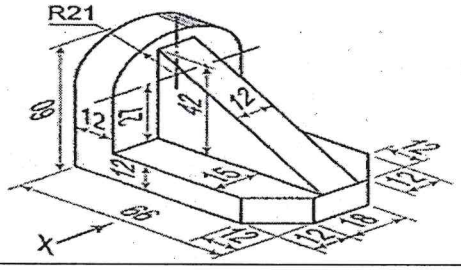
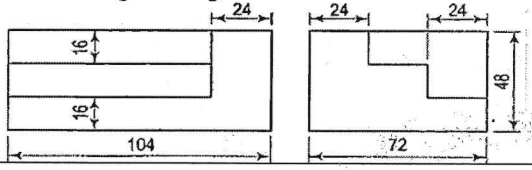
23ME01-ENGINEERING GRAPHICS

CSE (A,B,C&D)

9.22

Time : 3 hours

Max. Marks : 70

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Construct hyperbola when the distance of the focus from the directrix is 65mm and eccentricity is 3/2. Draw a tangent and a normal to the curve at a point 75 mm from the directrix.	7 M	CO1	L3
(b)	Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart. (i) A, in the H.P. and 20 mm behind the V.P. (ii) B, 40 mm above the H.P. and 25 mm in front of the V.P. (iii) C, in the V.P. and 40 mm above the H.P. (iv) D, 25 mm below the H.P. and 25 mm behind the V.P.	7 M	CO1	L2
	(OR)			
2.	A circle of diameter 50 mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one clockwise revolution of the circle. Draw a normal and tangent to the curve at a point 40 mm above the directing line.	14 M	CO1	L4
3(a)	Draw the projections of 75mm straight line AB in the following positions. (i) Perpendicular to V.P., 25mm above the H.P., and its one end in the V.P. (ii) Perpendicular to H.P., in the V.P., its one end in the H.P	7 M	CO2	L3
(b)	A 70 mm long line is parallel to and 40 mm above H.P. Its two ends are 25 mm and 50mm in front of V.P. respectively. Draw its projections and find the inclination with the V.P.	7 M	CO2	L3
	(OR)			
4.	A regular pentagon of 25 mm side has one side on the ground. Its plane is inclined at 45° to the H.P and perpendicular to the V.P Draw its projections.	14 M	CO2	L3
5(a)	A cube of 50 mm long edges is resting on the H.P. with its vertical faces equally inclined to the V.P. Draw its projections.	7 M	CO3	L3
(b)	Draw the projections of a cylinder, base 30 mm diameter and axis 60 mm Jong resting on the H.P. on its respective base.	7 M	CO3	L3
	(OR)			
6.	A pentagonal pyramid, base 25 mm side and axis 50 mm long has one of its triangular faces in the V.P. Draw its projections.	14 M	CO3	L3
7.	A cone, base 75 mm diameter and axis, 80 mm long is resting on its base on the ground. It is cut by a section plane perpendicular to the V.P. inclined at 45^0 to the H.P. and cutting the axis at a point 35 mm from the apex. Draw its front view, sectional top view and true shape of the section.	14 M	CO4	L3
	(OR)			
8(a)	Draw the development of the lateral surface of a right square prism of edge of base 30mm and axis 50 mm long.	7 M	CO4	L4
(b)	Draw the development of the lateral surface of the cone diameter 60 mm and axis length 60 mm resting with its base on H.P.	7 M	CO4	L3
9.	Draw the orthographic projections for the pictorial view shown in figure. All dimensions are in mm. 	14 M	CO5	L3
	(OR)			
10.	Draw the isometric view of the given figure. All dimensions are in mm. 	14 M	CO5	L3

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01 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

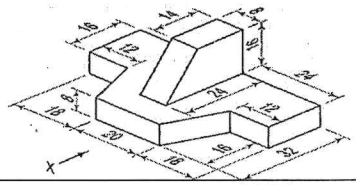
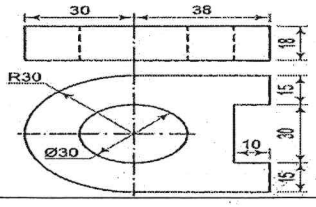
L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

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

23ME01-ENGINEERING GRAPHICS

Regular - CSE (E,F,G &H) / Supplementary

Time : 3 hours Max. Marks : 70

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Construct parabola with the distance from the focus to the directrix as 50mm. Draw a tangent and normal to the curve at a point 45 mm from the directrix.	7 M	CO1	L3
(b)	Draw the projections of the following points. (i) A is 15 mm above H.P. and 28 mm in front of V.P. (ii) B is 22 mm below H.P. and 33 mm behind V.P (iii) C, 18 mm above the H.P. and 32 mm behind the V.P. (iv) D, 8 mm below the H.P. and 28 mm in front of the V.P.	7 M	CO1	L2
	(OR)			
2.	Draw epi-cycloid of a circle of 50 mm diameter, which rolls on another circle of 175mm diameter for one revolution clockwise. Draw a tangent and normal to the curve at a point 125 mm from the centre of the directing circle.	14 M	CO1	L3
3.	The front view of a 75 mm long line measures 55 mm. The line is parallel to the H.P. and one of its ends is in the V.P. and 25 mm above the H.P. Draw the projections of the line and determine its inclination with the V.P.	14 M	CO2	L3
	(OR)			
4(a)	Draw the projections of a regular pentagon 25 mm side with its surface, making an angle of 45^0 with H.P. One of the sides of the pentagon is parallel to H.P. and 15mm away from it.	7 M	CO2	L3
(b)	A rectangular plane 60 mm x 40 mm in size rests on HP on one of its shorter edges, with its surface inclined at 60^0 to HP and perpendicular to VP. Draw its projections.	7 M	CO2	L3
5(a)	A square pyramid base 35 mm side and axis 60 mm long has its base in the V.P. One edge of the base is at 45^0 to H.P. and a corner containing that edge is on the H.P. Draw its projections.	7 M	CO3	L3
(b)	Draw the projections of a square prism side of base 35mm and axis 70 mm long is resting on the ground on its base.	7 M	CO3	L3
	(OR)			
6.	Draw the projections of a right circular cone of base 40 mm diameter and axis 60mm long resting on H.P on a point on its base circle with the axis making an angle of 30^0 with H.P.	14 M	CO3	L3
7.	A hexagonal pyramid side of base 25 mm and axis 55 mm long rests with its base on H.P. such that one of the edges of its base is perpendicular to V.P. It is cut by a section plane perpendicular to H.P. inclined at 45^0 to V.P. and passing through the pyramid at a distance of 10 mm from the axis. Draw the top view, sectional front view and true shape of the section.	14 M	CO4	L3
	(OR)			
8(a)	Draw the development of the lateral surface of the cylinder with base diameter 30 mm and height 50mm.	7 M	CO4	L3
(b)	Draw the development of the lateral surface of a square pyramid side of base 25mm and height 50 mm resting with its base on H.P. and an edge of the base parallel to V.P.	7 M	CO4	L3
9.	Convert the isometric view of the picture shown in figure in to the orthogonal projections. Draw the front view and top view of the object. 	14 M	CO5	L3
	(OR)			
10.	The orthographic projections of the object is shown in figure below. Draw the isometric view of the object. 	14 M	CO5	L3

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02 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

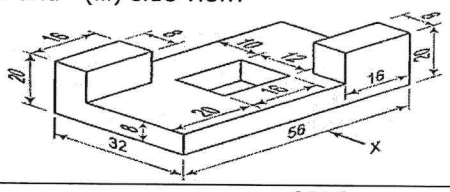
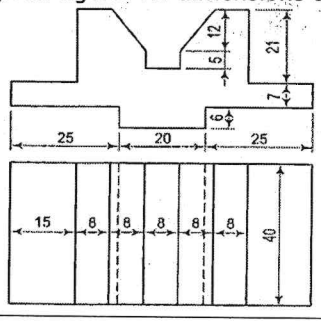
B.Tech. (II Semester) Regular/Supplementary Examinations

23ME01-ENGINEERING GRAPHICS

(AI&DS and CSE(AI&ML))

Time : 3 hours

Max. Marks : 70

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Construct an ellipse when the distance of the focus from the directrix is equal to 50mm and eccentricity is 2/3.	7 M	CO1	L2
(b)	Draw the projections of the following points (i) A is 15 mm above HP and 25 mm in behind VP (ii) B is 12 mm below HP and 23 mm behind VP (iii) C is on the HP and 15 mm in front of VP (iv) D is on the VP and 15 mm above HP.	7 M	CO1	L2
	(OR)			
2.	Draw a hypocycloid of a circle of 50 mm diameter which rolls inside another circle of 175mm diameter for one complete revolution. Draw a tangent and normal to the curve at a point 50mm from the centre of the directing circle.	14 M	CO1	L2
3(a)	A 90 mm long line is parallel to and 25 mm in front of V.P. It's one end is in the H.P., while the other end is 50 mm above H.P. Draw its projections and find its inclination with the H.P.	7 M	CO2	L3
(b)	A 70 mm long line is parallel to and 40 mm above H.P. Its two ends are 25 mm and 50 mm in front of V.P. respectively. Draw its projections and find the inclination with the V.P.	7 M	CO2	L3
	(OR)			
4(a)	Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 45^0 to the HP.	7 M	CO2	L3
(b)	A square ABCD of 40 mm side has a corner on the H.P and 20 mm in front of the V.P. All the sides of the square are equally inclined to the H.P and parallel to the V.P. Draw its projections.	7 M	CO2	L3
5(a)	Draw the projections of a cylinder of base 40 mm diameter and axis 50 mm long resting on H.P on its base.	7 M	CO3	L3
(b)	A square pyramid, base 40 mm side and axis 65 mm long, has its base in the V.P. One edge of the base is inclined at 30^0 to the H.P and a corner contained by that edge is on the H.P. Draw its projections.	7 M	CO3	L3
	(OR)			
6.	A pentagonal prism, base 25mm side and axis 50mm long is resting on one of its base edges in the H.P. The axis of the solid makes 45^0 with H.P and parallel to V.P. Draw its projections.	14 M	CO3	L3
7.	A square prism, base 40 mm side, axis 80 mm long, has its base on the ground and its faces equally inclined to the V.P. It is cut by a plane perpendicular to the V.P. inclined at 60^0 to the H.P. and passing through a point on the axis 55 mm above the ground. Draw its front view, sectional top view and true shape of the section.	14 M	CO4	L3
	(OR)			
8.	A hexagonal prism edge of base 20 mm and axis 50 mm long rests with its base on H.P. such that one of its rectangular faces is parallel to V.P. It is cut by a plane perpendicular to V.P. and inclined at 45^0 to H.P. and passing through the right corner of the top face of the prism. Draw the sectional top view and develop the lateral surface of the truncated prism.	14 M	CO4	L3
9.	Draw the following views of the object given in figure below. All dimensions are in mm. (i) Front view (ii) Top view and (iii) side view. 	14 M	CO5	L3
	(OR)			
10.	Draw the isometric view of the given figure. All dimensions are in mm. 	14 M	CO5	L3

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

Proof 2/7/26

23FE06-ENGINEERING CHEMISTRY

(ASE, CE & ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Differentiate between temporary hardness and permanent hardness of water with one example each.	2 M	CO1	L1
(b)	What is dissolved oxygen (DO)? Why is its estimation important in water quality analysis?	2 M	CO1	L1
(c)	State the Nernst equation and define each term involved in it.	2 M	CO2	L1
(d)	What is Pilling-Bedworth rule? Give its significance.	2 M	CO2	L1
(e)	What is addition and condensation polymerisation?	2 M	CO3	L1
(f)	Define calorific value of a fuel. Mention its unit.	2 M	CO3	L1
(g)	Define viscosity index. What is its significance in lubricating oils?	2 M	CO4	L1
(h)	State any two properties of refractory materials required for high-temperature applications.	2 M	CO4	L1
(i)	Define a colloid. Mention any two characteristics of colloidal particles.	2 M	CO5	L1
(j)	List any two stabilizing agents used for nanomaterials and mention their role.	2 M	CO5	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	Define potable water. Discuss four essential requirements that water must satisfy before it can be considered safe for domestic consumption.	5 M	CO1	L2
(b)	How does carry over occur in boilers? Suggest prevention methods.	5 M	CO1	L2
	(OR)			
3.	Explain ion exchange method in detail with a neat diagram.	10 M	CO1	L2
4.	Explain the mechanism involved in the rusting of iron by the wet theory of corrosion.	10 M	CO2	L2
	(OR)			
5(a)	Explain the construction and working principle of a lithium-ion battery. Discuss the electrode reactions during charging and discharging.	5 M	CO2	L2
(b)	Compare the zinc-air battery and nickel-cadmium (Ni-Cd) battery with respect to construction, working principle, electrode reactions, advantages, and applications.	5 M	CO2	L2
6(a)	Compare the thermoplastic and thermosetting plastics.	5 M	CO3	L2
(b)	Write the prepartion and properties of Buna S.	5 M	CO3	L2
	(OR)			
7(a)	Explain the proximate analysis of coal and discuss the significance of any two constituents.	5 M	CO3	L2
(b)	Compare propane, methanol, ethanol and biodiesel as alternative fuels with respect to source, advantages, limitations and environmental impact.	5 M	CO3	L2
8(a)	Explain fiber and structural reinforced composites.	5 M	CO4	L2
(b)	Discuss flash point and cloud point with significance.	5 M	CO4	L2
	(OR)			
9.	Explain the mechanism of setting and Hardening of cement.	10 M	CO4	L2
10(a)	Explain applications of colloids and nanomaterials.	5 M	CO5	L2
(b)	Explain the preparation of colloids.	5 M	CO5	L2
	(OR)			
11(a)	Explain the Freundlich adsorption isotherm curve.	5 M	CO5	L2
(b)	Explain the importance of the BET equation.	5 M	CO5	L2

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02 JUL 2026

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

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

Proof 21/7/26

23FE02-CHEMISTRY

(ECE & EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Difference between atomic orbital and molecular orbital.	2M	CO1	L1
(b)	Define linear combination of atomic orbital.	2M	CO1	L1
(c)	Write the Applications of CNTs?	2M	CO2	L1
(d)	Draw the structure of Fullerenes.	2M	CO2	L1
(e)	Define Electrochemical cell.	2M	CO3	L1
(f)	What is Fuel cell? Give an example.	2M	CO3	L1
(g)	What do mean by chain growth polymerization? Give an example.	2M	CO4	L1
(h)	Define Bio-Degradable polymers? Give two examples.	2M	CO4	L1
(i)	Express the principal involved in UV-Visible spectroscopy?	2M	CO5	L1
(j)	Write the basic principle and classification of Chromatography.	2M	CO5	L1

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Write Schrodinger wave equation in cartision co-ordinates and explain terms and significance of the ψ and ψ2.	5M	CO1	L2
(b)	Discuss briefly the M.O.T. and Draw the molecular orbital diagram of CO molecule.	5M	CO1	L2
	(OR)			
3(a)	State and explain Heisenberg Uncertainty principle.	5M	CO1	L2
(b)	Discuss about the π-molecular orbitals of butadiene with a neat diagram.	5M	CO1	L2
4.	What are super capacitors? Explain basic concept and Applications of super capacitors.	10M	CO2	L2
	(OR)			
5(a)	Explain briefly about properties and applications graphene.	5M	CO2	L2
(b)	Discuss about the types of the semi-conductor in brief.	5M	CO2	L2
6(a)	Discuss about the Polymer Electrolyte Membrane Fuel cells.	5M	CO3	L2
(b)	Explain Conductometric titrations. (i) Strong acid Vs Srong Base. (ii) Weak Acid Vs Strong Base.	5M	CO3	L2
	(OR)			
7(a)	Define Potentiometry. Explain the Redox Potentiometric Titrations.	5M	CO3	L2
(b)	What is an electrochemical sensor? Discuss about the amperometric sensors with example.	5M	CO3	L2
8(a)	Preparation properties and applications of Bakelite.	5M	CO4	L2
(b)	Discus the Bio-Degradable Polymer Poly Glycolic Acid(PGA) and Poly Lactic Acid(PLA).	5M	CO4	L2
	(OR)			
9.	Explain Co-polymerization and coordination polymerization with an example.	10M	CO4	L2
10(a)	Write the Beer-Lambert's Law and explain the absorbance.	5M	CO5	L2
(b)	Discuss briefly about the types of electronic transitions.	5M	CO5	L2
	(OR)			
11.	Give important principle, instrumentation and applications of HPLC chromatography.	10M	CO5	L2

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02 JUL 2026

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

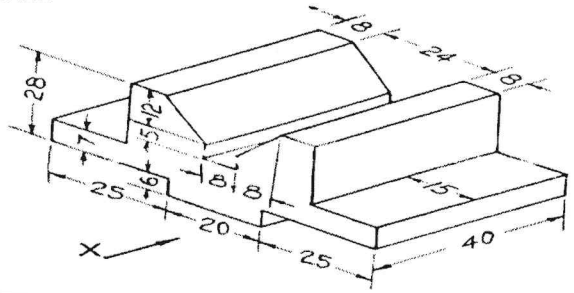
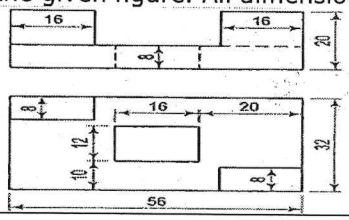
B.Tech. (II Semester) Regular/Supplementary Examinations

23ME01-ENGINEERING GRAPHICS

(IT)

Time : 3 hours

Max. Marks : 70

Q.No	All questions carry equal marks	Marks	CO	BL
1.	Construct an ellipse when the distance of the focus from the directrix is equal to 50mm and eccentricity is 2/3. Draw tangent and normal at a point 40 mm from the directrix.	14 M	CO1	L2
	(OR)			
2(a)	Draw an involute of a circle of 35 mm diameter. Draw also a normal and tangent to it at a point 75 mm away from the centre of the circle.	7 M	CO1	L2
(b)	Draw the projections of the following points (i) P is 25 mm above HP and 35 mm in front of VP (ii) Q is 30 mm below HP and 45mm behind VP (iii) R is 15 mm below HP and 15 mm in front of VP (iv) S is on both HP and VP	7 M	CO1	L2
3(a)	Draw the projections of 75mm straight line in the following positions. (i) Parallel to both H.P. and V.P. and 25 mm from each (ii) Parallel to and 30 mm above H.P and in the V.P.	7 M	CO2	L3
(b)	A 75 mm long line PQ is inclined at an angle of 30^0 to the H.P. The end P is 20 mm above the H.P. and on the V.P. The end Q is 60 mm in front of the V.P. Draw the projections of the line .	7 M	CO2	L3
	(OR)			
4(a)	A square ABCD of 40 mm side has a corner on the H.P and 20 mm in front of the V.P. All the sides of the square are equally inclined to the H.P and parallel to the V.P. Draw its projections.	7 M	CO2	L3
(b)	A hexagonal plate of side 35mm rests on the H.P and one its side is perpendicular to V.P . Draw its projections when its surfaces is inclined at 50^0 to HP.	7 M	CO2	L3
5(a)	Draw the projections of a triangular prism base 40 mm side and axis 50 mm long resting on one of its bases on H.P. with vertical face perpendicular to the V.P.	7 M	CO3	L3
(b)	Draw the projections of a cone of base 40 mm diameter and axis 50 mm long resting on H.P on its base.	7 M	CO3	L3
	(OR)			
6.	Draw the projections of hexagonal prism of base 25 mm side and axis 60 mm long when it is resting on one of its corners of the base on H.P. The axis of the solid is inclined at 45^0 to the H.P.	14 M	CO3	L3
7.	A hexagonal pyramid side of base 30 mm and axis 60 mm long, rests with its base on H.P. and one of the edges of its base is parallel to V.P. It is cut by a horizontal section plane at a distance of 38 mm above the base. Draw the front view and sectional top view.	14 M	CO4	L3
	(OR)			
8.	A cone of base 50 mm diameter and height 65 mm rests with its base on H.P. A section plane perpendicular to V.P. and inclined at 30^0 to H.P. bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone.	14 M	CO4	L3
9.	Draw the front view, top view & side view of the object shown in figure. All dimensions are in mm. 	14 M	CO5	L3
	(OR)			
10.	Draw the isometric view of the given figure. All dimensions are in mm. 	14 M	CO5	L4

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04 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

23FE05-DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All)

Boscof 4/7/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Find the integrating factor for $\frac{dy}{dx}-\frac{2}{x}y=x^3$	2 M	CO1	L1
(b)	Write the solution of law of natural decay.	2 M	CO1	L1
(c)	Find the complementary function of $\frac{d^4y}{dx^4}-y=0$	2 M	CO2	L2
(d)	Evaluate $\frac{1}{D-1}x^2$	2 M	CO2	L2
(e)	Form the Partial differential equation by eliminating a and b from $z=ax^2+by^2$	2 M	CO3	L1
(f)	Solve $(D^2+3DD^1+2D'^2)z=0$	2 M	CO3	L2
(g)	If $\bar{r}=x\bar{i}+y\bar{j}+z\bar{k}$ then find $Curl\ \bar{r}$	2 M	CO4	L2
(h)	Find the value of k if $\bar{f}=(2kx+y)\bar{i}+(3x-2y)\bar{j}+(x+z)\bar{k}$ is solenoidal.	2 M	CO4	L2
(i)	Define Line integral.	2 M	CO5	L1
(j)	Find unit normal vector to the surface $f=x^2+y^2+z^2$ at the point $(1,2,1)$.	2 M	CO5	L1

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Solve $(x^2-4xy-2y^2)dx+(y^2-4xy-2x^2)dy=0$.	5 M	CO1	L3
(b)	If the temperature of the air is 30^0_C and the substance cools from 80^0_C to 60^0_C in 12 minutes, find the temperature of the body after 24 minutes.	5 M	CO1	L3
	(OR)			
3(a)	Solve $ylogydx+(x-logy)dy=0$.	5 M	CO1	L3
(b)	Bacteria in a certain culture increase at a rate proportional to the number present. If the number N increases from 1000 to 2000 in one hour, how many are present at the end of 1.5 hours.	5 M	CO1	L3
4(a)	Solve $\frac{d^3y}{dx^3}+y=e^{-x}$	5 M	CO2	L3
(b)	Using method of variation of parameters, solve $(D^2+4)y=sec2x$.	5 M	CO2	L3
	(OR)			
5(a)	Solve $(D^3-6D^2+11D-6)y=cos2x$.	5M	CO2	L3
(b)	Solve the simultaneous equations $\frac{dx}{dt}+2y+sint=0$, $\frac{dy}{dt}-2x-cost=0$.	5M	CO2	L3
6(a)	Solve $xp-yq=y^2-x^2$	5M	CO3	L3
(b)	Form the Partial differential equation by eliminating arbitrary functions from $z=y^2+2f\left(\frac{1}{x}+\log y\right)$	5M	CO3	L3
	(OR)			
7(a)	Solve $(D^2+4DD'-5D'^2)z=\sin(2x+3y)$	5M	CO3	L3
(b)	Solve $x(y-z)p+y(z-x)q=z(x-y)$	5M	CO3	L3
8(a)	Find the directional derivative of $\phi=x^2yz+4xz^2$ at the point $(1,-2,1)$ in the direction of the vector $2\bar{i}-\bar{j}-2\bar{k}$	5 M	CO4	L3
(b)	Prove that $\nabla^2(r^n)=n(n+1)r^{n-2}$	5 M	CO4	L3
	(OR)			
9(a)	Evaluate $div\bar{f}$ and $curl\bar{f}$ at the point $(1,2,3)$ given $\bar{f}=3x^2\bar{i}+5xy^2\bar{j}+5xyz^3\bar{k}$	5 M	CO4	L3
(b)	If the given function $\bar{A}=(2x+3y+az)\bar{i}+(bx+2y+3z)\bar{j}+(2x+cy+3z)\bar{k}$ is irrotational find the constants a, b, c. Also find ϕ such that $\bar{A}=\nabla\phi$	5 M	CO4	L3
10.	Verify Green's theorem for $\int(x^2-xy^3)dx+(y^2-2xy)dy$ where C is a square with vertices $(0,0),(2,0),(2,2)\ \&\ (0,2)$.	10M	CO5	L3
	(OR)			
11.	Verify Gauss divergence theorem for $\bar{f}=(x^2-yz)\bar{i}+(y^2-xz)\bar{j}+(z^2-xy)\bar{k}$ taken over the rectangular parallelepiped $x=y=z=0$ to $x=y=z=a$	10M	CO5	L3

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R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

23FE04-ENGINEERING PHYSICS

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

Time : 3 hours Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List the necessary conditions for sustained interference.	2M	CO1	L1
(b)	Define double refraction and give an example of a double-refracting crystal.	2M	CO1	L1
(c)	Define space lattice and Basis.	2M	CO2	L1
(d)	Why X-rays are preferred for studying crystal structures.	2M	CO2	L1
(e)	State the relation between electric displacement vector (D), electric field intensity (E) and polarization (P).	2M	CO3	L1
(f)	Define magnetization and magnetic field intensity.	2M	CO3	L1
(g)	State Heisenberg's uncertainty principle.	2M	CO4	L1
(h)	Give the possible probable values of the Fermi–Dirac distribution function at T=ok and T≠ 0k.	2M	CO4	L1
(i)	What are the majority and minority charge carriers in P-type and N-type semiconductors.	2M	CO5	L1
(j)	Classify the solids based on energy band diagrams.	2M	CO5	L1

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Illustrate the experimental arrangement of Newton's rings and find the expression for the diameter of dark rings.	7M	CO1	L3
(b)	In Newton's rings experiment the diameter of the 10^{th} dark ring is 4.2 mm and that of the 5^{th} dark ring is 2.9 mm. If the radius of curvature of the lens is 1 m, calculate the wavelength of light used.	3M	CO1	L3
	(OR)			
3(a)	Differentiate between Fresnel and Fraunhofer diffraction based on their experimental arrangements and diffraction patterns.	5M	CO1	L2
(b)	Apply Brewster's law to prove that the reflected and refracted rays are perpendicular to each other at the Brewster angle.	5M	CO1	L3
4 (a)	Calculate packing fractions for SC and FCC crystal structures.	7M	CO2	L3
(b)	Define nearest neighboring distance, coordination number and lattice parameters.	3M	CO2	L1
	(OR)			
5(a)	Illustrate Laue's method with a neat diagram and explain its working.	5M	CO2	L3
(b)	X-rays of wavelength 1.54 Å are diffracted by crystal planes spaced 2.0 Å apart. Calculate the Bragg angle for the first-order diffraction.	5M	CO2	L3
6(a)	Find an expression for Lorentz internal electric field inside a dielectric material.	7M	CO3	L2
(b)	Describe ionic polarization and state the expression for ionic polarizability.	3M	CO3	L2
	(OR)			
7(a)	Explain the origin of magnetic moment and derive the expression for Bohr magneton.	5M	CO3	L2
(b)	Describe the hysteresis loop of a ferromagnetic material.	5M	CO3	L2
8	Derive Schrödinger's time independent wave equation for a free particle.	10M	CO4	L2
	(OR)			
9(a)	Summarize the merits and demerits of quantum free electron theory.	5M	CO4	L2
(b)	Describe the concept of electrical conductivity based on quantum free electron theory.	5M	CO4	L2
10(a)	Describe the electrical conductivity of intrinsic semiconductors.	5M	CO5	L2
(b)	Locate the position of the Fermi level in an intrinsic semiconductor and explain its importance.	5M	CO5	L2
	(OR)			
11	Explain the variation of the Fermi level with temperature and carrier concentration in a p-type semiconductor.	10M	CO5	L2

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

23CS01-INTRODUCTION TO PROGRAMMING

(ASE,CE,ECE,EEE&ME)

6/7/26

Time : 3 hours Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Differentiate between variable and constant.	2 M	CO2	L1
(b)	Define CPU.	2 M	CO1	L1
(c)	List out all types of loops available in C.	2 M	CO2	L1
(d)	What is the purpose of `break` statement?	2 M	CO4	L1
(e)	What is the index of the first element in an array?	2 M	CO2	L1
(f)	Can we create a string without arrays? Justify your answer.	2 M	CO2	L1

(g)	int *p=10;
	printf("%d",*p);
	printf("%u",p); Write the output of this snippet?
		2 M	CO4	L1

(h)	What is a structure in C?	2 M	CO2	L1
(i)	Differentiate call-by-value and call-by-reference.	2 M	CO2	L1
(j)	What is the use of fopen() function?	2 M	CO2	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	Define an Algorithm. Explain its characteristics.	5 M	CO3	L2
(b)	Explain `scanf()` and `printf()` format specifiers for: `int`, `float`, `char`, `string`.	5 M	CO2	L2
	(OR)			
3(a)	Draw a flowchart to check whether a given number even or odd.	5 M	CO3	L3
(b)	Write a program to check someone is eligible to vote or not using Conditional operator.	5 M	CO4	L3
4(a)	Write a program to generate natural numbers.	5 M	CO4	L3
(b)	Design an algorithm to find out the roots of a quadratic equation.	5 M	CO3	L2
	(OR)			
5(a)	Write a C program that takes from user an arithmetic operator ('+', '-', '*', '/', '%') and two operands. Perform corresponding arithmetic operation on the operands using switch-case statement.	5 M	CO4	L3
(b)	Design a flowchart to verify number is palindrome or not.	5 M	CO3	L3
6(a)	Write a C program to find out smallest and largest element in the array.	5 M	CO4	L3
(b)	Explain the following string handling functions. (i) strcpy() (ii) strupr().	5 M	CO2	L2
	(OR)			
7(a)	Define string and compare it with an array.	5 M	CO2	L2
(b)	Write a program to display the transpose of the given matrix.	5 M	CO4	L3
8(a)	Explain the process of creating a structure and initializing its data members.	5 M	CO2	L2
(b)	Create a structure called "account" with data members like accno, name and balance by imposing a condition i.e., balance >= 500.	5 M	CO5	L3
	(OR)			
9(a)	How is memory allocated for structure and union? Explain it with an example.	5 M	CO5	L3
(b)	Write a program to read elements of an array and display them using pointer.	5 M	CO4	L3
10(a)	Define Function Prototype. Give an example for the function which takes arguments and return a value.	5 M	CO2	L3
(b)	Write a program to find the GCD of two numbers using recursion.	5 M	CO4	L3
	(OR)			
11(a)	Explain any 4 file handling functions of C language.	5 M	CO2	L2
(b)	Write a C program to copy the content one file by creating another file.	5 M	CO4	L3

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

Bcool 8/7/26

23EE01-BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(AI&DS,ASE,CE,CSE,CSE(AI&ML),IT and ME)

Time : 3 hours Max. Marks : 70

Part - A

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State Superposition theorem.	1 M	CO1	L1
(b)	Define time period of an AC waveform.	1 M	CO1	L1
(c)	State Fleming's left hand rule.	1 M	CO2	L1
(d)	List the types of MI instruments.	1 M	CO2	L1
(e)	What is meant by an electric shock?	1 M	CO3	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	State Ohm's law and list its applications.	5 M	CO1	L2
(b)	Derive the voltage-current relations for R, L and C elements.	5 M	CO1	L3
	(OR)			
3(a)	Discuss the behaviour of AC circuit with R load.	5 M	CO1	L2
(b)	Determine the following parameters of a voltage v = 200 sin314t. (i) Frequency (ii) Form factor (iii) Crest factor.	5 M	CO1	L3
4.	Illustrate the operation of PMMC instrument with neat diagram.	10 M	CO2	L2
	(OR)			
5(a)	Describe the principle of operation of DC Generator.	5 M	CO2	L2
(b)	List the applications of AC machines.	5 M	CO2	L2
6.	Draw the layout of nuclear power generation and discuss its working by showing each part of the plant.	10 M	CO3	L2
	(OR)			
7(a)	Calculate the electricity bill amount for a month of 30 days, if the following devices are used: (i) 4 bulbs of 40 watts for 5 hours (ii) 2 tube lights of 50 watts for 10hours (iii) 1 fridge of 300 watts for 24 hours The rate of electrical energy per unit is Rs. 6.	5 M	CO3	L3
(b)	Discuss the working principle of Fuse with neat diagram.	5 M	CO3	L2

Part - B

Q.No	Compulsory Question	Marks	CO	BL
8(a)	What is forward bias condition?	1 M	CO4	L1
(b)	What are the terminals of BJT?	1 M	CO4	L1
(c)	Draw the output waveform of full wave rectifier.	1 M	CO5	L1
(d)	Convert $(2311)_{16} = (\ ?\ )_{10}$	1 M	CO6	L1
(e)	What is XS-3 code?	1 M	CO6	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
9(a)	Describe the V-I characteristics of Zener diode.	5 M	CO4	L2
(b)	Discuss the elementary treatment of small signal CE amplifier.	5 M	CO4	L2
	(OR)			
10(a)	Illustrate the formation of CE & CC configurations.	5 M	CO4	L2
(b)	Elaborate the characteristics of CB configuration.	5 M	CO4	L2
11.	Illustrate the working of public address system with neat block diagram.	10 M	CO5	L2
	(OR)			
12(a)	Describe the operation of full wave rectifier with capacitor filter.	5 M	CO5	L2
(b)	Discuss the operation of common emitter RC coupled amplifier.	5 M	CO5	L2
13(a)	Convert (i) $(1011)_2 = (\ ?\ )_{10}$ (ii) $(27)_{10} = (\ ?\ )_2$	5 M	CO6	L2
(b)	Elaborate the operation of EX-OR and EX-NOR gates.	5 M	CO6	L2
	(OR)			
14(a)	Develop the logic circuit of AND & OR gates using NOR gates.	5 M	CO6	L2
(b)	Illustrate the working of clocked T flip flop using NAND gates.	5 M	CO6	L2

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

23CM01-BASIC CIVIL & MECHANICAL ENGINEERING

(ECE & EEE)

Time : 3 hours

Max. Marks : 70

PART-A

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State the role of Geo-Technical Engineer.	1 M	CO1	L1
(b)	Define true bearing.	1 M	CO2	L1
(c)	List the different types of rail gauges.	1 M	CO4	L1
(d)	What are the permissible limits of pH and Chlorides in drinking water as per BIS?	1 M	CO5	L1
(e)	Define back bearing.	1 M	CO2	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	Describe the following building materials: (i) Bricks (ii) Aggregates.	5 M	CO3	L2
(b)	Explain the elements of building.	5 M	CO1	L2
	(OR)			
3(a)	Explain the scope of the following branches of Civil Engineering; (i) Water resources Engineering (ii) Transportation Engineering	5 M	CO1	L2
(b)	List the different types of aggregates and explain the properties of a good aggregate.	5 M	CO3	L2
4.	The following readings are successively taken with a level 1.255, 3.255, 1.355, 0.625, 1.755, 1.895, 2.35, 1.780, 2.755, 1.055, 1.230 and 3.155. The instrument is shifted after the 5th and 9th readings. Prepare a level book and calculate all reduced levels of different points. The RL of the 1st point is 100.00 m. Use HI and rise and fall method.	10 M	CO2	L3
	(OR)			
5(a)	Differentiate plane surveying and geodetic surveying.	5 M	CO2	L2
(b)	Convert the following from whole circle bearing to reduced bearing: 155° 45′, 220° 15′, 42° 0′, 305° 5′, 200° 10′.	5 M	CO2	L3
6(a)	What is harbor? Explain the classification of harbors.	5 M	CO5	L2
(b)	Discuss the advantages and disadvantages of road transportation.	5 M	CO4	L2
	(OR)			
7(a)	Explain the components of an airport.	5 M	CO4	L2
(b)	Differentiate between flexible pavement and rigid pavement.	5 M	CO4	L2

PART-B

Q.No	All questions carry equal marks	Marks	CO	BL
8(a)	Mention any two applications of ceramics.	1 M	CO1	L1
(b)	Define composite material.	1 M	CO2	L1
(c)	What is the cycle for SI engine?	1 M	CO2	L1
(d)	State any one limitation of belt drives.	1 M	CO3	L1
(e)	Write any two joints used in robots.	1 M	CO4	L1
Q.No	**Compulsory Question**	**Marks**	**CO**	**BL**
9(a)	Explain the importance of mechanical engineers in the industrial sector.	5 M	CO1	L1
(b)	Define non-ferrous metals and list the advantages and properties of copper.	5 M	CO1	L1
	(OR)			
10(a)	Discuss the role of mechanical engineering in the manufacturing sector.	5 M	CO1	L2
(b)	Classify various types of smart materials with their applications.	5 M	CO1	L2
11(a)	Explain the steps involved in the casting process with a flowchart.	5 M	CO2	L2
(b)	Elucidate the 3D Printing process in detail.	5 M	CO2	L2
	(OR)			
12(a)	With a neat sketch discuss the refrigeration system.	5 M	CO2	L2
(b)	Explicate the main components of an electric vehicle with a neat diagram.	5 M	CO2	L2
13.	Illustrate the working principle of Hydro-electric power plant with sketch and also mention its advantages and disadvantages.	10 M	CO3	L2
	(OR)			
14(a)	Classify gears drives and explain any two gears with suitable diagrams.	5 M	CO3	L2
(b)	Discuss the applications of robotics in various sectors.	5 M	CO4	L2

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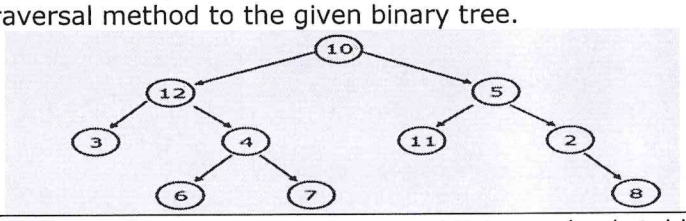
Revised 10/7/26

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

23CS02-DATA STRUCTURES

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

Time : 3 hours Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Data Structure.	2 M	CO1	L1
(b)	What is space complexity?	2 M	CO1	L1
(c)	Define Linked List.	2 M	CO2	L1
(d)	What are the applications of linked lists?	2 M	CO2	L1
(e)	What is the role of stack in function calls?	2 M	CO3	L1
(f)	What is the advantage of stack using linked list?	2 M	CO3	L1
(g)	What is queue underflow?	2 M	CO4	L1
(h)	What is output restricted deque?	2 M	CO4	L1
(i)	Define root node, leaf node and internal node in a tree.	2 M	CO5	L1
(j)	Mention applications of hashing.	2 M	CO5	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	Explain Binary Search algorithm. Perform binary search for key 45 in the sorted array {10, 20, 30, 40, 45, 50, 60}.	5 M	CO1	L3
(b)	What is linear data structure? List various types and explain the algorithm for implementation of any one.	5 M	CO1	L2
	(OR)			
3(a)	Explain insertion sort algorithm. Perform insertion sort on the given elements 70, 20, 25, 50, 45, 35, 10.	5 M	CO1	L2
(b)	Write a program to perform linear search on the given list of elements.	5 M	CO1	L3
4.	Define the structure of a Double Linked List. Explain its operations with neat diagrams.	10 M	CO2	L2
	(OR)			
5(a)	Explain deletion operations in a Singly Linked List with pseudocode.	5 M	CO2	L3
(b)	Compare arrays and linked lists with respect to memory allocation and operations.	5 M	CO2	L3
6(a)	Define Stack and explain its basic properties and operations.	5 M	CO3	L2
(b)	Evaluate the given postfix expression using stack : 82/3-42*+5+73*-	5 M	CO3	
	(OR)			
7(a)	Write an algorithms for push and pop operations of stacks using linked list.	5 M	CO3	L2
(b)	Explain applications of stacks.	5 M	CO3	L2
8(a)	Define Queue and explain its properties and operations.	5 M	CO4	L2
(b)	Differentiate between input restricted deque and output restricted deque.	5 M	CO4	L3
	(OR)			
9(a)	Explain queue overflow and underflow conditions.	5 M	CO4	L2
(b)	Discuss insertion and deletion operations in circular queues with algorithms.	5 M	CO4	L2
10(a)	Write C functions to perform following operations on Binary Search Tree (i) Inserting a node into Binary Search Tree (ii) Search the given element in a Binary Search Tree	5 M	CO5	L3
(b)	Insert the following keys into a hash table of size **10** using **Linear Probing**: **15, 25, 35, 45, 55, 65, 75, 85**	5 M	CO5	L3
	(OR)			
11(a)	Discuss the various binary tree traversal techniques with suitable algorithms. Apply each traversal method to the given binary tree. 	5 M	CO5	L4
(b)	Insert the keys **15, 25, 35, 45, 55, 65, 75, 85** into a hash table of size **10** using Double Hashing. Assume: h1(k)=kmod10 h2(k)=7−(kmod7).	5 M	CO5	L3

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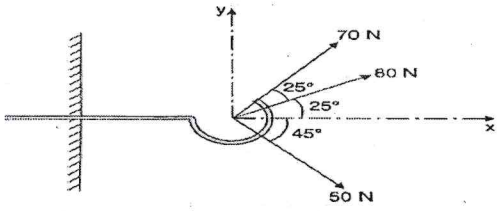
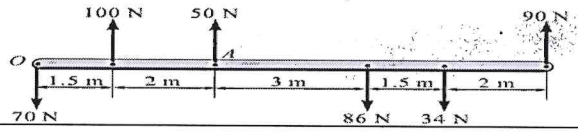
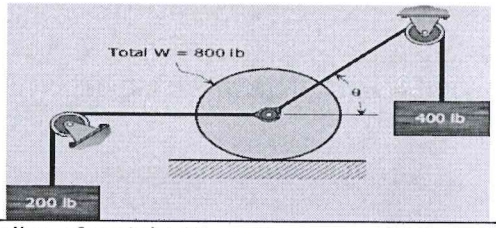
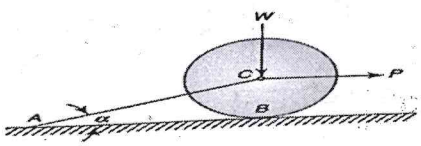
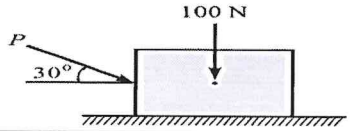
B.Tech. (II Semester) Regular/Supplementary Examinations

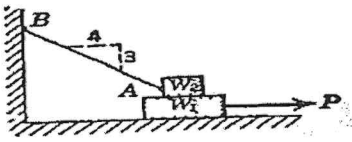
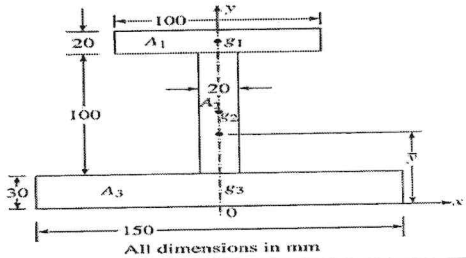
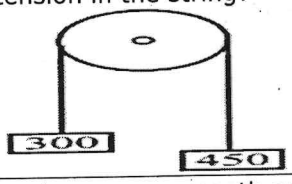
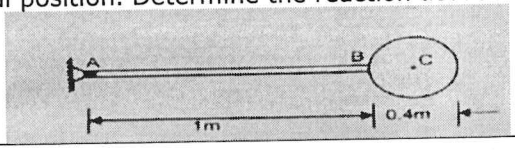
23ME02-ENGINEERING MECHANICS

(ASE,CE & ME)

Time : 3 hours Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define the term "force". Mention its characteristics.	2 M	CO1	L1
(b)	Define Varignon's theorem.	2 M	CO1	L1
(c)	Explain the concept of "Free Body Diagram" with an example.	2 M	CO2	L2
(d)	Describe the term "Coefficient of friction" with a sketch.	2 M	CO2	L2
(e)	Differentiate between "centroid" and "centre of gravity".	2 M	CO3	L2
(f)	Define term "Mass moment of Inertia" with a sketch.	2 M	CO3	L1
(g)	Write kinematic equations of motion for linear motion under uniform acceleration.	2 M	CO4	L1
(h)	When a particle is projected vertically upward from the ground with initial velocity of u m/s. Then (i) What is time for upward motion? (ii) What is maximum height reached?	2 M	CO4	L1
(i)	State D'Alembert's principle.	2 M	CO5	L1
(j)	Find the force needed to produce a torque of 30 N-m,if the lever arm is 3 m.	2 M	CO5	L2

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Find the magnitude of two forces such that if they act at right angles, their resultant is $\sqrt{10}$ N, but if they act at 60^0, their resultant is $\sqrt{13}$ N.	5 M	CO1	L3
(b)	Determine the resultant of three forces acting on a hook as shown in figure. 	5 M	CO1	L3
	(OR)			
3.	Evaluate the resultant of the following force system and also find the equivalent force and couple at point A of the same force system shown. 	10 M	CO1	L3
4(a)	By assuming the system shown in figure is in equilibrium condition, determine the angle θ. 	5 M	CO2	L3
(b)	A right circular roller of weight W rests on a smooth horizontal plane and is held in position by an inclined bar AC, as shown in Figure. Find the tension S in the bar AC and the vertical reaction R_b at B if there is also a horizontal force P acting at C. 	5M	CO2	L3
	(OR)			
5(a)	Determine the frictional force developed on the block shown in figure, when $P = 40N$ and also find the load P when the block is about to move. 	5M	CO2	L3

(b)	A block of weight W_1=890N rests on a horizontal surface and supports on top of it another block of weight W_2=222.5 N. The block W_2 is attached to a vertical wall by the inclined string AB. Find the magnitude of horizontal force P, applied to the lower block as shown, that will be necessarily to cause slipping to impend. The coefficient of static friction for all contiguous surfaces is 0.3. 	5M	CO2	L3
6(a)	Locate the centroid of unsymmetrical I section shown 	5M	CO3	L3
(b)	Determine the moment of Inertia of a rectangle of base 'b' and height 'h' about the (i) centroidal axis (ii) base.	5M	CO3	L3
	(OR)			
7.	Calculate the mass moment of inertia of circular plate of radius 'R', thickness 't' and mass 'M' about its centroidal axes.	10M	CO3	L3
8(a)	A car starts from rest and with constant acceleration achieves a velocity of 15 m/s when it travels a distance of 200 m. Determine the acceleration of the car and the time required.	5 M	CO4	L3
(b)	Derive the equations of motion of rotation under constant acceleration (α), when a particle rotates by an angular displacement (θ), initial velocity (ω_0) and final velocity (ω) after t seconds.	5 M	CO4	L3
	(OR)			
9(a)	A motorist is travelling at 90 kmph, when he observes traffic light 250 m ahead of him turns red. The traffic light is timed to stay red for 12 seconds. If the motorist wishes to pass without stopping just as it turns green, determine (i) the required uniform deceleration of the motor (ii) the speed of motor as it passes the traffic light.	5 M	CO4	L3
(b)	The motion of a particle moving in a straight line is given by the expression $s=t^3-3t^2+2t+5$ where s is displacement in metres and t is the time in seconds. Determine (i) displacement, velocity and acceleration after 4 seconds (ii) time at which velocity is zero.	5M	CO4	L3
10(a)	Two bodies weighing 300N and 450N are hung to the two ends of a rope passing over an ideal pulley as shown in figure. With what acceleration will the heavier body come down? What is the tension in the string? 	5M	CO5	L3
(b)	A body of mass 10kg is moving over a smooth surface, whose equation of motion is given by the relation s = 5t + $2t^2$ where (s) is in metres and (t) in seconds. Find the magnitude of force responsible for the motion.	5M	CO5	L3
	(OR)			
11.	A Cylinder weighing 500N is welded to 1m long uniform bar of 200N as shown in fig. Evaluate the acceleration with which the assembly will rotate about A, if released from rest in horizontal position. Determine the reaction at A at this instant. 	10M	CO5	L3

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10 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

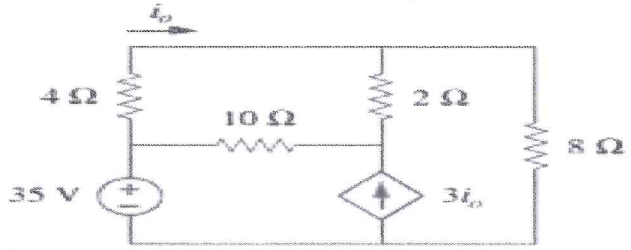
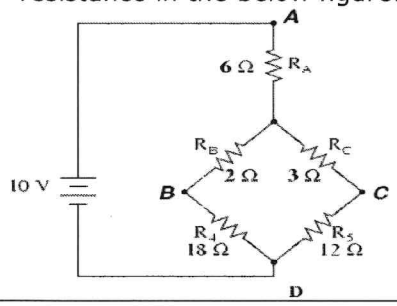
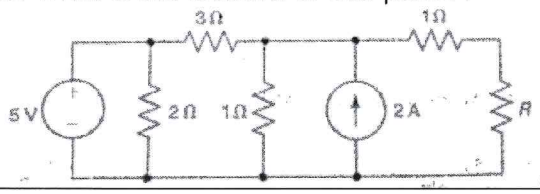
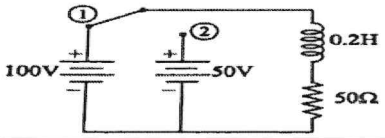
23EC01-NETWORK ANALYSIS

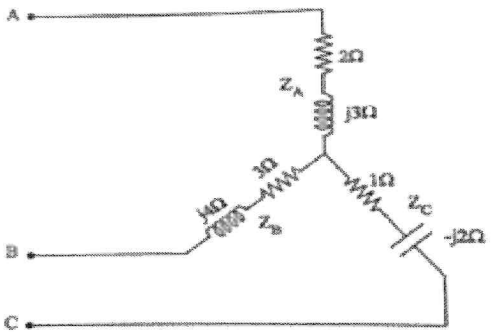
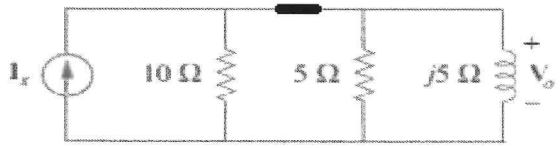
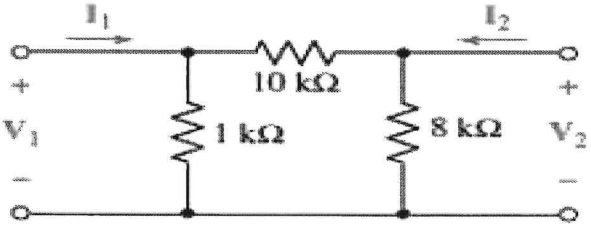
(ECE)

Received 10/7/26

Time : 3 hours | Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define source transformation.	2 M	CO1	L1
(b)	Write the drawbacks of superposition theorem.	2 M	CO1	L1
(c)	Define transient response.	2 M	CO2	L2
(d)	Recall Properties of Laplace Transformation theorem .	2 M	CO2	L2
(e)	What are the advantages of Nodal Analysis?	2 M	CO3	L1
(f)	A series RLC circuit consists of 50ohm resistance, 0.2H inductance and 10 micro F capacitance with the applied voltage of 20V. Determine the impedance, Assume the frequency is 50 Hz.	2 M	CO3	L2
(g)	Define the Quality factor of RLC Series Circuit.	2 M	CO4	L1
(h)	State the Self and Mutual inductance of coupled circuit.	2 M	CO5	L1
(i)	Define the Symmetry and Reciprocity of Two Port network.	2 M	CO6	L1
(j)	Write the applications of Lattice network.	2 M	CO6	L2

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Use mesh analysis to find current io in figure. 	5 M	CO1	L3
(b)	Find voltage across 12Ω resistance in the below figure. 	5 M	CO1	L3
	(OR)			
3(a)	Show that the under the condition of maximum power transfer the efficiency of the circuit is 50%.	5 M	CO2	L3
(b)	Find the value of R in the circuit shown in figure such that maximum power transfer takes place. What is the amount of this power? 	5 M	CO2	L3
4.	In the series circuit shown in figure the switch is closed on position 1 at t = 0. At t = 1 ms, the switch is moved the position 2. Obtain the equations for the current in both intervals and draw the transient current waves. 	10 M	CO2	L4
	(OR)			

5(a)	Determine the DC response of RL and RC circuit and sketch the voltage transients.	5M	CO2	L3
(b)	For an RC series circuit, a sinusoidal voltageV(t) = Vm sin(ωt)) is applied at t=0. Find the expression for transient current using Laplace transform approach.	5M	CO2	L3
6(a)	A 200 V, 50 Hz AC supply is applied to a coil of 0.08 H inductance and 3.5 resistance connected in series with a 7.2 micro F capacitor. Calculate Impedance and current.	5M	CO3	L3
(b)	A series combination of R and C is in parallel with a 25 ohms resistor. A 50 Hz source results in a total current of 6.5 A, a current of 5 A through 25 ohms resistance and a current of 2.3 A in the R-C branch. (i) Draw the phasor diagram of the circuit and find values of R and C.	5M	CO3	L3
	(OR)			
7(a)	Obtain the delta connected equivalent for the star connected circuit shown in figure. 	5M	CO3	L3
(b)	If Vo= 8∠30 V in the circuit, find Is. 	5M	CO3	L3
8(a)	What is Resonance? Derive the expression for resonance frequency in a series RLC circuit.	5M	CO4	L4
(b)	Derive the expression for bandwidth of series resonating circuit and its relation with Q.	5M	CO4	L4
	(OR)			
9(a)	Two similar coils connected in series gave a total inductance of 600 mH and when one of the coil is reversed, the total inductance is 300 mH. Determine the mutual inductance between the coils and coefficient of coupling.	5M	CO5	L3
(b)	Explain the concept of mutual inductance with necessary equations.	5M	CO5	L2
10(a)	Explain the cascading of two 2-port networks and derive the transmission parameters matrix.	5M	CO6	L2
(b)	Find the complete set of Y – parameters. 	5M	CO6	L4
	(OR)			
11(a)	Explain about the parameters used for series connected 2-port network.	5M	CO6	L2
(b)	A two port network has the following parameters: Z11=6 Ω, Z12=Z21=3 Ω and Z22=4 Ω. Calculate hybrid parameters.	5M	CO6	L3

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10 JUL 2026

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

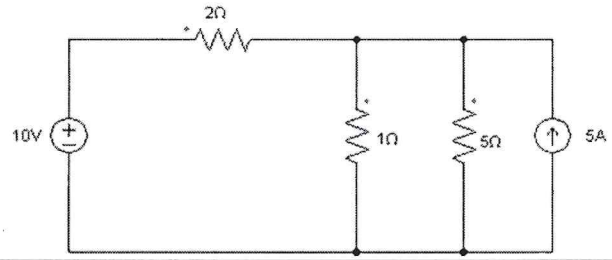
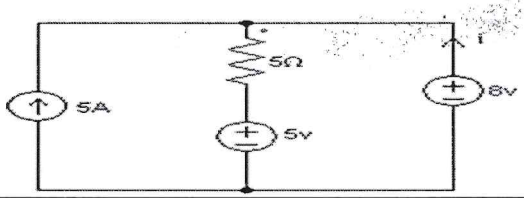
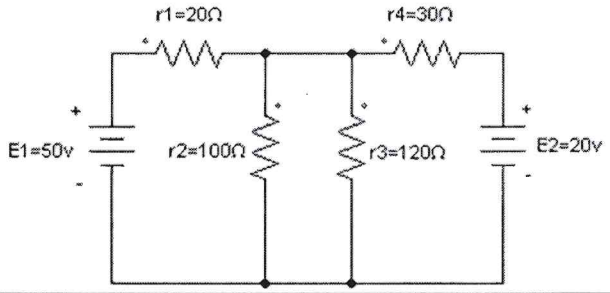
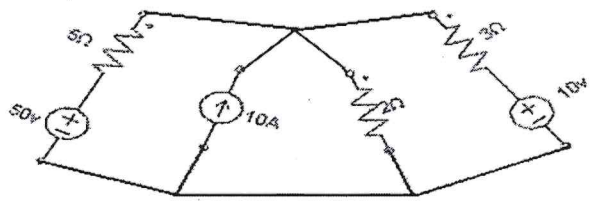
Received 10/7/26

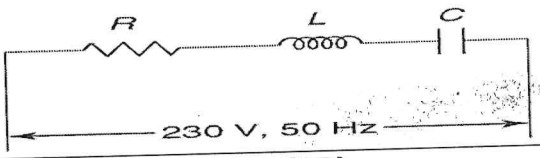
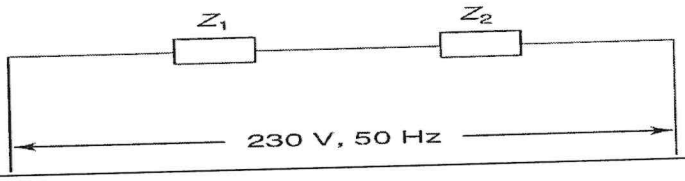
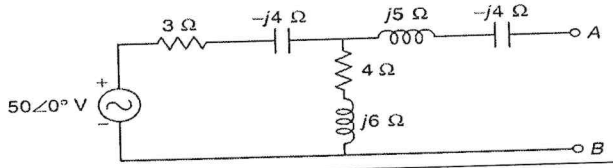
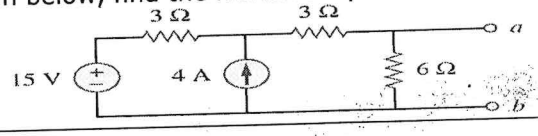
B.Tech. (II Semester) Regular/Supplementary Examinations

23EE02-ELECTRICAL CIRCUIT ANALYSIS-I

(EEE)

Time : 3 hours | Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are active elements? Give examples.	2 M	CO1	L2
(b)	What are dependent voltage sources? Draw the equivalent circuit.	2 M	CO1	L2
(c)	What does Complex Power mean?	2 M	CO2	L2
(d)	Define Coefficient of Coupling.	2 M	CO2	L1
(e)	State superposition theorem and its limitations.	2 M	CO3	L1
(f)	Draw the locus diagram of series RC circuit with R as variable parameter.	2 M	CO3	L1
(g)	A series RLC circuit has the following parameters: R = 10 Ω, L = 0.01 H, C = 100 mF. Compute the resonant frequency.	2 M	CO4	L2
(h)	A magnetic pole face has a rectangular section having dimensions 200 mm by 100 mm. If the total flux emerging from the pole is 150 μWb, calculate the flux density.	2 M	CO4	L2
(i)	State Thevenin's theorem & draw its equivalent circuit.	2 M	CO5	L1
(j)	State Maximum Power Transfer theorem& draw its equivalent circuit.	2 M	CO5	L1
Q.No	**All questions carry equal marks**	**Marks**	**CO**	**BL**
2(a)	Using KCL find the current through 1Ω and 5Ω resistors in figure below? 	5 M	CO1	L3
(b)	Find the current i in the below figure? 	5 M	CO1	L3
	(OR)			
3(a)	Using nodal method, find the current through r2? 	5 M	CO1	L3
(b)	Using mesh analysis, find the current flowing through 50 V source in the network shown below? 	5 M	CO1	L3

4.	Two inductors are connected in parallel. Their equivalent inductance when the mutual inductance aids the self-inductance is 6 mH and it is 2mH when the mutual inductance opposes the self-inductance. If the ratio of the self-inductances is 1:3 and the mutual inductance between the coils is 4 mH, find the self-inductances.	10 M	CO2	L3
	(OR)			
5(a)	Define magnetic flux density & magnetic field strength and also derive the relationship between them.	5 M	CO2	L2
(b)	A closed magnetic circuit of cast steel contains a 6 cm long path of cross-sectional area 1 cm^2 and a 2 cm path of cross-sectional area 0.5cm^2. A coil of 200 turns is wound around the 6 cm length of the circuit and a current of 0.4 A flows. Determine the flux density in the 2cm path, if the relative permeability of the cast steel is 750.	5 M	CO2	L3
6(a)	Illustrate the significance of power factor.	5 M	CO3	L2
(b)	A resistor of 20 Ω, inductor of 0.05 H and a capacitor of 50 mF are connected in series as shown below. A supply voltage 230 V, 50 Hz is connected across the series combination. Calculate the following: (i) impedance, (ii) current drawn by the circuit, (iii) phase difference and power factor, and (iv) active and reactive power consumed by the circuit. 	5 M	CO3	L3
	(OR)			
7(a)	Derive the expression for Average value for a sinusoidal signal of maximum value V_m.	5 M	CO3	L3
(b)	Two impedances $Z_1 = 40\angle 30°$ Ω and $Z_2 = 30\angle 60°$ Ω are connected in series across a single-phase 230 V, 50 Hz supply as shown below. Calculate the (i) current drawn, (ii) pf and (iii) power consumed by the circuit. 	5 M	CO2	L3
8(a)	Derive the expression for resonant frequency for parallel RLC circuit.	5 M	CO4	L2
(b)	Examine & plot the locus of current for series R-C circuit with varying R	5 M	CO4	L2
	(OR)			
9.	A resistor and a capacitor are connected in series with a variable inductor. When the circuit is connected to a 230 V, 50 Hz supply, the maximum current obtained by varying the inductance is 2 A. The voltage across the capacitor is 500 V. Calculate the resistance, inductance and capacitance of the circuit.	10 M	CO4	L3
10(a)	State and examine the steps involved in analyzing a network using Superposition Theorem.	5 M	CO5	L2
(b)	Obtain Thevenin's equivalent network for the terminals A and B for the network shown below. 	5 M	CO5	L2
	(OR)			
11(a)	Explain steps involved in determining the Millman's equivalent circuit.	5 M	CO5	L2
(b)	For the network shown below, find the Norton's equivalent circuit. 	5 M	CO5	L3

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