Q.P. Code: 2021302 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Probability, statistics & Numerical Methods (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Out of 800 families with 4 children each, how many families would be expected to have (i) 2 boys and 2 girls (ii) at least 1 boy (iii) at most 2 girls. Assume equal probabilities for boys and girls.	6M	CO1	L2
	(b)	If X is a Poisson variate such that $P(X=0)=P(X=1)$, find $P(X=0)$ and using recurrence formula determine the probabilities at $x=1,2,3,4$ and 5.	6M	CO1	L5
		(OR)			
2.		Construct a normal distribution to the following frequency distribution and hence find the theoretical frequencies.	12M	CO1	L3

x	2	4	6	8	10	Total
f	1	4	6	4	1	16

		UNIT – II							
3.	(a)	The mean life time of a sample of 100 fluorescent light tubes produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the tubes produced by the company is 1600 hours. Using the LOS of 0.05, is the claim acceptable?	6M	CO2	L5
	(b)	In a sample of 1000 people in Andhra Pradesh, 540 are rice eaters and the rest are wheat eaters. Can we judge that both rice and wheat are equally popular in this state at 1% LOS?	6M	CO2	L5
		(OR)			
4.	(a)	The average marks scored by 32 boys are 72 with a standard deviation of 8, while that for 36 girls is 70 with a standard deviation of 6. Test at 1% LOS whether the boys perform better than girls.	6M	CO2	L4
	(b)	In a large city A, 20% of a random sample of 900 school boys had a slight physical defect. In another large city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant?	6M	CO2	L4
		UNIT – III			
5.	(a)	A sample of 26 bulbs used a mean life of 990 hours with a standard deviation of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard?	6M	CO3	L4
	(b)	Two independent samples of 8 and 7 items respectively had the following values of the variable:	6M	CO3	L4

Sample 1	9	11	13	11	15	9	12	14
Sample 2	10	12	10	14	9	8	10	

Do the two estimates of population variance differ significantly at 5% LOS?

(OR)

6.		A total number of 3759 individuals were interviewed in a public opinion survey on a political proposal. Of them, 1872 were men and the rest women. A total of 2257 individuals were in favour of the proposal and 917 were opposed to it. A total of 243 men were undecided and 442 women were opposed to the proposal. Do you justify or contradict the hypothesis that there is no association between sex and attitude?	12M	CO3	L5

UNIT – IV

7.	(a)	Find a root of the equation $x^3 - 2x - 5 = 0$ using bisection method corrected to four decimal places.	6M	CO4	L1
	(b)	Identify the real root of the equation $3x = \cos x + 1$ by Newton's method.	6M	CO4	L3

(OR)

8.		Solve the system of equations $20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$ by Jacobi's iteration method.	12M	CO4	L3

UNIT-V

9.		The following table gives the specific heat of ethyl alcohol of different temperatures. Estimate the specific heat corresponding to 15℃ and 45℃.	12M	CO5	L5

Temperature(x°C)	0	10	20	30	40	50
Specific heat (y)	0.51	0.55	0.57	0.59	0.62	0.67

(OR)

10.		A curve passes through the points $(0,18),(1,10),(3,-18)$ and $(6,90)$. Determine the curve $y = f(x)$ by using Lagrange's interpolation formula.	12M	CO5	L5

Q.P. Code: 2001302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Geology & Building Materials (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Explain any two folds and faults with neat sketches?	6M	CO1	L2
	(b)	Define geology and Explain the importance of geology from civil engineering with a case study?	6M	CO1	L1
		(OR)			
2.	(a)	What is meant by weathering of rocks? Explain briefly?	6M	CO1	L1
	(b)	Illustrate in brief about some common geological structure associated with the rocks?	6M	CO1	L2
		UNIT – II			
3.	(a)	Write the physical properties of limestone and sandstone?	6M	CO2	L1
	(b)	Write the physical properties of minerals galena and bauxite, ?	6M	CO2	L1
		(OR)			
4.	(a)	Write the physical properties of basalt and quartzite?	6M	CO2	L1
	(b)	Explain the importance of study of topographical features from geological maps?	6M	CO2	L2
		UNIT – III			
5.	(a)	Explain the different types of pozzolanic materials and their merits?	6M	CO3	L2
	(b)	What are the various types of timbers used in construction?	6M	CO3	L1
		(OR)			
6.	(a)	Explain the manufacturing process of bricks?	6M	CO3	L2
	(b)	What are the various methods of storing the cement?	6M	CO3	L1
		UNIT – IV			
7.	(a)	Explain in detail the various types of roofing materials?	6M	CO4	L2
	(b)	Explain about Industrial Flooring, Vaccum Dewatered Flooring	6M	CO4	L2
		(OR)			
8.	(a)	Explain about cement concrete flooring, mosaic flooring and ceramic flooring?	6M	CO4	L2
	(b)	What are the different tests on bituminous materials? Explain any one?	6M	CO4	L1
		UNIT-V			
9.	(a)	Write about fibre glass reinforced plastics and clay products used in civil engineering?	6M	CO5	L1
	(b)	Write in detail about fibre textiles and geo synthetics?	6M	CO5	L1
		(OR)			
10.	(a)	Explain about various types of polymers used in civil engineering?	6M	CO5	L2
	(b)	What are the applications of laminar composites?	6M	CO5	L1

Q.P. Code: 2001303

SET - 1

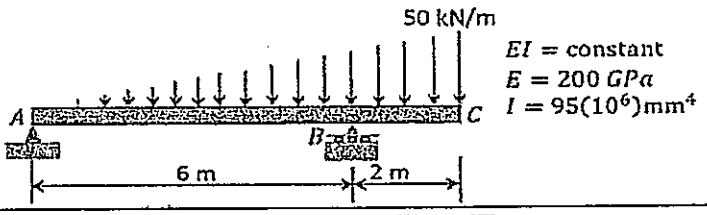
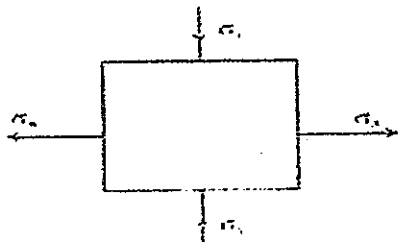
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Advanced Strength of Materials (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Define the terms: (i) Slope (ii) Deflection (iii) Radius of curvature	6M	CO1	L2
	(b)	Determine the slope and deflection for a cantilever beam of span 10m loaded with point load of intensity 10kN at the free end and UDL of intensity 6kN/m throughout the span.	6M	CO1	L3
		(OR)			
2		A beam carries a distributed load that varies from zero at support A to 50 kN/m at its overhanging end, as shown in Figure. Write the equation of the elastic curve for segment AB of the beam, determine the slope at support A, and determine the deflection at a point of the beam located 3 m from support A. 	12M	CO1	L3
		UNIT – II			
3.	(a)	(i) Differentiate between torque and torsion. (ii) Define pure torsion.	6M	CO2	L2
	(b)	Derive torsion equation considering all necessary notations.	6M	CO2	L2
		(OR)			
4.	(a)	Derive an equation for deflection of the closed coil helical spring considering the following data: W is the axial load, R is radius of the coil n is the number of turns of coil, C is the modulus of rigidity d is the diameter of the wire of the coil	6M	CO2	L2
	(b)	A metal bar of 10mm dia when subjected to a pull of 23.55KN gave and elongation of 0.3mm on a gauge length of 200mm. In a torsion test maximum shear stress of 40.71N/mm2 was measured on a bar of 50mm dia. The angle of twist measured over a length of 300mm being 0°21'. Deter poisson's.	6M	CO2	L3
		UNIT – III			
5.	(a)	The figure shows the state of stress at certain point in a stresses body. The magnitudes of normal stresses in x and y direction are 100 MPa and 20 MPa respectively. Find the radius of Mohr's stress circle representing this state of stress. 	6M	CO3	L4
	(b)	What is Mohr's circle? Discuss the significance of it.	6M	CO3	L2
		(OR)			

6.	(a)	Explain Maximum Principal Stress Theory (Rankine's theory) with necessary stress diagram.	6M	CO3	L3
	(b)	Explain the stress-strain cure for mild steel indicating all the points on the curve.	6M	CO3	L2
		UNIT – IV			
7.	(a)	A solid round bar 3 m long and 5cm in diameter is used as a strut with both the ends hinged. Determine the crippling load. Take E=2x105 N/mm2.	6M	CO4	L3
	(b)	A mild steel tube 4m long, 30 mm internal diameter and 4mm thick is used as a strut with both ends hinged. Find the collapsing load. Take E = 2.1x105N/mm2	6M	CO4	L4
		(OR)			
8.	(a)	A strut 2.5m long is 60mm in diameter. One end of the strut is fixed while its other end is hinged. Find the safe compressive load with FOS=3.5. Take E=2.1x105N/mm2	6M	CO4	L3
	(b)	A column of timber section 15cmx 20cm is 6m long both ends being fixed. E for timber is 17.5KN/mm2, Determine: (i) Crippling load (ii) Safe load for the column if factor of safety=3	6M	CO4	L3
		UNIT-V			
9.	(a)	Mention the assumptions are made in order to derive the expressions for the stresses and strains in thin cylinders.	6M	CO5	L2
	(b)	A cylindrical compressed air drum is 2 m in diameter with plates 12.5 mm thick. The efficiencies of the longitudinal and circumferential joints are 85% and 45% respectively. If the tensile stress in the plating is to be limited to 100 MN/m^2, find the maximum safe air pressure.	6M	CO5	L3
		(OR)			
10.	(a)	Derive the expressions for the radial stress and hoop stress for thick cylinders.	6M	CO5	L2
	(b)	The cylinder of a hydraulic press has an internal diameter of 0.3 m and is to be designed to withstand a pressure of 10 MN/m2 without the material being stressed over 20 MN/m2. Determine the thickness of the metal and the hoop stress on the outer side of the cylinder.	6M	CO5	L3

Q.P. Code: 2001304 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

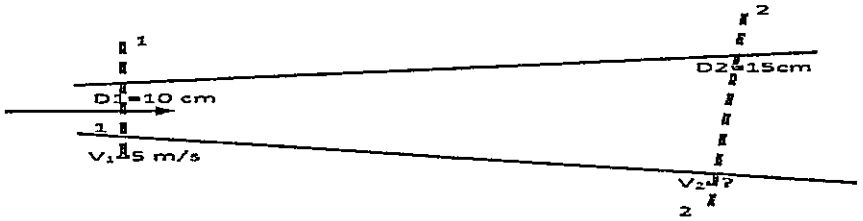
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Fluid Mechanics (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT – I			
1.	(a)	A plate 0.05 mm distance from a fixed plate moves at 1.2 m/s and requires a force of 2.2N/m^2 to maintain this speed. Estimate the viscosity of the fluid between the plates.	6M	CO1	L5
	(b)	Elaborately Explain the phenomenon of capillarity. Obtain an expression for capillary rise of a liquid?	6M	CO1	L6
		(OR)			
2.	(a)	Demonstrate the Newton 's law of viscosity. Deduce the expression for the dynamic viscosity?	6M	CO1	L2
	(b)	State Pascal's law and Derive pressure variation in liquid at rest?	6M	CO1	L2
		UNIT – II			
3.	(a)	Illustrate the Bernoulli's equation from fundamentals?	8M	CO2	L2
	(b)	The dia. of pipe at the section 1 & 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe. If the velocity of water flowing through the pipe at section 1 is 5 m/s. Determine also the velocity at the section 2.	6M	CO2	L3



		(OR)			
4.	(a)	Define the equation of continuity. Obtain the expression for continuity equation in three dimensions?	6M	CO2	L1
	(b)	The velocity vector in a fluid flow is given by $V=4x^3i-10x^2yj+2tk$. Estimate the velocity and acceleration of a fluid particle at (2, 1, 3) at time t = 1.	6M	CO2	L5
		UNIT – III			
5.	(a)	Derive the expression for discharge over a rectangular notch.	6M	CO3	L2
	(b)	An oil of specific gravity 0.85 is flowing through a venturi meter having inlet diameter 20cm and throat diameter 10cm. The oil mercury differential manometer shows a reading of 30cm. Calculate the discharge of oil through the horizontal venturi meter. Take Cd as 0.98.	6M	CO3	L4
		(OR)			
6.	(a)	Derive the expression for discharge over a triangular notch ?	6M	CO3	L3
	(b)	A rectangular notch 400 mm long is used for measuring a discharge of 0.003 m^3 /s. An error of 1.5 mm was made, while measuring the head over the notch. Calculate the percentage error in the discharge. Assume Cd = 0.6	6M	CO3	L4
		UNIT – IV			
7.	(a)	List out the minor losses in closed conduit flow and discuss their significance.	4M	CO4	L1
	(b)	The rate of flow water through a horizontal pipe of 0. 25m m^3 /s. The dia of the pipe which is 200mm is suddenly enlarged to 400mm. the pressure intensity in the smaller pipe is 11.772 N/cm^2. Determine i) Loss of head due to sudden enlargement ii) Pressure intensity in the large pipe iii) power lost due to enlargement?	8M	CO4	L5
		(OR)			
8.	(a)	What is dimensionless number? Explain different types of numbers?	4M	CO4	L2
	(b)	Derive the Darcy-Weisbach equation for frictional head loss in a pipe ?	8M	CO4	L4
		UNIT-V			
9.	(a)	Demonstrate Reynolds Experiment with a neat sketch?	10M	CO5	L3
	(b)	Define Model and Prototype?	2M	CO5	L1
		(OR)			
10.		The pressure difference Δp in a pipe of diameter D and length l due to turbulent flow depends on the velocity V, viscosity μ, density ρ, and roughness k,. Using Buckinghams π theorem, obtain an expression for Δp ?	12M	CO5	L5

Q.P. Code: 2001305 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Geomatics (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Discuss briefly the classification of surveying based on purpose and Instruments.	6M	CO1	L1
	(b)	A survey line BAC crosses a river. A and C being on the near and opposite banks respectively. A perpendicular AD 36 m long is set out A. If the bearing of AD and DC are 38^0 45' and 278^0 45' respectively and the chainage at A is 775.8m. Find the chainage at C.	6M	CO1	L5
		(OR)			
2.	(a)	Give in a tabular form, the difference between prismatic compass and surveyor's compass	6M	CO1	L2
	(b)	The following bearings were taken in running a compass traverse :	6M	CO1	L3

Line	F.B.	B.B.
AB	$124^0$30'	$304^0$30'
BC	$68^0$15'	$246^0$0'
CD	$310^0$30'	$135^0$15'
DA	$200^0$15'	$17^0$45'

At what stations do you suspect local attraction? Find the correct bearings of lines

		UNIT – II			
3.	(a)	Explain any two methods of plane table surveying.	6M	CO2	L2
	(b)	The following staff readings were observed in sequence; 1.324. 2.605, 1. 385. 0 638, 1.655, 1.085, 2.125, and 1, 555. The instrument was shifted after the third and sixth readings. The third reading was taken to an arbitrary bench-mark of elevation 220.000m. Find the reduced levels of the other points.	6M	CO2	L4
		(OR)			
4.	(a)	Explain the following terms: Height of instrument, Back sight, Foresight and Intermediate sight.	6M	CO2	L1
	(b)	Discuss the uses of contour maps with sketch.	6M	CO2	L2
		UNIT – III			
5.	(a)	List out the method used to measure the horizontal angles by using a Theodolite. Explain any one method in detail.	6M	CO3	L2
	(b)	The record of a closed traverse is given below, with two distances missing.	6M	CO3	L5

Line	Length (m)	Bearing
AB	100.5	N$30^0$30'E
BC	?	S$45^0$00'E
CD	75.0	S$40^0$30'W
DE	50.5	S$60^0$00'W
EA	?	N$40^0$15'W

Calculate the length of BC and EA.

(OR)

6. (a) Describe the conditions under which tacheometric surveying is advantageous. Explain how you would obtain in the field the constants of a tacheometer. 6M CO3 L2

(b) Following observations were taken with a tacheometre fitted with an anallatic lens having value of constant to be 100. 6M CO3 L5

Inst. station	Staff Station	R.B	Vertical angle	Staff Readings		
O	A	N 36° W	4° 15'	0.9	1.5	2.1
O	B	N 24° E	5° 45'	1.8	2.7	3.5

Calculate the horizontal distance between A and B.

UNIT – IV

7. (a) List the general methods of calculating area with one example 6M CO4 L2

(b) Find the capacity of reservoir for a given data by Prismoidal rule. 6M CO4 L3

Contour	252	254	256	258	260	262	264	266
Area (cm^2)	105	254	485	735	1055	1265	1395	1590

(OR)

8. (a) What is transition curve? What are the requirements of an ideal transition curve? 6M CO4 L1

(b) Prepare a table of Rankine's tangential angles to set out a circular curve of radius 360 m, when the straight meet at chainage 1640m and the deflection angle is 24^0. Take peg interval = 20 m. 6M CO4 L6

UNIT-V

9. (a) Explain briefly the principle of Electronic Distance Measurement. 6M CO5 L2

(b) Describe the basic features of a total station and its advantages. 6M CO5 L2

(OR)

10. (a) Discuss the applications of drone surveying. 6M CO5 L1

(b) List out the errors in total station survey and explain them. 6M CO5 L2

Q.P. Code: 2002301

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Switching Theory & Logic Design (EEE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT – I			
1.	(a)	Evaluate the value of x in each case: (i) $(26.24)_8 = (x)_{10}$ (ii) $(16.5)_{16} = (x)_{10}$ (iii) $(1011011)_2 = (x)_{16}$	6M	CO1	L5
	(b)	Perform the following subtraction in binary using 1's and 2's complement method: $(677)_{10} - (899)_{10}$	6M	CO1	L5
		(OR)			
2.	(a)	Perform the following addition using excess-3 code (i) 386 + 756 (ii) 1010 + 444	6M	CO1	L5
	(b)	What is the Hamming code? How is the Hamming code word tested and corrected, explain with an example.	6M	CO1	L3
		UNIT – II			
3.	(a)	What are universal gates? Implement all the basic gates using universal gates.	6M	CO2	L6
	(b)	Simplify the following Boolean expressions using the Boolean theorems (i) (A+B+C) (B'+C) + (A+D) (A'+C) (ii) (A+B) (A+B') (A'+B)	6M	CO2	L4
		(OR)			
4.	(a)	Simplify the following function using Karnaugh map method $F(A,B,C,D) = \Sigma m(0,1,2,3,4,6,9,10) + d(7,11,12,13,15)$	6M	CO2	L5
	(b)	Reduce the following expression using tabulation method $Y(A, B, C, D) = \Sigma m(1, 3, 5, 8, 9, 11, 15)$	6M	CO2	L3
		UNIT – III			
5.	(a)	Design a half subtractor and full subtractor using logic gates.	6M	CO3	L6
	(b)	Perform the realization of half adder and full adder using decoders and logic gates.	6M	CO3	L4
		(OR)			
6.	(a)	Design a BCD adder using 4-bit parallel binary adder and logic gates.	6M	CO3	L6
	(b)	Explain the operation priority encoder with a neat diagram.	6M	CO3	L2
		UNIT – IV			
7.	(a)	Draw the circuit diagram of a positive edge triggered JK flip-flop and explain its operation with the help of a truth table.	6M	CO4	L2
	(b)	With the aid of external logic, Convert a D flip-flop into JK flip-flop.	6M	CO4	L5
		(OR)			
8.	(a)	Explain different types of shift registers.	6M	CO4	L2
	(b)	Explain the operation of 4-bit ring counter with circuit diagram and timing diagrams.	6M	CO4	L4
		UNIT-V			
9.		Implement the following Boolean functions using PLA. $A(x, y, z) = \Sigma(0,1,2,4,6)$ $B(x, y, z) = \Sigma(0, 2, 6,7)$ $C(x, y, z) = \Sigma(3,6)$	12M	CO5	L4
		(OR)			
10.	(a)	Write explanatory notes on ROM and PROM.	6M	CO5	L2
	(b)	What is PLD? Compare the three combinational PLDs.	6M	CO5	L5

Q.P. Code: 2002302 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Electromagnetic Field Theory (EEE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	State and explain Coulomb's Law.	6M	CO1	L2
	(b)	A plane x = 4 carry a charge density 10nc/m^2 and a line x = 0 and z = 2 carry a line charge density 10nc/m. Calculate $\bar{E}$ at (1, 1, -1) due to these two charges.	6M	CO1	L2
		(OR)			
2.		What is Dipole Moment? Obtain expression for the Potential and Electric Field due to an Electric Dipole.	12M	CO1	L3
		UNIT – II			
3.	(a)	Derive Ohms Law in point form.	6M	CO2	L2
	(b)	Find the current passing through in the downward direction through the cylinder defined by $0 \le Z \le 1$, $0 \le r \le 1$, if the current density in the cylinder is $\bar{J} = 35e^{-2r}[r\bar{a}_r + \bar{a}_z]$ A/m^2.	6M	CO2	L3
		(OR)			
4.	(a)	Derive the equation for a capacitance of a parallel plate capacitor	6M	CO2	L3
	(b)	A parallel plate capacitor consists of two square metal plates with 50mm side and separated by 10mm. A slab of sulphur with permittivity of 4 of 6mm thick is placed on the lower plate with an air gap of 4mm. Find the Capacitance.	6M	CO2	L3
		UNIT – III			
5.	(a)	Determine **B** due to a straight conductor of length Lm and steady current I Amps at a distance of R m from the centre of line current.	6M	CO3	L3
	(b)	If the magnetic field intensity is $\bar{H} = x^2\overline{a_x} + 2yz\overline{a_y} + (-x^2)\overline{a_z}\ A/m$. Find the current density at point (i) 2, 3, 4 (ii) $\rho = 6, \varphi = 45^0, z = 3$ (iii) $r = 3.6, \Theta = 60^0, \varphi = 90^0$	6M	CO3	L3
		(OR)			
6.	(a)	State and explain Ampere's Circuital Law.	6M	CO3	L3
	(b)	In the region 0<r<0.5m in cylindrical coordinators, the current density is $\bar{J} = 4.5e^{-2r}\overline{a_z}$ A/m^2 and $\bar{J} = 0$ elsewhere. Use Ampere's Circuital Law to find $\bar{H}$.	6M	CO3	L3
		UNIT – IV			
7.	(a)	a) Derive Lorentz Force Equation. Obtain the expression for the force experienced by a conductor placed in magnetic fields.	6M	CO4	L2
	(b)	b) Calculate the force on a straight conductor of length 30cm carrying a current of 5A in $\overline{a_z}$ direction and the magnetic field is $\bar{B} = 3.5x10^3(\overline{a_x} - \overline{a_y})Tesla$. Where $\overline{a_x}$ *and* $\overline{a_y}$ are unit vectors	6M	CO4	L2
		(OR)			
8.	(a)	Derive the Inductance of a Solenoid and Toroid.	6M	CO4	L2
	(b)	Two coils are wound on a common circular magnetic circuit of 45cm^2 in section and having mean radius of 50cm. One coil has 180 turns and other has 750. Calculate the mutual inductance of coils, if the relative permeability of iron path is 2400. If both the coils are connected in series what would be the self-inductance of coil.	6M	CO4	L3

UNIT-V

9.	(a)	State Faraday's laws of electromagnetic induction	6M	CO5	L1
	(b)	Find the displacement current density within a Parallel Plate Capacitor where $\epsilon = 100\epsilon_o$, a = $0.01m^2$, d=0.05mm and the capacitor voltage is $100\sin 200\pi t$ volts.	6M	CO5	L2

(OR)

10.	(a)	Distinguish between conduction Current and Displacement Current. Prove that conduction current through a capacitor is also equal to its displacement current.	6M	CO5	L2
	(b)	A straight conductor of length 40cm moves perpendicular to its axis at a velocity of 50m/s in a uniform magnetic field of flux density 1.2T. Evaluate the emf induced in the conductor, if the direction of motion is 1. Normal to the field 2. Parallel to the field 3. At an angle of 60^0 to the field.	6M	CO5	L2

Q.P. Code: 2002303 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

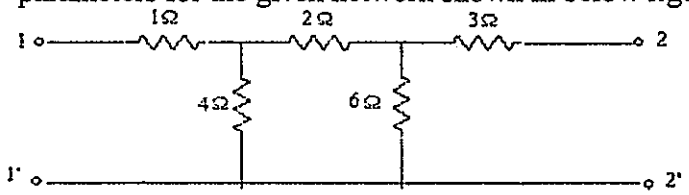
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Electrical Circuit Analysis – II (EEE)

Time: 3 Hours **Max. Marks: 60**

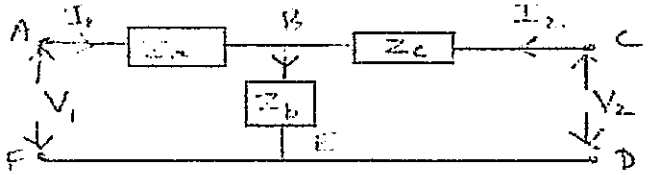
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Derive the expressions for Resonant frequency, Quality factor and Band width of series RLC circuit	6M	CO1	L5
	(b)	Explain the locus diagram of series R-C circuit and when C is variable	6M	CO1	L2
		(OR)			
2.	(a)	Derive expression for half power frequencies of a RLC series network.	6M	CO1	L5
	(b)	If for a series RLC circuit R=5Ω, L= 2H, C=3F What is Resonant frequency and Quality factor?	6M	CO1	L2
		UNIT – II			
3.	(a)	Explain about Necessary Conditions for Driving Point Functions	6M	CO2	L2
	(b)	An RC driving point function has zeros at S = -2 & s = - 5. Determine admissible poles for the functions.	6M	CO2	L5
		(OR)			
4.		Draw the pole zero diagram for the given network function and hence Determine v(t). V(s)= 4(s+2)s/(s+1)(s+3)	12M	CO2	L5
		UNIT – III			
5.	(a)	Determine the transmission line parameters when the two transmission networks having the transmission parameters A1, B1, C1, D1 and A2, B2, C2, D2 are connected in cascade.	6M	CO3	L5
	(b)	Obtain 'Y' – parameters for the given network shown in below figure.	6M	CO3	L3

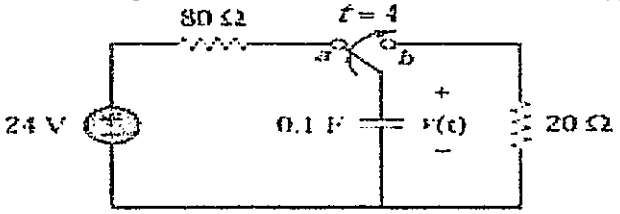


(OR)

6.	(a)	Find the Z parameters and Y parameters of the T- network shown in figure below.	6M	CO3	L2

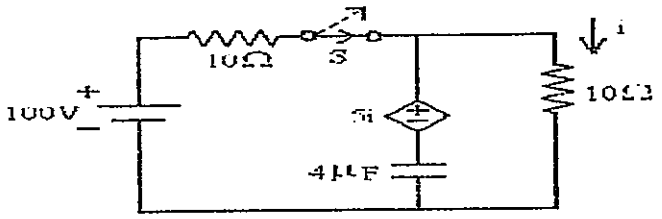


	(b)	Define driving point impedance and Explain briefly.	6M	CO3	L1
		UNIT – IV			
7.	(a)	What are the initial conditions? Why are they needed? Explain	6M	CO4	L1
	(b)	The switch in the below figure has been in position a for a long time, At t = 4 s the switch is moved to position b and left there. Determine v(t) at t = 10 s.	6M	CO4	L5



(OR)

8. For the circuit shown below Figure, Define the current equation when switch S is opened at t = 0. 12M CO4 L5



UNIT-V

9. (a) Explain about the transient response of series RLC circuit to the AC excitation for zero initial conditions. 6M CO5 L2

(b) Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω, L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions. 6M CO5 L5

(OR)

10. (a) Explain about the transient response of series RL circuit to the AC excitation for zero initial conditions. 6M CO5 L2

(b) Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. 6M CO5 L5

Q.P. Code: 2002304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Electrical Measurements & Measuring Instruments (EEE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Derive the Torque equation for moving iron instrument.	6M	CO1	L2
	(b)	Explain deflecting, control and damping torques.	6M	CO1	L1
		(OR)			
2.	(a)	Describe the principle of PMMC meters	6M	CO1	L2
	(b)	How the range of DC ammeter and DC voltmeter can be extended. Derive the expression to find the shunt resistance and multiplier resistance?	6M	CO1	L3
		UNIT – II			
3.	(a)	Explain any two errors that occur in electrodynamometer type wattmeter and its compensation	6M	CO2	L2
	(b)	Describe the construction of single phase dynamometer.	6M	CO2	L2
		(OR)			
4.	(a)	Explain the operation of single phase induction type energy meter.	6M	CO2	L2
	(b)	A 50A, 230V meter on full load test makes 61 revolutions in 37s. If the normal disc speed is 520 revolutions per kWh, find the percentage error.	6M	CO2	L3
		UNIT – III			
5.	(a)	With the help of neat sketch describe the method of measurement of earth resistance.	6M	CO3	L2
	(b)	What is Wheatstone's bridge? On what factors does its sensitivity depend? Explain.	6M	CO3	L4
		(OR)			
6.	(a)	Show how the Wien's bridge can be used for the measurement of frequency in audio range. Derive the equation for frequency f.	6M	CO3	L2
	(b)	In Hay's bridge the four arms are arranged as under: AB is a resistance of 600Ω in series with an inductor of 0.18 H, BC and DA are non-inductive resistances of 1200 Ω each and CD consists of a resistance R in series with a capacitor C. A potential difference of 3V at a frequency of 50Hz is applied between A and C. Determine the values of R and C. Derive the condition for bridge balance.	6M	CO3	L6
		UNIT – IV			
7.	(a)	Describe how high currents and voltages are measured with the help of instrument transformers. Draw diagrams to illustrate your answer.	8M	CO4	L4
	(b)	Describe the advantages of instrument transformers as regards extension of range of current and voltage on high voltage a.c. systems.	4M	CO4	L2
		(OR)			
8.	(a)	Draw the circuit diagram of Crompton's potentiometer and explain its working. Describe the steps used when measuring an unknown resistance.	6M	CO4	L4
	(b)	Power is measured with an a.c. potentiometer. The voltage across a 0.1Ω standard resistance connected in series with the load is 0.35 – j0.10V. The voltage across 300:1 potential divider connected to the supply is 0.8 + j0.15V. Determine the power consumed by the load and the power factor.	6M	CO4	L5
		UNIT-V			
9.	(a)	Explain how CRO can be used to measure frequency and phase angle	6M	CO5	L2
	(b)	Explain the major parts of CRT with a block diagram	6M	CO5	L2
		(OR)			
10.	(a)	With necessary diagrams explain Ramp type digital voltmeter	6M	CO5	L2
	(b)	With necessary diagrams explain Integrating type digital voltmeter	6M	CO5	L2

Q.P. Code: 2002305

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular/Supplementary Examinations of March 2023

SUB: DC Machines & Transformers (EEE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			Marks	CO	BL
		UNIT - I			
1.	(a)	Derive the emf equation of DC generator	6M	CO1	L3
	(b)	List the different Types of Dc generators	6M	CO1	L1
		(OR)			
2.	(a)	Explain clearly the armature reaction of DC Generator	6M	CO1	L2
	(b)	Draw and explain open circuit characteristics of DC shunt generator	6M	CO1	L3
		UNIT – II			
3.	(a)	Describe Principle of operation DC motor	6M	CO2	L2
	(b)	Write the significance of back emf in DC motor	6M	CO2	L1
		(OR)			
4.	(a)	Explain the different Speed control methods of DC shunt motor	6M	CO2	L2
	(b)	Explain the different Speed control methods of DC series motor	6M	CO2	L2
		UNIT – III			
5.	(a)	Derive the condition for maximum efficiency of a DC machine	6M	CO3	L3
	(b)	Explain different losses in a DC machine	6M	CO3	L2
		(OR)			
6.	(a)	Describe the test procedure of swinburne's test with neat circuit diagram	6M	CO3	L2
	(b)	List the merits and demerits of Swinburne's test	6M	CO3	L1
		UNIT – IV			
7.	(a)	Explain the working principle of single phase transformer	6M	CO4	L2
	(b)	A 2200/200 V transformer draws a no load primary current of 0.6 A and absorbs 400 watts. Find the magnetizing and iron loss currents.	6M	CO4	L4
		(OR)			
8.	(a)	Explain OC test of a transformer with neat circuit diagram	6M	CO4	L2
	(b)	Explain SC test of a transformer with neat circuit diagram	6M	CO4	L2
		UNIT-V			
9.	(a)	What is mean by auto transformer and compare with two winding transformer	6M	CO5	L2
	(b)	An auto transformer supplies a load of 3kw at 115v at a unity power factor. If the applied primary voltage is 230v, calculate the power transferred to the load (a)inductively(ii)conductively	6M	CO5	L4
		(OR)			
10.	(a)	Compare Y-Y and Y-Δ, three phase transformer connnctions	6M	CO5	L4
	(b)	Compare Δ-Y and Δ-Δ three phase transformer connnctions	6M	CO5	L4

Q.P. Code: 2024310

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Universal Human Values (EEE, ECE & AI ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Integrity, Trustworthiness and Respect for others are driving force to live peacefully – Discuss.	6M	CO1	L4
	(b)	Write a short note on Work Ethics-Service.	6M	CO1	L1
		(OR)			
2.	(a)	Define Empathy and how it works in personal and professional.	6M	CO1	L5
	(b)	Illustrate the aspect of Spirituality at Work place and Corporate Excellence.	6M	CO1	L2
		UNIT – II			
3.	(a)	Write a note on about the importance of respecting the professions of all people. Make a list of 10 professions for today's youth other than those in the medical and Engineering field.	6M	CO2	L6
	(b)	What is Moral dilemma? List out various situations when moral dilemmas arise.	6M	CO2	L1
		(OR)			
4.	(a)	'Personal life leads to Professional life' – Elucidate.	6M	CO2	L3
	(b)	Explain Kohlberg's theory on moral autonomy.	6M	CO2	L2
		UNIT – III			
5.	(a)	What do you mean by competence in professional ethics? Elaborate with examples.	6M	CO3	L5
	(b)	Define the safety and risk assessment and list out few factors to reduce risks.	6M	CO3	L2
		(OR)			
6.	(a)	What are the factors that influence the risk benefit analysis?	6M	CO3	L1
	(b)	How does engineering disaster occur? Explain briefly about Chernobyl case study.	6M	CO3	L4
		UNIT – IV			
7.	(a)	Natural acceptance is innate, invariant and universal. Explain this statement with an example.	6M	CO4	L2
	(b)	Mutual fulfillment in human relationships is something we want, we aspire for, Justify the statement.	6M	CO4	L4
		(OR)			
8.	(a)	What is value education? Why there is a need of value education? What are the basic guidelines for value education?	6M	CO4	L1
	(b)	Define Self exploration. What is the content of Self exploration?	6M	CO4	L3
		UNIT-V			
9.	(a)	What is meaning of Justice in human relationships? How does it follow from family to world family?	6M	CO5	L6
	(b)	Give the difference between intention and competence when you have to judge the other. Why is it important?	6M	CO5	L4
		(OR)			
10.	(a)	Bring out the differences and similarities between a human being and an animal. Give examples to support your answer.	6M	CO5	L2
	(b)	Explain in detail the harmony in nature. How can we ensure harmony in self(I)?	6M	CO5	L6

Q.P. Code: 2003301 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

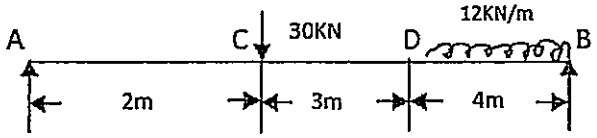
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Fundamentals of Statistics and Dynamics (ME)

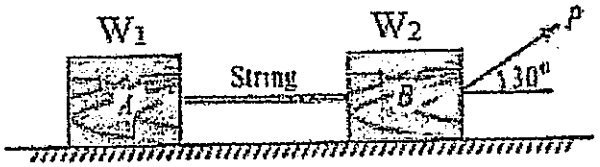
Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

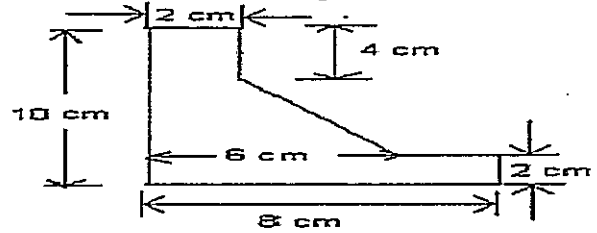
			M	CO	BL
		UNIT - I			
1.	(a)	Define the terms force, moment and couple and mention their units.	6M	CO1	L1
	(b)	Explain the concepts of resolution of force and resultant force with example.	6M	CO1	L3
		(OR)			
2.	(a)	Determine the reactions at simply supports A and B as shown in figure.	6M	CO1	L3



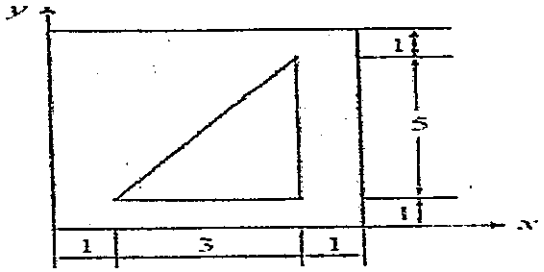
	(b)	What is beam? Classify the types of beams with diagrams.	6M	CO1	L2
		UNIT – II			
3.	(a)	Explain the term frame and classify it with suitable sketch.	6M	CO2	L2
	(b)	How to analyze the frames by using method of joints? Explain.	6M	CO2	L3
		(OR)			
4.	(a)	Describe the term friction. What are the factors influencing the friction?	6M	CO2	L2
	(b)	In the figure, the two blocks (A= 30N and B= 50N) are placed on rough horizontal plane. Coefficient of friction between the block A and the plane is 0.3 and that between B and plane is 0.2. Find the minimum value of force P to just move the system. Also find the tension in the string.	6M	CO2	L3



		UNIT – III			
5.	(a)	Discuss the procedure to find the location of centroid of composite plane area.	6M	CO3	L2
	(b)	Find the centroid of the area shown in figure.	6M	CO3	L3



		(OR)			
6.	(a)	Locate the centroid of the given figure about X and Y axes. All dimensions are in m.	6M	CO3	L3



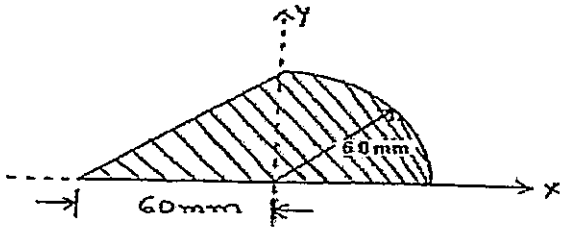
	(b)	Determine the centroid of a triangle of base 'b' and height 'h' about its base.	6M	CO3	L3

UNIT – IV

7.	(a)	State and prove the parallel axis theorem on moment of inertia for a plane area.	6M	CO4	L2
	(b)	Find the moment of inertia of a triangle with base 'b' and height 'h' about its base.	6M	CO4	L3

(OR)

8.		Find the moment of inertia of shaded area shown in figure about its centroidal axis parallel to X-axis.	12M	CO4	L3



UNIT-V

9.	(a)	Discuss the terms distance, displacement, Velocity and acceleration with their units.	6M	CO5	L2
	(b)	Explain the equations of motion of a particle in straight line with uniform acceleration.	6M	CO5	L3

(OR)

10.	(a)	Express the torsion formula and define the each term in formula.	6M	CO5	L3
	(b)	What is spring? Classify the springs with applications.	6M	CO5	L2

Q.P. Code: 2003302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Fluid Mechanics & Hydraulic Machinery (ME)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	What is the difference between the dynamic viscosity and kinematic viscosity? State their units of measurements.	6M	CO1	L2
	(b)	Define viscosity. A plate having an area of 0.7 m^2 is sliding down the inclined plane at 450 to the horizontal with a velocity of 0.45 m/s. there is a cushion of fluid 2 mm thick between the plane and the plate. Find the viscosity of the fluid if the weight of the plate is 300N.	6M	CO1	L5
		(OR)			
2.		An inverted differential manometer containing an oil of specific gravity 0.9 is connected to find the difference of pressures at two points of a pipe containing water. If the manometer reading is 40 cm, find the difference of pressures.	12M	CO1	L5
		UNIT – II			
3.		Define the equation of continuity. Obtain an expression for continuity equation for one dimensional flow.	12M	CO2	L4
		(OR)			
4.		Derive Bernoulli's equation through Euler's equation of motion.	12M	CO2	L
		UNIT – III			
5.		Determine the rate of flow of water through a pipe of diameter 20 cm and length of 50 m when one end of pipe is connected to a tank and other end of pipe is open to the atmosphere. The pipe is horizontal and height of water in the tank is 4 m above the center of the pipe. Consider all minor losses and take f= 0.009.	12M	CO3	L5
		(OR)			
6.		Derive an expression for Darcy Weisbach equation.	12M	CO3	L4
		UNIT – IV			
7.	(a)	Explain in detail laminar boundary layer, turbulent boundary layer, laminar sub-layer.	6M	CO4	L2
	(b)	Derive an expression for minor losses due to sudden contraction.	6M	CO4	L4
		(OR)			
8.		Find the displacement thickness, energy thickness and momentum thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at distance y from the plate and u=U at y= δ, where δ= boundary layer thickness. Also calculate the value of δ^*/Θ.	12M	CO4	L5
		UNIT-V			
9.		A Pelton wheel has a mean bucket speed of 10 meters per second with a jet of water flowing at the rate of 700 litres/s under a head of 30 meters. The buckets deflect the jet through an angle of 160^0 . Calculate the power given by water to the runner and hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98.	12M	CO5	L5
		(OR)			
10.	(a)	Explain the working principles of reciprocating pump with a neat sketch.	6M	CO5	L2
	(b)	Define the terms 'unit power', 'unit speed' and 'unit discharge' with reference to a hydraulic turbine. Also derive expressions for these terms.	6M	CO5	L1

Q.P. Code: 2003303 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Manufacturing Processes (ME)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Define pattern and briefly explain any six types of patterns with a neat sketch.	6M	CO1	L2
	(b)	Write the advantages and disadvantages of casting in detail.	6M	CO1	L2
		(OR)			
2.	(a)	With a neat sketch explain clay content test.	6M	CO1	L2
	(b)	Explain the concept of Allowances. Write different types of allowances.	6M	CO1	L2
		UNIT – II			
3.	(a)	Describe the CO_2–gas molding process in detail using suitable sketches and state its advantages, disadvantages and applications.	6M	CO2	L3
	(b)	Name the various defects which occur in sand castings and state their probable causes and remedies.	6M	CO2	L2
		(OR)			
4.		Explain in detail the working of a cupola furnace with a neat sketch, stating different zones?	12 M	CO2	L2
		UNIT – III			
5.	(a)	Explain "oxy-acetylene gas welding" with a neat sketch indicating different flames?	6M	CO3	L2
	(b)	With a neat sketch, explain the working principle of Thermit welding process.	6M	CO3	L2
		(OR)			
6.	(a)	Explain plasma arc welding with applications.	6M	CO3	L2
	(b)	Explain the two solid state welding's i) Explosive welding ii) Friction welding	6M	CO3	L2
		UNIT – IV			
7.	(a)	Differentiate between hot working and cold working.	6M	CO4	L2
	(b)	What do you understand by mechanical working of metals? Define re-crystalline temperature.	6M	CO4	L3
		(OR)			
8.	(a)	Describe briefly with neat sketches all the process of extrusions.	6M	CO4	L2
	(b)	Explain any four forging defects with a neat sketch.	6M	CO4	L2
		UNIT-V			
9.	(a)	With the aid of a sketch, briefly describe the process of spinning. Why is it called a flow turning process?	6M	CO5	L3
	(b)	With a neat sketch explain the following. i) Bending ii)Embossing iii)coining	6M	CO5	L2
		(OR)			
10.	(a)	List out some Important defects prevalent in sheet metal formed parts.	6M	CO5	L2
	(b)	Explain with a neat sketch wire drawing operation.	6M	CO5	L2

Q.P. Code: 2003304 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Engineering Thermodynamics (ME)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Write short notes on quasi-static process and its characteristic features.	6M	CO1	L1
	(b)	A new scale N of temperature is divided in such a way that the freezing point of ice is 100 ° N and the boiling point is 400 ° N. What is the temperature reading on this new scale when the temperature is 150° C? At what temperature both the Celcius and the new temperature scale reading would be the same?	6M	CO1	L3
		(OR)			
2.	(a)	Show that heat is a path function and not a property.	6M	CO1	L2
	(b)	A gas expands from an initial state with p1 = 350 kPa and V_1 = 0.045 m^3 to a final state where p_2 = 140 kPa. If the pressure-volume relationship during the process is pV^2 = constant. Calculate the work in kJ.	6M	CO1	L4
		UNIT – II			
3.	(a)	What is PMM1? Why is it impossible?	4M	CO2	L2
	(b)	A mass of 6.8 kg gas expands within a flexible container so that the p-v relationship is of the form $pv^{1.2}$ = constant. The initial pressure is 1210 kPa and the initial volume is 1.2 m^3. The final pressure is 52 kPa. If specific internal energy of the gas decreases by 44 kJ/kg, calculate the heat transfer in magnitude and direction.	8M	CO2	L4
		(OR)			
4.	(a)	Derive an expression for work output from a turbine using SFEE.	4M	CO2	L3
	(b)	Steam flows through a horizontal nozzle @ 0.3 kg/s entering with a velocity of 30 m/s and at an enthalpy of 2800 kJ/kg. It leaves the nozzle with an enthalpy of 2600 kJ/kg. Neglecting heat loss from the nozzle determine its exit velocity. Also find its exit specific volume if the area of the nozzle at its outlet is 16 cm^2	8M	CO2	L4
		UNIT – III			
5.	(a)	Explain Kelvin-Planck statement of second law of thermodynamics.	6M	CO3	L2
	(b)	A heat engine receives half of its heat supply at 1200 K and half at 540 K while rejecting heat to a sink at 310 K. Calculate the maximum thermal efficiency of the heat engine.	6M	CO3	L4
		(OR)			
6.		A heat pump working on the Carnot cycle takes in heat from a reservoir at 5^0 C and delivers heat to a reservoir at 60^0 C. The heat pump is driven by a reversible heat engine which takes in heat from a reservoir at 840^0 C and rejects heat to a reservoir at 60^0 C. The reversible heat engine also drives a machine that absorbs 30 kW. If the heat pump extracts 17 kJ/s from the 5^0C reservoir, determine: **(i)** The rate of heat supply from the 840^0 C source. **(ii)** The rate of heat rejection to the 60^0 C sink	12M	CO3	L4
		UNIT – IV			
7.	(a)	State and prove Clausius' theorem.	6M	CO4	L3
	(b)	Two kg of water at 85^0C is mixed adiabatically with 3.25 kg of water at 35^0C in a constant pressure process of 1 atmosphere. Calculate the increase in the entropy of the total mass of water due to the mixing process. Consider Cp of water as 4.187 kJ/kgK	6M	CO4	L4
		(OR)			

8.	(a)	What is meant by availability?	4M	CO4	L2
	(b)	Derive the expressions for availabilities of a close system and a steady flow open system	8M	CO4	L3

UNIT-V

9.	(a)	Draw phase equilibrium diagram for a pure substance on h-s plot with relevant constant property lines.	6M	CO5	L2
	(b)	10 kg of water at 50° C is heat heated at a constant pressure of 11 bar until it becomes superheated vapour at 250° C. Calculate the change in enthalpy, internal energy and entropy.	6M	CO5	L4

(OR)

10.	(a)	What is degree of saturation? What are its limiting values?	4M	CO5	L2
	(b)	Calculate the amount of heat removed per kg of dry air if the initial condition of air is 35^{0} C, 75% RH and the final condition is 25^{0} C, 60% RH	8M	CO5	L4

Q.P. Code: 2003305

SET - 1

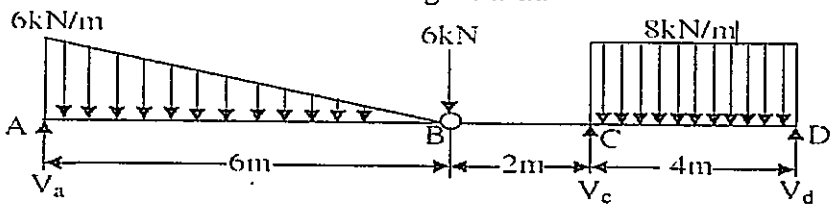
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Mechanics of Materials (ME)

Time: 3 Hours | Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	State Hooke's law and write its expression	6M	CO1	L2
	(b)	A piece of material is subjected to three mutually perpendicular tensile stresses and the strains in the three directions are in the ratio 3:4:5. If the value of Poisson's ratio is 0.2857, find the ratio of the stresses and their values when the greatest stress is $90N/mm^2$	6M	CO1	L3
		(OR)			
2.		A compound bar consists of a central steel strip 25 mm wide and 6.4 mm thick placed between two strips of brass each 25 mm wide and x mm thick. The strips are firmly fixed together to form a compound bar of rectangular section 25 mm wide and (2x + 6.4) mm thick. Determine: i) The thickness of the brass strips which will make the apparent modulus of elasticity of compound bar 157 GN/m2. ii) The maximum axial pull the bar can then carry if the stress is not to exceed 157 MN/m2, in either the brass or the steel. Take Es= 207 GN/m2 and Eb= 114 GN/m2.	12M	CO1	L3
		UNIT – II			
3.	(a)	Define Shear force and Bending moment	4M	CO2	L1
	(b)	A cantilever of length 3m carries a gradually varying load, zero at the free end to 1kN/m at the fixed end. Draw the S.F.D and B.M.D for the cantilever.	8M	CO2	L3
		(OR)			
4.		Analyze the beam ABCD shown in figure. Draw the shear force and bending moment diagram, also calculate the maximum bending moment. 	12M	CO2	L3
		UNIT – III			
5.		Write the assumptions for theory of simple bending and derive the bending equation	12M	CO3	L2
		(OR)			
6.		Derive an expression for section modulus of rectangular and circular sections	12M	CO3	L3
		UNIT – IV			
7.		A cantilever AB of 2 m long is carrying a load of 20 KN at a free end and 30 KN at a distance of 1 m from free end. Find the slope and deflection at free end. Take E = 200 GPa & $I = 150 \times 10^6\ mm^4$.	12M	CO4	L3
		(OR)			
8.		A hollow alloy tube 4 m long with external and internal diameter of 40 and 25 mm respectively was found to extent 4.8 mm of tensile load 60 KN. Find the buckling load for the tube with both ends pinned. also find safe load on the tube by taking FOS as 5.	12M	CO4	L3
		UNIT-V			
9.	(a)	Draw Mohr's circle when the component is subjected to state of pure shear.	6M	CO5	L2
	(b)	Derive an expression for the stresses on an oblique plane of a rectangular body, when the body is subjected simple shear stresses.	6M	CO5	L3
		(OR)			
10.		A thin cylindrical pressure vessel of diameter 2.5m and thickness of 18mm is subjected to an internal pressure of $1.2N/mm^2$. In addition, the vessel is also subjected to an axial tensile load of 2800kN. Determine the normal and shear stresses on a plane at an angle of 60 degrees to the axis of the vessel and also find the maximum shear stress.	12M	CO5	L3

Q.P. Code: 2021301 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Special Functions and Complex Analysis (ECE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT – I			
1.	(a)	Prove that $J_{-n}(x)=(-1)^n J_n(x)$, n is an integer.	6M	CO1	L1
	(b)	Express $J_{3/2}(x)$ in terms of sine and cosine functions	6M	CO1	L2
		(OR)			
2.		**Prove that** $(2n+1)xP_n(x) = (n+1)P_{n+1}(x) + nP_{n-1}(x)$	12M	CO1	L1
		UNIT – II			
3.		Show that $f(z) = \sqrt{\lvert xy \rvert}$ is not analytic at origin even though it satisfies Cauchy -Riemann equations at origin.	12M	CO2	L2
		(OR)			
4.	(a)	Find all values of k such that f(z) = $e^x(\cos ky + i \sin ky)$ is analytic.	6M	CO2	L3
	(b)	Show that u $= e^{-x}(x\sin y - y\cos y)$ is harmonic	6M	CO2	L2
		UNIT – III			
5.		Find the bilinear transformation which maps the points z=0, 1, ∞ onto the points w=-1, -2, i.	12M	CO3	L3
		(OR)			
6.		Discuss the transformation $w = \cos z$.	12M	CO3	L3
		UNIT – IV			
7.		State and prove cauchy's integral formula	12M	CO4	L3
		(OR)			
8.	(a)	Evaluate $\oint_c \frac{\log z}{(z-1)^5} dz$, where c is the circle $\lvert z-1 \rvert = \frac{1}{2}$ using Cauchy's integral formula	6M	CO4	L4
	(b)	Evaluate, using Cauchy's Integral Formula $\oint_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$ where c is the circle $\lvert z \rvert = 3$.	6M	CO4	L4
		UNIT-V			
9.	(a)	State and prove Cauchy's residue theorem.	6M	CO5	L5
	(b)	Evaluate $\oint_C \frac{2z^2}{z(z-3)} dz$ where 'c' is the circle $\lvert z \rvert = 2$ by residue theorem.	6M	CO5	L5
		(OR)			
10.		Show that $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}$ $(a > b > 0)$ by method of Residues	12M	CO5	L3

Q.P. Code: 2004301

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

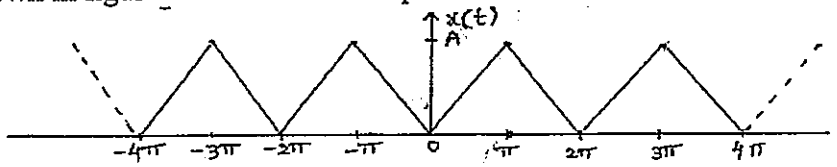
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Signals and Systems (ECE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	What are the different types of Continuous time signals and explain it.	6M	CO1	L1
	(b)	What are the basic operations on signals? Illustrate with an Example.	6M	CO1	L2
		(OR)			
2.	(a)	Define Energy and Power signals.	4M	CO1	L1
	(b)	Determine the Exponential Fourier series representation of the wave form shown in figure 1.Also Sketch its spectrum.	8M	CO1	L5



		UNIT – II			
3.	(a)	State Dirchlet's conditions for the existence of Fourier transform.	4M	CO2	L1
	(b)	Find Fourier transform of Unit impulse ,Unit Step and rectangular functions	8M	CO2	L1
		(OR)			
4.	(a)	*Explain about Fourier Transform for periodic signals.*	6M	CO2	L2
	(b)	*Find Fourier Transform of* $x(t)=\sum_{n=-\infty}^{\infty}\partial(t-nT)$	6M	CO2	L1
		UNIT – III			
5.		Explain the process for Sampling Theorem for Band limited signals with neat sketch and necessary equations	12M	CO3	L5
		(OR)			
6.		Find the convolution integral of x(t) and h(t), and sketch the convolved signal: $x(t) = (t-1)\{u(t-1)+u(t-3)\}$ and $h(t)= [u(t+1) - 2u(t-2)]$	12M	CO3	L1
		UNIT – IV			
7.		What do you mean by impulse response of an LTI System? Deduce the equation for the response of an LTI System, if the input sequence x(n) and the impulse response are given.	12M	CO4	L4
		(OR)			
8.		Let the system function of an LTI system be 1/(jw+2). What is the output of the system for the input $(0.8)^t u(t)$?	12M	CO4	L4
		UNIT-V			
9.		Find the Inverse Laplace Transform of $G(S) = \frac{S}{(S+3)(S^2+4S+5)}$ for all possible ROC.	12M	CO5	L5
		(OR)			
10.		Solve the following difference equation using unilateral z-transform : $y(n) - \frac{3}{2}y(n-1) + \frac{1}{2}y(n-2) = x(n), for\ n \geq 0$, with initial conditions y(-1) = 4, $x(n) = \left(\frac{1}{4}\right)^n u(n)$.	12M	CO5	L6

Q.P. Code: 2004302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Digital System Design (ECE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT – I			
1.	(a)	Convert the following numbers (i) $(4021.2)_5$ to base 2 (ii) $(FAFA.B)_{16}$ to base 10 (iii) $(153.513)_{10}$ to base 8	6M	CO1	L1
	(b)	Represent "COLLEGE" as a stream of ASCII characters.	6M	CO1	L1
		(OR)			
2.	(a)	Add the following BCD numbers (i) 1000 and 0101 (ii) 00011001 and 00011000	6M	CO1	L2
	(b)	Perform the subtraction using 1's complement and 2's complement methods: (i) 11010 – 10000 (ii) 11010 – 1101	6M	CO1	L2
		UNIT – II			
3.	(a)	Simplify the following expressions using Boolean algebra (i) $Y=(A+B)(A+\bar{C})(B+\bar{C})$ (ii) $F(A,B,C)=\bar{A}B+B\bar{C}+BC+A\bar{B}\bar{C}$	6M	CO2	L3
	(b)	Explain about TTL in detail with diagram.	6M	CO2	L4
		(OR)			
4.	(a)	Express the given Boolean functions in standard SOP form (i) $F=A+\bar{B}C$ (ii) $F=\bar{A}C+\bar{A}B+A\bar{B}C+BC$	6M	CO2	L5
	(b)	Draw the multilevel NOR circuit for the following expression $W=(X+Y+Z)+XYZ$	6M	CO2	L4
		UNIT – III			
5.	(a)	Realize the following Boolean expression using a 8×1 multiplexer $Y=\bar{A}\bar{B}C+\bar{A}B\bar{C}+A\bar{B}C+ABC$	6M	CO3	L6
	(b)	Construct 3×8 decoder using logic gates and truth table.	6M	CO3	L6
		(OR)			
6.	(a)	Design a 2-bit magnitude comparator using logic diagram and explain.	6M	CO3	L6
	(b)	What is Hazard in switching circuits? Explain the design of Hazard free switching circuit with an example.	6M	CO3	L3
		UNIT – IV			
7.	(a)	Draw the logic diagram of master slave JK flip flop, explain in detail.	6M	CO4	L4
	(b)	Differentiate synchronous and asynchronous sequential circuits.	6M	CO4	L2
		(OR)			
8.	(a)	Convert JK flip flop to SR flip flop.	6M	CO4	L6
	(b)	Draw and explain the logic diagram of a 4-bit binary ripple counter using positive edge triggering.	6M	CO4	L5
		UNIT-V			
9.	(a)	Implement the following using PLA $F_1(A,B,C)=\Sigma m(3,5,6,7)$, $F_2(A,B,C)=\Sigma m(0,2,4,7)$	6M	CO5	L6
	(b)	Differentiate RAM and ROM.	6M	CO5	L5
		(OR)			
10.	(a)	Implement the following function using ROM $F(A,B,C,D)=\Sigma m(0,1,2,4,7,9,11,13)$	6M	CO5	L6
	(b)	Give the comparison between PROM, PLA, PAL.	6M	CO5	L5

Q.P. Code: 2004303

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Analog Circuits (ECE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Draw the circuit of Darlington pair and derive the expression for overall current gain.	6M	CO1	L2
	(b)	Derive expression for CMRR of BJT differential pair.	6M	CO1	L2
		(OR)			
2.	(a)	Discuss the effect of cascading amplifier stages on voltage gain and bandwidth.	6M	CO1	L2
	(b)	Explain the small signal operation of MOS differential pair.	6M	CO1	L2
		UNIT – II			
3.	(a)	Draw hybrid π equivalent circuit of CE amplifier and discuss the significance of each component.	6M	CO2	L2
	(b)	The following h parameters are known for a given transistor at I_C = 10mA, V_{CE} = 10V, and at room temperature. At the same operating point, f_T = 50MHz and C_{ob} = 3pF, compute values of all hybrid π parameters.	6M	CO2	L3
		(OR)			
4.	(a)	Obtain expression for f_β of a CE amplifier at high frequencies and derive a relationship between f_β and f_T.	6M	CO2	L2
	(b)	Explain CG amplifier at high frequencies.	6M	CO2	L2
		UNIT – III			
5.	(a)	Explain the effect of negative feedback on various parameters of amplifier.	6M	CO3	L2
	(b)	Sketch the diagram of RC phase shift oscillator and explain how Barkhausen criterion is satisfied to obtain oscillations.	6M	CO3	L2
		(OR)			
6.	(a)	With the help of circuit diagram, explain the operation of Hartley oscillator and derive expression for output frequency.	6M	CO3	L2
	(b)	Discuss the amplitude and frequency stability of oscillators.	6M	CO3	L2
		UNIT – IV			
7.	(a)	With the help of circuit diagram and mathematical analysis explain how even harmonics are eliminated in push-pull amplifier.	6M	CO4	L2
	(b)	Prove that maximum efficiency of Transformer coupled class A power amplifier is 50%.	6M	CO4	L2
		(OR)			
8.	(a)	Bring out the differences between voltage amplifiers and power amplifiers	6M	CO4	L4
	(b)	Sketch the diagram of single tuned amplifier and explain its operation	6M	CO4	L6
		UNIT-V			
9.	(a)	Explain the operation of Schmitt trigger circuit using BJT.	6M	CO5	L2
	(b)	Describe how a pulse can be generated from a collector coupled one shot.	6M	CO5	L2
		(OR)			
10.	(a)	Write about the general characteristics of a time base signal.	6M	CO5	L2
	(b)	Explain the operation of Bootstrap time base generator.	6M	CO5	L2

Q.P. Code: 2004304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

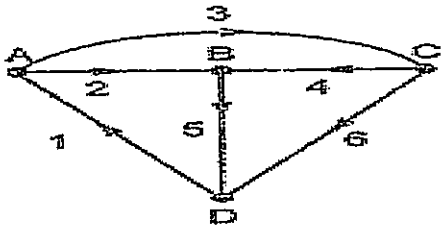
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Network Theory (ECE)

Time: 3 Hours **Max. Marks: 60**

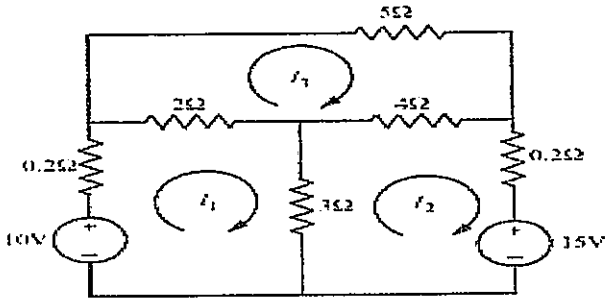
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Define the following : (i) Vertex (ii) Edge (iii) basic cut set	6M	CO1	L1
	(b)	Determine the element node incidence matrix for the given graph.	6M	CO1	L3

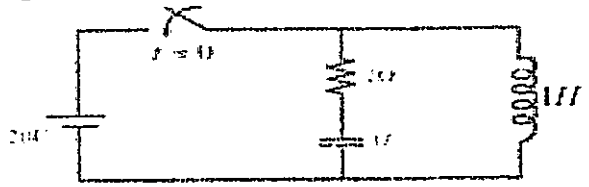


(OR)

2.	(a)	Determine the loop currents in the given network shown using loop current method.	6M	CO1	L3

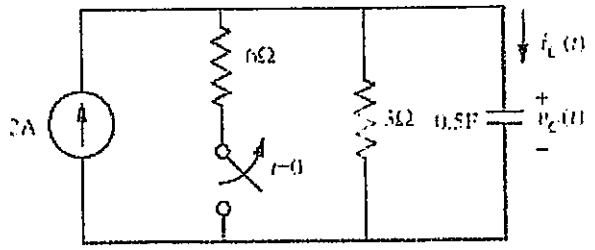


	(b)	Explain the procedure to obtain dual network.	6M	CO1	L2
		UNIT – II			
3.	(a)	Explain the transient response of R-L series circuit for DC excitation.	6M	CO2	L2
	(b)	For the circuit shown in Fig, determine the current delivered by the source when the switch is closed at t=0, using Laplace transformation. Assume there is no initial charge on the capacitor and no initial current though the inductor.	6M	CO2	L3



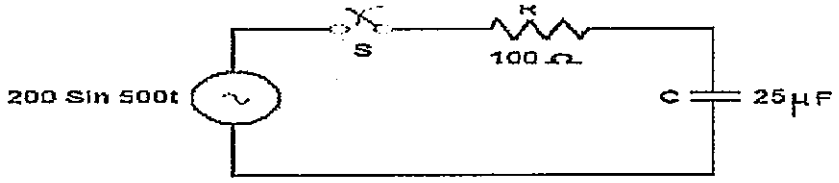
(OR)

4.	(a)	Explain the circuit element models and initial conditions.	6M	CO2	L2
	(b)	Find voltage $v_C(t)$ and current $i_C(t)$ for $t \geq 0$ for the circuit shown in Fig.	6M	CO2	L3



UNIT – III

5.	(a)	Explain the transient response of R-L series circuit for AC excitation.	6M	CO3	L2
	(b)	Determine the current i(t) along capacitor in the circuit shown in figure. Assume that the initial conditions are zero.	6M	CO3	L3

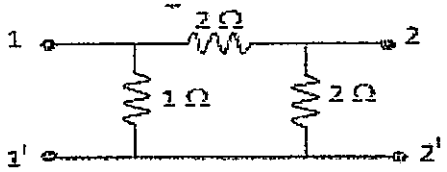


(OR)

6.	(a)	Explain the resonance of RLC series circuit.	6M	CO3	L2
	(b)	Two coils, one of R_1 = 0.51 Ω, L_1 = 32 mH, the other of R_2 = 1.3 Ω and L_2 = 15 mH and two capacitors of 25 μF and 62 μF are all in series with a resistance of 0.24 Ω. Determine the following for this circuit. (i) Resonance frequency (ii) Q of each coil.	6M	CO3	L3

UNIT – IV

7.		Determine the Z and Transmission parameters for the resistive network shown in figure below:	12M	CO4	L3



(OR)

8.		The impedance parameters of a two-port network are Z_{11}= 6 Ω, Z_{22}=4 Ω, Z_{12}=Z_{21}=3Ω. Compute the Y parameters and ABCD parameters and write the describing equations.	12M	CO4	L3

UNIT-V

9.	(a)	Explain the properties of positive real function.	6M	CO5	L2
	(b)	Determine if $p(s)= s^4+3s^3+5s^2+5s+2$ is a Hurwitz polynomial.	6M	CO5	L3

(OR)

10.		Explain the RC network synthesis.	12M	CO5	L2

Q.P. Code: 2024310

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Universal Human Values (EEE, ECE & AI ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Integrity, Trustworthiness and Respect for others are driving force to live peacefully – Discuss.	6M	CO1	L4
	(b)	Write a short note on Work Ethics-Service.	6M	CO1	L1
		(OR)			
2.	(a)	Define Empathy and how it works in personal and professional.	6M	CO1	L5
	(b)	Illustrate the aspect of Spirituality at Work place and Corporate Excellence.	6M	CO1	L2
		UNIT – II			
3.	(a)	Write a note on about the importance of respecting the professions of all people. Make a list of 10 professions for today's youth other than those in the medical and Engineering field.	6M	CO2	L6
	(b)	What is Moral dilemma? List out various situations when moral dilemmas arise.	6M	CO2	L1
		(OR)			
4.	(a)	'Personal life leads to Professional life' – Elucidate.	6M	CO2	L3
	(b)	Explain Kohlberg's theory on moral autonomy.	6M	CO2	L2
		UNIT – III			
5.	(a)	What do you mean by competence in professional ethics? Elaborate with examples.	6M	CO3	L5
	(b)	Define the safety and risk assessment and list out few factors to reduce risks.	6M	CO3	L2
		(OR)			
6.	(a)	What are the factors that influence the risk benefit analysis?	6M	CO3	L1
	(b)	How does engineering disaster occur? Explain briefly about Chernobyl case study.	6M	CO3	L4
		UNIT – IV			
7.	(a)	Natural acceptance is innate, invariant and universal. Explain this statement with an example.	6M	CO4	L2
	(b)	Mutual fulfillment in human relationships is something we want, we aspire for, Justify the statement.	6M	CO4	L4
		(OR)			
8.	(a)	What is value education? Why there is a need of value education? What are the basic guidelines for value education?	6M	CO4	L1
	(b)	Define Self exploration. What is the content of Self exploration?	6M	CO4	L3
		UNIT-V			
9.	(a)	What is meaning of Justice in human relationships? How does it follow from family to world family?	6M	CO5	L6
	(b)	Give the difference between intention and competence when you have to judge the other. Why is it important?	6M	CO5	L4
		(OR)			
10.	(a)	Bring out the differences and similarities between a human being and an animal. Give examples to support your answer.	6M	CO5	L2
	(b)	Explain in detail the harmony in nature. How can we ensure harmony in self(I)?	6M	CO5	L6

Q.P. Code: 2024301 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Business Economics and Accounting for Engineers (CSE)

Time: 3 Hours | Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Discuss the scope of managerial economics.	6M	CO1	L6
	(b)	Define Law of demand and state the exceptions	6M	CO1	L1
		(OR)			
2.	(a)	List out the factors governing demand forecasting.	6M	CO1	L1
	(b)	Discuss the role and responsibilities of managerial economist	6M	CO1	L6
		UNIT – II			
3.	(a)	Explain various cost concepts used in decision making.	6M	CO2	L2
	(b)	Define production function and explain production function with one variable input.	6M	CO2	L1
		(OR)			
4.	(a)	Discuss managerial significance of break even analysis.	6M	CO2	L6
	(b)	From the following information. You are required to compute (i) P/V Ratio (ii) Fixed cost (iii) Sales volume to earn profit of Rs. 1,60,000. Sales = Rs. 4,00,000 Profit = Rs. 40,000 Variable cost = 70%	6M	CO2	L5
		UNIT – III			
5.	(a)	Define Perfect competition and explain the features of perfect competition.	6M	CO3	L1
	(b)	What are objectives and policies of pricing?	6M	CO3	L1
		(OR)			
6.		Explain various Methods of Pricing with suitable examples?	12M	CO3	L2
		UNIT – IV			
7.	(a)	Briefly explain the users of accounting information..	6M	CO4	L2
	(b)	From the following trial balance prepare trading , P/L accounts for the year ending 31/03/2016	6M	CO4	L5

Particulars	Dr.Amt.	Particulars	Cr.Amt.
Machinery	3,320	Capital	8,500
Opening stock	2920	Sales	23,812
Purchases	20,724	Returns outwards	582
Returns inwards	420	Bank overdraft	640
Sundry expenses	880	Creditors	2000
Factory rent	640	Bills payable	570
Bad debts	344	Discount Received	120
Debtors	6,400		
Cash in hand	96		
Bills receivable	480		
	36,224		36,224

Adjustments: (i) Closing stock was valued @ 3,400,
(ii) Outstanding rent @ 80, (iii) Depreciation on machinery @ 10% per annum

(OR)

8.	(a)	Explain the need for accounting in the present era?	6M	CO4	L2
	(b)	Discuss about double entry book keeping?	6M	CO4	L6

UNIT-V

9.	(a)	Write about various types of liquidity ratios?	6M	CO5 L
	(b)	Calculate the different liquidity ratios (any TWO)from the following particulars:	6M	CO5 L

Particulars	Amount
Inventory	1,50,000
Cash	50,000
Sundry Debtors	3,00,000
Creditors	3,50,000
Bills Receivable	30,000
Bank Overdraft	30,000

(OR)

10.		Discuss in detail about different profitability ratios with suitable examples?	12M	CO5 L

Q.P. Code: 2005302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

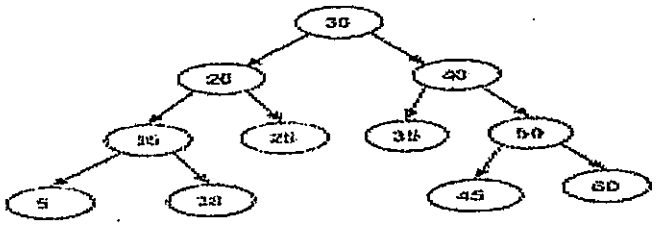
B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Advanced Data Structures (CSE)

Time: 3 Hours **Max. Marks: 60**

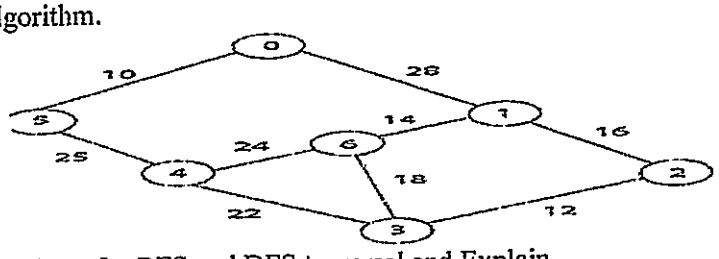
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	What is an array list? Explain its implementation and advantages & disadvantages.	6M	CO1	L2
	(b)	What is Stack? Explain the implementation of stack using single linked list.	6M	CO1	L2
		(OR)			
2.	(a)	Explain the three cases of insertion operation on single list, with neat sketch.	6M	CO1	L2
	(b)	What are the different applications of stack? Explain any one application in detail	6M	CO1	L2
		UNIT – II			
3.	(a)	What is Queue? Explain the implementation of Queue using array.	6M	CO2	L2
	(b)	What is binary tree? Explain the representation of Binary tree using arrays. Is it advantageous or disadvantageous? Justify with an example.	6M	CO2	L2
		(OR)			
4.	(a)	What is circular queue? Explain the enqueue and dequeue operations on circular queues.	6M	CO2	L2
	(b)	Write a pseudo code for enqueue and dequeue operations on circular queues.	6M	CO2	L1
		UNIT – III			
5.	(a)	Explain the FOUR rotations in insertion operation on an AVL tree.	6M	CO3	L2
	(b)	Explain three traversals on the below given binary tree.	6M	CO3	L2



(OR)

6.	(a)	What is Heap and explain its properties. Construct the Min Heap for the following keys: 12, 34, 56, 78, 90, 45, 10, 98, 67, 79, 33, 22, 8, 54, 5, 76	6M	CO3	L6
	(b)	What is the binary search tree? Explain and write an algorithm for deletion of an element.	6M	CO3	L2
		UNIT – IV			
7.	(a)	Explain the quick sort algorithm with an example.	6M	CO4	L2
	(b)	Write an algorithm for quick sort.	6M	CO4	L1
		(OR)			
8.	(a)	What is minimum cost spanning tree. For the given graph, Find the MST using Kruskal's algorithm.	6M	CO4	L5



	(b)	Write an algorithm for BFS and DFS traversal and Explain.	6M	CO4	L1
		UNIT-V			
9.	(a)	Construct 2-3 tree for the following keys: 12, 34, 67, 89, 43, 76, 98, 90, 12, 33, 65, 87, 78, 23, 8, 77	6M	CO5	L6
	(b)	Explain the different hah functions with examples.	6M	CO5	L2
		(OR)			
10.		What is skip list explain the operations on skip list with neat diagram	12M	CO5	L2

Q.P. Code: 2005303 | **SET - 1**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Formal Languages and Automata Theory (CSE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	What is the finite state machine? Define finite automata and discuss the representation of finite automata.	6M	CO1	L1
	(b)	Draw a DFA for the language accepting strings ending with 'abba' over input alphabets $\sum = \{a, b\}$	6M	CO2	L2
		(OR)			
2.	(a)	Construct DFA for the NFA-ε where p is start state and r is final state.	7M	CO1	L2

	ε	a	b	c
p	φ	{p}	{q}	{r}
q	{p}	{q}	{r}	φ
r	{q}	{r}	Φ	{p}

	(b)	Discuss the method for converting the Moore machine to Mealy machine.	5M	CO1	L2
		UNIT – II			
3.	(a)	Show that if L is a regular language and F is a finite language, the LUF, L∩F, and L-F are regular?	6M	CO2	L2
	(b)	Show that if L is a non-regular language and F is a finite language then F is non-regular.	6M	CO2	L2
		(OR)			
4.	(a)	Demonstrate Pumping lemma of regular sets.	6M	CO2	L2
	(b)	What are the applications of regular expressions and finite automaton?	6M	CO1	L1
		UNIT – III			
5.	(a)	Explain in detail about Chomsky normal form with suitable Example.	6M	CO3	L3
	(b)	Eliminate unit productions from the following grammar: S→A|bb. A→B|a. B→S|a.	6M	CO3	L3
		(OR)			
6.	(a)	Explain the procedure of converting the given CFG to Greibach Normal Form(GNF) with suitable example.	6M	CO3	L3
	(b)	Write the procedure for Eliminating Unit productions in the given grammar.	6M	CO3	L2
		UNIT – IV			
7.	(a)	Construct a PDA that recognizes balanced parentheses.	6M	CO4	L3
	(b)	Construct a PDA that recognizes strings of type $a^i b^j c^{i+j}$.	6M	CO4	L3
		(OR)			
8.	(a)	Construct a PDA that accepts language that generates the following grammar. $S \rightarrow aB$ $B \rightarrow bA/b$ $A \rightarrow aB$	6M	CO4	L3
	(b)	Show that the language $L=\{a^i b^j c^j / i \geq 1\}$ is not context free language.	6M	CO4	L2
		UNIT-V			
9.	(a)	Give the properties of Recursively languages and Recursively enumerable languages.	6M	CO5	L2
	(b)	Show that it is undecidable whether an arbitrary CFG is ambiguous. (Assume that PCP is undecidable).	6M	CO5	L3
		(OR)			
10.	(a)	Explain any four variations of Turing machines.	6M	CO5	L3
	(b)	Design a Turing machine for multiplying two numbers using subroutine	6M	CO5	L4

Q.P. Code: 2005304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Object Oriented Programming through Java (CSE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	List and explain Java Buzzwords.	6M	CO1	L3
	(b)	What are constructors? Explain the different types of constructors	6M	CO1	L2
		(OR)			
2.	(a)	The Object-Oriented thinking is analogous to viewing real world objects. Justify the statement with proper examples	6M	CO1	L3
	(b)	Discuss in brief about overloading and overriding concepts in OOP.	6M	CO1	L4
		UNIT – II			
3.	(a)	List and explain the benefits of Inheritance and Polymorphism.	6M	CO2	L3
	(b)	What is a package? Explain the process of creating and using a package in Java.	6M	CO2	L2
		(OR)			
4.		Discuss the variables in interface and extending interfaces.	12M	CO2	L4
		UNIT – III			
5.	(a)	Define thread. Draw and explain thread life cycle.	6M	CO3	L3
	(b)	What happens when there is no suitable try block to handle exception? Explain	6M	CO3	L2
		(OR)			
6.	(a)	Explain the usage of two keywords in exception handling	6M	CO3	L4
	(b)	List and explain the Benefits of Exception Handling	6M	CO3	L3
		UNIT – IV			
7.		Explain the following: (i) Event Listeners (ii) Delegation event model	12M	CO4	L2
		(OR)			
8.		List and explain the Layout manager types.	12M	CO4	L3
		UNIT-V			
9.	(a)	Write a java applet that demonstrates the use of check boxes.	6M	CO5	L2
	(b)	Explain about the life cycle and architecture of an applet	6M	CO5	L3
		(OR)			
10.	(a)	With a programming example, explain about passing parameters to applets.	6M	CO5	L2
	(b)	Differentiate between the AWT components and Swing components.	6M	CO5	L3

Q.P. Code: 2005305

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Database Management Systems (CSE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.		Discuss in detail about Database Architecture with neat diagram?	12M	CO1	L6
		(OR)			
2.	(a)	Explain about Constraints in ER Model?	6M	CO1	L5
	(b)	Write a short notes on Entity Relationship Diagrams with suitable examples?	6M	CO1	L2
		UNIT – II			
3.	(a)	What are the keys in relational model? give suitable examples?	6M	CO2	L4
	(b)	Write a short notes on Database Languages.	6M	CO2	L4
		(OR)			
4.	(a)	What are the Fundamental Relational Algebra Operations in relational mode?	6M	CO2	L4
	(b)	How Modification of Database in relational model?	6M	CO2	L4
		UNIT – III			
5.	(a)	What are the Basic Structure of SQL Queries?	6M	CO3	L4
	(b)	Discuss in detail about Aggregate Functions in SQL with examples	6M	CO3	L4
		(OR)			
6.	(a)	Write a short notes on Tuple Relational Calculus, Domain Relational calculus	6M	CO3	L4
	(b)	What are the uses of Functions and Procedures? how its related to Database	6M	CO3	L4
		UNIT – IV			
7.	(a)	Explain in detail about 1NF & 2NF? Implement on Student relation.	6M	CO4	L5
	(b)	Write a short notes on (i) 3NF (ii) BCNF (iii) 4NF	6M	CO4	L2
		(OR)			
8.	(a)	How to implement joining dependencies in database?	6M	CO4	L4
	(b)	What is mean by Lossless decomposition?	6M	CO4	L2
		UNIT-V			
9.		How transactions are done in DBMS? What are the transaction states in DBMS?	12M	CO5	L4
		(OR)			
10.	(a)	Write about Lock-Based Protocols and Timestamp-Based Protocols	6M	CO5	L2
	(b)	Discuss in detail about Log based recovery	6M	CO5	L6

Q.P. Code: 2021303 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Probability & Optimization (AI&ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	A,B,C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The chance of B to shoot the balloon is 3 out of 4 and that of C is 2 out of 3. If the three aim the balloon simultaneously, then estimate the probability that at least two of them hit the balloon.	6M	CO1	L5
	(b)	In a state election in the year 2020 there were three major parties X,Y,Z fighting for the claim of Chief ministership. The chances of winning the election of the 3 parties are in the ratio 1:2:3 respectively. The probability that the party X is selected, will introduce total arrack prohibition in thr state is $\frac{1}{2}$. The probability that the party Y is selected, will introduce total arrack prohibition in thr state is $\frac{1}{4}$ and the probability that the party Z is selected, will introduce total arrack prohibition in thr state is $\frac{3}{4}$. What is the probability that there will be a total prohibition in the state after the election in year 2020.	6M	CO1	L2
		(OR)			
2.		In a bolt factory machines A,B,C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A, (ii) Machine B, (iii) Machine C.	12M	CO1	L1
		UNIT – II			
3.		Let the random variable X represent the number of automobiles that are used for official business purposes on any given workday. The following is the probability distribution of X .	12M	CO2	L5

$X=x$	0	1	2	3	4
$f(x)$	0.2	0.1	0.3	0.3	0.1

Determine the mean, variance and standard deviation of X.

(OR)

4. A continuous random variable X has a density function 12M CO2 L5

$$f(x)=\begin{cases} k(1-x^2); & 0<x<1 \\ 0 & ;\text{elsewhere} \end{cases}$$

Determine (i) k (ii) mean and (iii) variance of X .

UNIT – III

5. Explain the methods and scientific methods in Operations research. 12M CO3 L5

(OR)

6. (a) Operations research is a tool for Decision support system. Explain 6M CO3 L5
   (b) What are the limitations of Operations research? 6M CO3 L3

UNIT – IV

7. (a) Three grades of coal A,B and C contain ash and phosphorous as impurities. In a particular industrial process a fuel obtained by blending the above grades containing not more than 25% ash and 0.03% phosphorous is required. The maximum demand of the fuel is 100 tons. Percentage impurities and costs of the various grades of coal are shown below. Assuming that there is an unlimited supply of each grade of coal and there is no loss in blending, develop the blending problem to minimize the cost. 6M CO4 L3

Coal grade	% Ash	% Phosphorous	Cost per ton in Rs,
A	30	0.02	240
B	20	0.04	300
C	35	0.03	280

(b) Solve the following LPP using graphical method. **6M CO4 L3**

Maximize $z = 5x_1 + 3x_2$

Subject to constraints $3x_1 + 5x_2 \leq 15$

$5x_1 + 2x_2 \leq 10$

$x_1 \geq 0;\ x_2 \geq 0$

(OR)

8. Solve the given linear programming problem by using Simplex method. **12M CO4 L3**

Maximize $z = 3x_1 + 5x_2 + 4x_3$

Subject to the constraints: $2x_1 + 3x_2 \leq 8$

$2x_2 + 5x_3 \leq 10$

$3x_1 + 2x_2 + 4x_3 \leq 15$

$x_1 \geq 0; x_2 \geq 0; x_3 \geq 0$

UNIT-V

9. Determine an initial basic feasible solution to the following transportation problem by using (i) North-West corner rule (ii) Least cost entry method **12M CO5 L5**

Demand / **Supply**	D1	D2	D3	D4	Total
S1	6	4	1	5	14
S2	8	9	2	7	16
S3	4	3	6	2	5
Total	6	10	15	4	

(OR)

10. Determine the initial basic feasible solution to the following transportation problem using Vogel's approximation method. **12M CO5 L5**

Source	Destination				Supply
	D1	D2	D3	D4	
S1	21	32	52	12	7000
S2	72	32	42	62	9000
S3	42	10	72	22	18000
Demand	5000	8000	7000	14000	

Q.P. Code: 2039302 | SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Discrete Mathematics & Graph Theory (AI&ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Show that following functions are logical equivalence using laws of logic method $\sim(P \leftrightarrow Q) \Leftrightarrow (P \vee Q) \wedge \sim(P \wedge Q)$	6M	CO1	L2
	(b)	Show that following Proposition function is tautology using truth table $((P \rightarrow Q) \wedge (Q \rightarrow R)) \rightarrow (P \rightarrow R)$.	6M	CO1	L2
		(OR)			
2.	(a)	Obtain the Principle Disjunctive normal forms of the following i) $P \vee (P \wedge Q)$ ii) $P \rightarrow \{(P \rightarrow Q) \wedge \sim(\sim Q \vee \sim P)\}$	6M	CO1	L2
	(b)	Show that these statements to a valid arguments If there was a ball game then travelling was difficult. If they arrive on time then travelling was not difficult. They arrive on time. Therefore there was no ball game.	6M	CO1	L2
		UNIT – II			
3.	(a)	What are the Equivalence and Compatibility relations? Give an example for each.	6M	CO2	L1
	(b)	Let L= {3, 4, 12, 24, 48, 72} and the relation $\leq$ be defined on L such that $x \leq y$ if x divides y .Draw the Hasse diagram.	6M	CO2	L2
		(OR)			
4.	(a)	Let A={1,2,3,4,5,6,7,8,9,10,11,12}.On this set define the relation R by (x,y) $\in$R if and only if x-y is a multiple of 5 .Verify that R is an equivalence relation.	6M	CO2	L3
	(b)	Let A= {1, 2, 3, 4, 6, 8, 12}.On A define the partial order R by aRb if and only if a|b. (i) Draw the Hasse diagram for R. (ii) Write down the relation matrix for R.	6M	CO2	L2
		UNIT – III			
5.	(a)	In how many ways can 6 men and 6 women be seated in a row (i) If any person may sit next to any other? (ii) If men and women must occupy alternate seats?	6M	CO3	L3
	(b)	A Certain question paper contains two parts A and B each containing 4 questions. How many different ways a student can answer 5 questions by selecting at least 2 questions from each part?	6M	CO3	L3
		(OR)			
6.	(a)	A Committee of eight is to be formed from 16 Men and 10 Women. In how many ways can the Committee be formed? (i) There are no restrictions. (ii) There should be an even number of women.	6M	CO3	L3
	(b)	A Certain question paper contains three parts A, B, C with four questions in part A. five questions in part B and six questions in part C.It is required to answer seven questions selecting at least two questions from each part. In how many different ways can a student select his seven questions for answering?	6M	CO3	L3
		UNIT – IV			
7.	(a)	Solve the recurrence relation $a_n - 3a_{n-1} = 5 \times 3^n$. for $n \geq 1$, given that $a_0 = 2$.	6M	CO4	L4
	(b)	Find a recurrence relation and the initial condition for the sequence 2, 10, 50, 250, …	6M	CO4	L3
		(OR)			

8.	(a)	Find a_{12} if $a^2_{n+1}=5a^2_n$, where $a_n>0$ for $n\geq 0$, given that $a_0=2$.	6M	CO4	L3
	(b)	Find the recurrence relation and the initial conditions for the sequence 0, 2, 6, 12, 20, 30, 42,...	6M	CO4	L3

UNIT-V

9.	(a)	Define terms binary tree, spanning tree and planar graphs .Explain with an examples.	6M	CO5	L1
	(b)	Explain DFS algorithm to finding a spanning tree with an example.	6M	CO5	L2

(OR)

10.	(a)	Explain Four-Color problem with an example.	6M	CO5	L2
	(b)	Generate basic rules for constructing Hamiltonian paths and cycle. Also give an example .	6M	CO5	L5

Q.P. Code: 2039303

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Digital Systems and Computer Organization (AI&ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	BL
		UNIT - I			
1.	(a)	Define Binary Number? Explain the 2's Complement with example.	6M	CO1	L2
	(b)	List out the Properties of Boolean Algebra? Explain each.	6M	CO1	L4
		(OR)			
2.	(a)	Design Five-variable map with example.	6M	CO1	L6
	(b)	Explain Product of Sum simplification with example.	6M	CO1	L2
		UNIT – II			
3.	(a)	Construct 4-bit Binary adder-subtractor and explain in detail.	6M	CO2	L6
	(b)	Describe in detail about 8*1 decoder.	6M	CO2	L2
		(OR)			
4.	(a)	Construct the Boolean function by using multiplexer with example.	6M	CO2	L6
	(b)	What is sequential circuit? Construct the flip flops.	6M	CO2	L3
		UNIT – III			
5.	(a)	Describe in detail about the shift registers.	6M	CO3	L2
	(b)	Explain about the ripple counters.	6M	CO3	L2
		(OR)			
6.	(a)	List out the computer types? Explain.	6M	CO3	L4
	(b)	Discuss about Functional units.	6M	CO3	L6
		UNIT – IV			
7.	(a)	Demonstrate about Instruction cycle.	6M	CO4	L3
	(b)	Define Memory? Explain Memory Reference Instructions.	6M	CO4	L2
		(OR)			
8.	(a)	Explain Control memory in detail.	6M	CO4	L2
	(b)	Design the control unit? Explain.	6M	CO4	L6
		UNIT-V			
9.	(a)	What is main memory? Explain in detail.	6M	CO5	L1
	(b)	Describe about virtual memory.	6M	CO5	L2
		(OR)			
10.	(a)	What is the input or output interfaces? Explain it.	6M	CO5	L2
	(b)	Discuss about priority interrupt.	6M	CO5	L6

Q.P. Code: 2039304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Introduction to Artificial Intelligence (AI&ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	What are the different AI approaches discuss them in brief.	6M	CO1	L1
	(b)	List applications of AI explain them.	6M	CO1	L3
		(OR)			
2.		Illustrate AI technique with an example	12M	CO1	L3
		UNIT – II			
3.		How to defining problem as a state space search explain with a suitable example	12M	CO2	L2
		(OR)			
4.	(a)	Explain why problem formulation must follow goal formulation	6M	CO2	L2
	(b)	Discuss Tic-Tac-Toe with an example	6M	CO2	L2
		UNIT – III			
5.	(a)	Explain Breath First Search in detail with a suitable example	6M	CO3	L2
	(b)	Discuss about problem reduction	6M	CO3	L2
		(OR)			
6.		Demonstrate how AO* algorithm is used for problem reduction with a suitable example.	12M	CO3	L4
		UNIT – IV			
7.	(a)	What are the various knowledge representation issues discuss with solutions	6M	CO4	L2
	(b)	Discuss about various approaches and properties of knowledge representation	6M	CO4	L2
		(OR)			
8.		Explain in detail about declarative and procedural knowledge.	12M	CO4	L2
		UNIT-V			
9.		What are the different applications of fuzzy logic system? Explain in detail with any one example.	12M	CO5	L3
		(OR)			
10.	(a)	Discuss about types and applications of FLCs.	6M	CO5	L2
	(b)	Explain about fuzzy control system	6M	CO5	L2

Q.P. Code: 2024310

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. III Semester (R20UG) Regular & Supple. Examinations of March – 2023

SUB: Universal Human Values (EEE, ECE & AI ML)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

			M	CO	BL
		UNIT - I			
1.	(a)	Integrity, Trustworthiness and Respect for others are driving force to live peacefully – Discuss.	6M	CO1	L4
	(b)	Write a short note on Work Ethics-Service.	6M	CO1	L1
		(OR)			
2.	(a)	Define Empathy and how it works in personal and professional.	6M	CO1	L5
	(b)	Illustrate the aspect of Spirituality at Work place and Corporate Excellence.	6M	CO1	L2
		UNIT – II			
3.	(a)	Write a note on about the importance of respecting the professions of all people. Make a list of 10 professions for today's youth other than those in the medical and Engineering field.	6M	CO2	L6
	(b)	What is Moral dilemma? List out various situations when moral dilemmas arise.	6M	CO2	L1
		(OR)			
4.	(a)	'Personal life leads to Professional life' – Elucidate.	6M	CO2	L3
	(b)	Explain Kohlberg's theory on moral autonomy.	6M	CO2	L2
		UNIT – III			
5.	(a)	What do you mean by competence in professional ethics? Elaborate with examples.	6M	CO3	L5
	(b)	Define the safety and risk assessment and list out few factors to reduce risks.	6M	CO3	L2
		(OR)			
6.	(a)	What are the factors that influence the risk benefit analysis?	6M	CO3	L1
	(b)	How does engineering disaster occur? Explain briefly about Chernobyl case study.	6M	CO3	L4
		UNIT – IV			
7.	(a)	Natural acceptance is innate, invariant and universal. Explain this statement with an example.	6M	CO4	L2
	(b)	Mutual fulfillment in human relationships is something we want, we aspire for, Justify the statement.	6M	CO4	L4
		(OR)			
8.	(a)	What is value education? Why there is a need of value education? What are the basic guidelines for value education?	6M	CO4	L1
	(b)	Define Self exploration. What is the content of Self exploration?	6M	CO4	L3
		UNIT-V			
9.	(a)	What is meaning of Justice in human relationships? How does it follow from family to world family?	6M	CO5	L6
	(b)	Give the difference between intention and competence when you have to judge the other. Why is it important?	6M	CO5	L4
		(OR)			
10.	(a)	Bring out the differences and similarities between a human being and an animal. Give examples to support your answer.	6M	CO5	L2
	(b)	Explain in detail the harmony in nature. How can we ensure harmony in self(I)?	6M	CO5	L6