R 18

Code: **(1801303)**

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech III SEMESTER (R18)Regular Examinations, JAN-2021
ENGINEERING MECHANICS
(Mechanical Engineering)
Model Question Paper

Time:3 hours   Max Marks: 70

Answer any five questions. Selecting one question from each unit
All questions carry equal marks

UNIT I

1. (a) State and explain Varignon' theorem   (4 Marks)

 (b) The forces 20N, 30N, 40N, 50N and 60N are acting on one of the angular points of a
   regular hexagon, towards other five angular points taken in order (Fig. 1). Find the
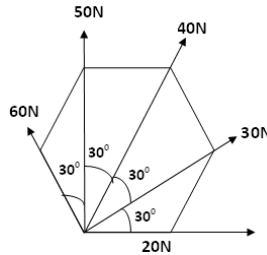   magnitude and direction of resultant force

Fig. 1   (10 Marks)

OR

2. (a) Explain free body diagram with one example   (4 Marks)

  (b) Two spheres each of weight 1000N and of radius 25cm rest in horizontal channel of width 90cm
     as shown in fig.2 .Identify the magnitudes of reactions on the points of contact A, B and C.
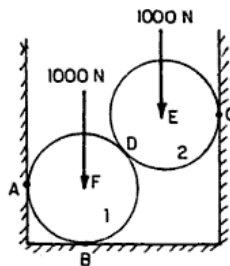
(10 Marks)

Fig. 2

UNIT II

3. (a) State the laws of friction.   (4 Marks)

   (b) A body of weight 500N is lying on a rough plane inclined at an angle of 25^0 with the horizontal. It s supported by an effort (P) parallel to the plane as shown in the Fig. 3.
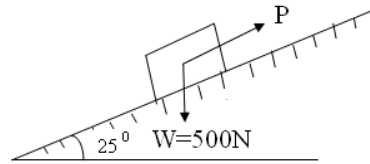

Fig.3

   Determine the minimum and maximum value of P, for which the equilibrium can exist, if the   angle of friction is 20^0 (10 Marks)

OR

4 (a) State clearly the difference between a perfect frame and an imperfect frame.   (4 Marks)

   (b) Fig.4 shows a warren girder consisting of seven members each of 3 m length freely supported at its end points.
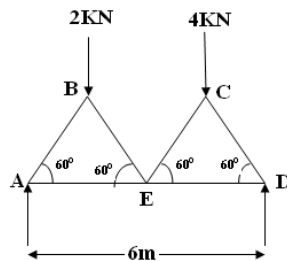

Fig. 4

The girder is loaded at B and C as shown in the Figure4. Find the forces in all the members of the girder, indicating whether the force is compressive or tensile.   (10 Marks)

UNIT III

5. (a) Determine centre of gravity of solid hemisphere of radius r from the base from basic principle.   (4 Marks)

(b) Determine the coordinates x_c and y_c of the centre of 100mm diameter circular hole cut in a thin plate so that this point will be the centroid of the shaded area shown in the Fig.5 .All dimensions are in mm.
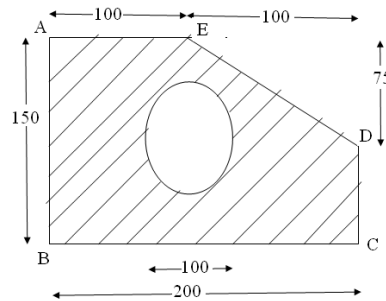
(10 Marks)

Fig. 5

OR

6 (a) Find the centroid of the triangle whose height is h and base is b from basic principle.   (4 Marks)

(b) A solid body is formed by joining the base of right circular cone of height H to the equal base of a right circular cylinder of height h as shown in the Fig. 6. Calculate the distance of centre of the mass of the solid from its plane face when H= 12 cm and h= 3cm.
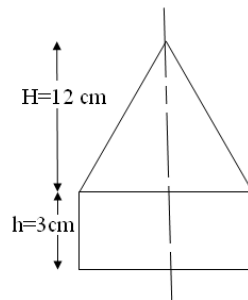
(10 Marks)

Fig. 6

UNIT 1V

7. (a) Derive an equation for moment of inertia of circular section about centroidal axis

(4Marks)

(b) Find the moment of inertia of area of a T section shown in the Fig.7 about XX and YY axes through the centre of gravity of the section. (All dimensions are in mm)
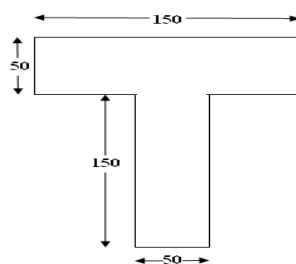
(10 Marks)

Fig. 7

OR

8.(a) State and prove the theorem of perpendicular axis as applied to moment of inertia

(4 Marks)

(b) Determine mass moment of inertia of a steel rectangular plate 8cm x16cm x 1cm thickness as shown in the Figure 8 about centroidal axis parallel to 8cm side. Take mss density of steel as 8000 kgs/m^3.

(10Marks)
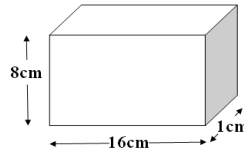
Fig. 8

UNIT V

(9) Three marks A ,B and C at a distance of 100m each are made along a straight road. A car starting from rest and with uniform acceleration passes the mark A and takes 10 sec to reach B and Further 8 seconds to reach the mark C. Calculate (i) The magnitude of the acceleration of the car. (ii) the velocity of the car at A (iii) Velocity of the car at B. (iv) the distance of the mark A from the starting point.

(14Marks)

OR

(10) A body is moving with uniform acceleration and covers 15m in 5th Sec and 25 m in 10th sec. Determine (i) Initial velocity of the body. (ii) Acceleration of the body.

(14Marks)
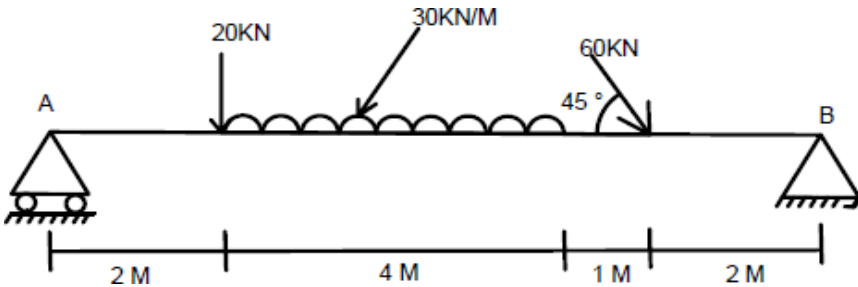
K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech 3ʳᵈ Semester Regular Examinations (R-18) Model Paper 2021
Sub: ENGINEERING MECHANICS
(Civil Engineering)

Time: 03:00 Hrs.   **Max. Marks: 70**

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

S. No.	QUESTION	Marks
	Unit – I	
1	a) How do you classify force system? b) A system of four forces acting on a body is as shown in the figure below. Determine the resultant of given force system. 	7 7
	OR	
2	a) State and prove Varigon's theorem. b) A fine light string *ABCDE* whose extremity *A* is fixed, has weights *W*1 and *W*2 attached to it at *B* and *C*. It passes round a small smooth peg at *D* carrying a weight of 40N at the free end *E* as shown in fig. If in the position of equilibrium, *BC* is horizontal and *AB* and *CD* makes 150° and 120° with *BC*, find (*i*) Tension in the portion *AB*, *BC* and *CD* of the string and (*ii*) Magnitude of *W*1 and *W*2. 	7 7

	Unit – II	
3	a) Explain the laws of solid friction.	7
	b) A body of weight 500N is pulled up by an inclined plane by a force of 350N. The inclination of plane is 30 degree to the horizontal and the force is applied parallel to the plane. Determine the coefficient of friction.	7
	OR	
4	a) Explain how a wedge is used for raising heavy loads. Also gives principle.	4
	b) A ladder 5m long rests on a horizontal ground and leans against a smooth vertical wall at an angle 70° with the horizontal. The weight of the ladder is 900N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750N stands 1.5m from the bottom of the ladder. Calculate coefficient of friction between the ladder and the floor.	10
	Unit – III	
5	a)Find the reactions at supports A and B of loaded beam shown in figure. 	7
	b)A simply supported beam AB of 7m span is subjected to (i) 4kNm clockwise couple at 2m from A (ii) 8kNm anticlockwise couple at 5m from A and a triangular load with zero intensity at 2m from A is increasing to 4kN/m at a point 5m from A. determine the reaction at A and B.	7
	OR	
6	Determine the forces in all the members of truss shown in the figure. All the inclined members are 60 degrees to horizontal and length of each member is 2 m.	14
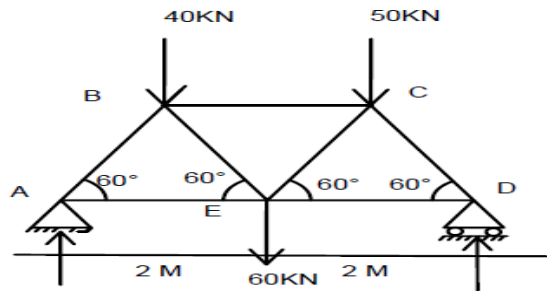
Unit – IV

| 7 | Find the centroid of the section given below. | 14 |

| | OR | |

| 8 | Locate the centroid of the shaded area. | 14 |
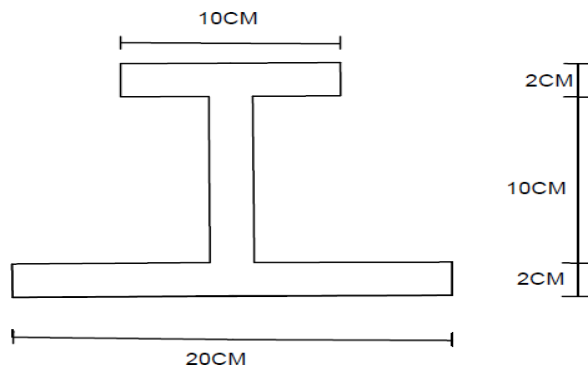
Dimensions in millimeters
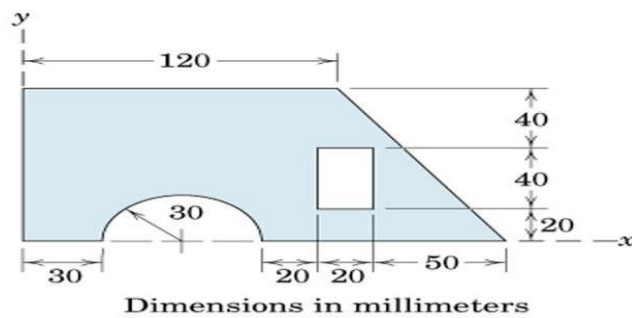
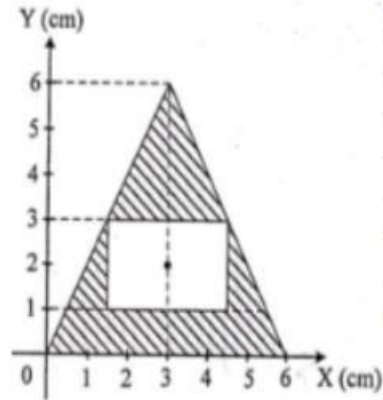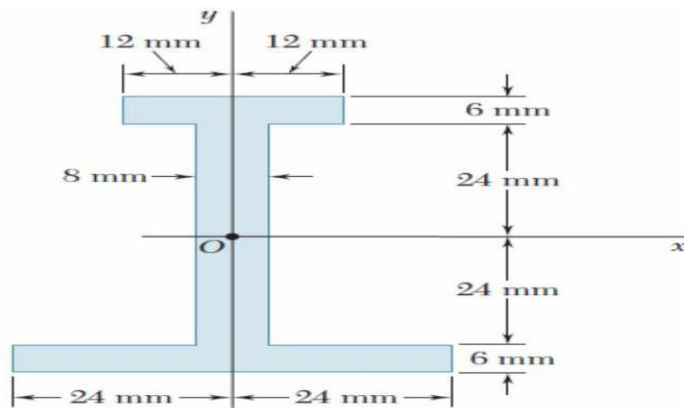|	**Unit - V**	
9.	a) State and prove parallel axis theorem.	7
	b) Determine the coordinate of the center of gravity of object, about the x axis. 	7
	OR	
10.	Determine the moment of inertia and the radius of gyration of the area shown in the fig. 	14

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech III Semester Regular Examinations, Model Question Paper- 2021
Sub: Surveying & Geomatics
(Civil Engineering)

Time: 03:00 Hrs.   Max. Marks: 70

Note: Answer All Questions. Each question will carry equal marks

		UNIT – I	
1 a)		What are different types of obstacles in chain survey? Describe them with neat sketches?	7
b)		To determine the width of a river ,a chain line PQR was laid across it, the points was at the points Q and R being on two sides of river. From point S, 60m from Q on line QS which 280 ^{0} and 190^0 respectively. If the distance PQ was 32m, determine the distance QR and draw the sketch.	7
		(Or)	
2 a)		What are the sources of errors in compass?	6
b)		The following are the observed bearings of the lines of a traverse ABCDEA with a compass in a plane where local attraction was suspected.	8

LINE   FB   BB
AB   191^{0}45'   13^{0}0'
BC   39^{0}30'   222^{0}30'
CD   22^{0}45'   200^{0}30'
DE   242^{0}45'   62^{0}45'
EA   330^{0}15'   147^{0}45'

		UNIT – II	
3 a)		Explain different types of leveling operations?	7
b)		When the reciprocal leveling is done? Describe the method along with a sketch.	7
		(Or)	
4 a)		In an operation of reciprocal leveling, two points A and B are taken on opposite banks of a river. When the level was set up near A, the staff readings on A and B are 3.235m and 4.250m respectively. When the level was set up near B, the respective staff readings are 2.345m and 3.623m. Find the true difference of level between A and B. What is the RL of B, if RL of A is 132.250?	7
b)		The following consecutive readings were taken with a level and 4m leveling staff on a continuously sloping ground at common intervals of 30m. 0.905(on A), 1.745, 2.345, 3.125, 3.725, 0.545, 1.390, 2.055, 2.955, 3.455, 0.595, 1.015, 1.850, 2.655 and 2.945(on B). The RL of A was 395.50 m. calculates RLs of different points and find the gradient of line AB.	7

	UNIT – III	
5 a) b)	Derive an expression for Simpson's rule for computing area between boundary and chain line. The following are the perpendicular offsets were taken from a chain line to a hedge Calculate area by (1) Trapezoidal rule (2) Simpsons rule Distance(m) _ 0 5 10 15 20 30 40 50 65 Offset (m) _ 3.40 4.25 2.60 3.70 2.90 1.80 3.20 4.50 3.70	7 7
	(Or)	

6 a)
 	
b)
	A railway embankment of formation width of 8m and side slope 2:1 is to be constructed. The ground level along the centre line is as follows:
	Chainage _ 0 50 100 150 200 250
	GL (m) _ 115.75 114.35 116.80 115.20 118.50 118.25
	     The embankment has a raising gradient of 1 in 100 and the formation level at zero chainage is 115.00. Assuming the ground is level across the centre line, Compute the volume of the earth work.
	The areas enclosed by the contours in a lake are as follows:
	Contour (m) _ 270 275 280 285 290
	Area (m^2) _ 2050 8400 16300 24500 31500
	   Calculate the volume of water between the contours 270m and 290m by:
	  (i) Trapezoidal formula and (ii) Prismoidal rule
		10
		
		4

	UNIT - IV	
7 a) b)	Describe the method of setting a circular curve by Rankin's deflection angle method Two tangents intersect at a chainage of 1000m, the deflection angle being 30^0. Calculate all the necessary data for setting out a circular curve of offsets from the chord produces, taking a peg interval of 25m.	7 7
	(Or)	
8 a) b)	Write the procedure to find horizontal and vertical angles using Total station instrument. What are the functions and principles involved in Total station instrument?	7 7
	UNIT – V	
9 a) b)	What are different types of photogrammetry? What is flight planning and stereoscopy?	7 7
	(Or)	
10 a) b)	Explain electro-magnetic spectrum. What are platforms and sensors? Write different types of platforms and sensors?	7 7

R18

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech III Semester Regular Examinations, Model Question Paper- 2021
Sub: Building Materials and Constructions
(Civil Engineering)

Time: 03:00 Hrs.   Max. Marks: 70

Note: Answer All Questions. Each question will carry equal marks
Unit-I

1. Briefly describe the following.   7+7 M
      (a) Dressing of stone (b) Quarrying
      Or

2. Describe the classification of Bricks as per Indian standards. How do they compare on their properties?   14 M

Unit-II

3. What are the types of cement explain clearly? Write the properties of Cement.   6+8 M

Or

4. Write an essay Mortar.   14 M

Unit-III

5. (a) What are the good characteristics of Paints.   7 M
     (b) Types of Paints   7 M

Or

6. Classification and properties of Glass .   14 M

Unit-IV

7. Differences between Stone Masonry and Brick Masonry.   14 M

Or

8. Explain in detail Types of Walls.   14 M

Unit-V

9. Describe types of Doors and Windows.   14 M

Or

10. What are the Methods of DPC? Explain Cleary wherever with neat sketches.   14 M

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KSRM College of Engineering (AUTONOMOUS), KADAPA

B.Tech., III Semester (R18) Regular Examinations of 2021

Sub: Electrical Circuit Analysis

Time: 3 Hrs   Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q No	Question	Marks	CO	BL
	UNIT-I			
1	a) State and Prove Reciprocity theorem	7	CO1	L1
	b) In a network given below,determine the current through (2+j4) ohms impedance using Millman's theorem. Figure 3:- Reduction of figure 2.	7	CO2	L2, L4
	OR			
2	Derive the condition for maximum power transfer from source to load for a sinusoidal excitation network.	14	CO2	L3
	UNIT-II			
3	Derive the expression for bandwidth for series RLC networks	14	CO1	L3
	OR			
4	Draw the Locus diagram of a Series RL Circuit with variable reactance and fixed resistance using necessary equations.	14	CO1	L2
	UNIT-III			
5	a) Write the necessary conditions to obtain the pole zero plot.	7	CO1	L1
	b) Obtain the time domain response for the transfer function given below using pole zero plot. $$V(s) = 10s/((s+5+j15)(s+5-j15))$$	7	CO4	L4

	OR			
6	Derive the expression for ABCD parameters in terms of Z and Y parameters.	14	CO5	L3
	UNIT-IV			
7	In the circuit shown below the switch s is kept first at position 1 and steady state condition is reached .At t=0, the switch is moved to position 2,Find the current in both the cases. 10Ω t=0 20Ω 100V 0.5H	7	CO3	L3
	OR			
8	a)Write the initial conditions to obtain the transient response for R, L and C elements.	7	CO3	L2
	b) Obtain the transient response for RL series network for DC excitations.	7	CO3	L3
	UNIT-V			
9	a) Obtain the relationship between line and phase voltages and currents in three phase star connection networks.	7	CO4	L3
	b) Three similar coils each having a resistance of 15Ω and an inductance of 0.04H are connected in delta to three phase 200V,50Hz supply. Calculate phase currents,line currents.	7	CO4	L3
	OR			
10	Derive the expression for three phase active power using two wattmeter method	14	CO4	L3

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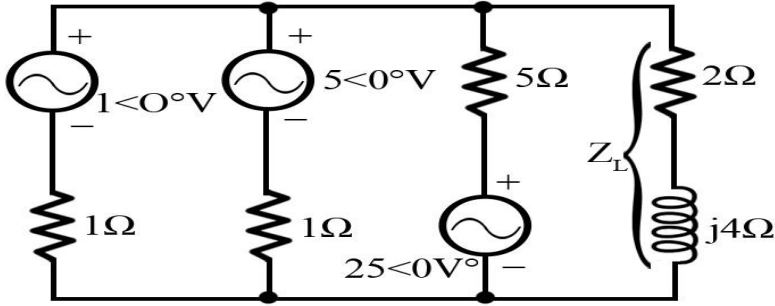B.Tech., III Semester (R18) Regular Examinations of 2021

Sub: Electromagnetic Fields

Time: 3 Hrs   Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	Marks	CO	BL
	Unit I			
1.	a) State and explain coulomb's law.	7	CO1	L2
	b) Determine the force on a unit positive charge at P (2, 0)m due to the charges Q_1 at origin and Q_2 at (1, 0). Where Q_1 = 1000 PC, Q_2 = - 2000 PC.	7	CO5	L3
	(OR)			
2.	a) Define Electric Dipole and derive an expression for the Potential (V) and Electric Field Intensity ($\bar{E}$) at any point in free space due to Dipole.	7	CO3	L2, L4
	b) Derive Maxwell's First Equation $\nabla.\bar{D} = \rho_v$.	7	CO2,3	L3
	Unit II			
3.	a) State Equation of Continuity and derive the expression in Point form and Integral form.	7	CO3	L2
	b) Given $\bar{J} = 100sin\theta\overline{a_r}\ A/m^2$ in Spherical Coordinates, Determine the current crossing the Spherical Shell at r = 0.02m.	7	CO5	L3
	(OR)			
4.	a) Derive the boundary conditions for $\bar{E}$ and $\bar{D}$ at the boundary between two perfect dielectrics.	7	CO3	L3, L4
	b) A capacitor with a dielectric of ϵ_r = 5 has a plate separation of 4mm and plate area of 64cm^2. A voltage of 200V is applied between the plates. Obtain the surface charge density and energy stored in the capacitor.	7	CO3	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.	7	CO5	L2
	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 1. 2, 3, 4 2. ρ = 6, φ = 45^0, z = 3 3. r = 3.6, Θ= 60^0, φ = 90^0	7	CO5	L2
	(OR)			
6.	a) State and explain Ampere's Circuital Law.	7	CO5	L2
	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 $\bar{H}$.	7	CO5	
	Unit IV			

7.	a) Derive Lorentz Force Equation. Obtain the expression for the force experienced by a conductor placed in magnetic fields.	7	CO4	L2, L3
	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 $\overline{B} = 3.5x10^3(\overline{a_x} - \overline{a_y})Tesla$. Where $\overline{a_x}$ and $\overline{a_y}$ are unit vectors	7	CO4	L3
	(OR)			
8.	a) Derive formulae for self inductance of a solenoid. Use this formulae, Determine self inductance of a solenoid having 500 turns, mean diameter equal to 10cm and length equal to 5cm. Assume medium to be air.	7	CO4	L2, L3
	b) What is the torque experienced by a closed circuit carrying a current of I amps and placed in a uniform magnetic field B-Tesla.	7	CO4	L3
	Unit V			
9.	a) Explain Faraday's Law of Electromagnetic Induction and derive Maxwell's equation in Integral and Differential Form.	7	CO2	L2, L3
	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 100sin200πt volts.	7	CO2	L2
	(OR)			
10.	a) Write down Maxwell's equations in differential form and hence obtain the corresponding equations in integral form.	7	CO2	L2
	b) A conductor of length 100cm moves at right angles to a uniform field of strength 10,000 lines/cm^2, with a velocity of 50m/sec. Calculate the EMF induced in it. Find also the value of the induced EMF when the conductor moves at an angle of 30^0 to the direction of the field.	7	CO5	L3

Code: 1802305

KSRM College of Engineering (AUTONOMOUS), KADAPA

B.Tech., III Semester (R18) Regular Examinations of 2021

Sub: Electrical Machines - I

Time: 3 Hrs   Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q. No	Question	Marks	CO	BL
	UNIT-I			
1	a) Derive the EMF equation of a DC generator	7	CO1	L3
	b) A 4-pole DC generator has a wave wound armature with 792 conductors. The flux per pole is 0.0121 wb. Determine the speed at which it should be run to generate 240V on no-load.	7	CO1	L4
	OR			
2	Analyse the Armature reaction effect in DC Generators with neat diagrams.	14	CO1	L3
	UNIT-II			
3	a) Explain the characteristics of DC shunt motors.	7	CO2	L2
	b) A 4-pole, 220V Shunt motor has 540 lap-wound conductors. It takes 32A from the supply mains and develops output power of 5.595kW. The field winding takes 1A. The R_a is 0.09Ω and the flux per pole is 30mWb. Calculate (i) Speed (ii) Armature torque and (iii) Output torque.	7	CO3	L4
	OR			
4	a) Explain 3-point starter with a neat diagram.	8	CO2	L3
	b) A 220V DC series motor is running at a speed of 800rpm and draws 100A. Calculate at what speed the motor will run when developing half the torque. Total resistance of armature and field is 0.1Ω. Assume that the magnetic circuit is unsaturated.	6	CO3	L4
	UNIT-III			
5	Explain in detail about the Losses and Efficiency of a DC Machine and also derive the Condition for maximum Efficiency.	14	CO3	L2
	OR			
6	a)Explain Swinburne's test on DC machines. Also state its advantages & disadvantages.	10	CO3	L3
	(b)A 200V DC motor takes 25 A while running at a speed of 1000r.p.m during brake test. If the spring balances read 5kgand 25 kg, find the output and efficiency. Diameter of the brake drum is given as 40cm	4	CO2	L4
	UNIT-IV			

7	a)Derive an expression for the induced e.m.f of a transformer.	8	CO1	L2
	b)The core of a 100kVA, 11000/550V, 50-Hz, 1-phase transformer has a cross section of 20cmX20cm. find (i) The number of turns in LV and HV windings. (ii) EMF per turn. The maximum flux density is 1.3 Tesla and assume a stacking factor of 0.9	6	CO1	L4
	OR			
8	a)Explain Sumpner's test on transformer.	7	CO3	L2
	b)Obtain the equivalent circuit of a 200/400V, 50Hz, 1-phase transformer from the following test data: OC test: 200V, 0.7A, 70W – on LV side SC test: 15V, 10A, 85W – on HV side. Calculate the equivalent circuit parameters and show them on equivalent circuit.	7	CO3	L4
	UNIT-V			
9	Draw and analyze the connection diagram of a transformer for converting 3-phase supply into 2-phase supply	14	CO4	L3
	OR			
10	a) Discuss the advantages of Auto transformers over two winding transformers	7	CO4	L3
	b) Discuss various types of connections used for 3-=phase transformers.	7	CO4	L2

Code: 1802306

KSRM College of Engineering (AUTONOMOUS), KADAPA

B.Tech. III Semester (R18) Regular Examinations of 2021

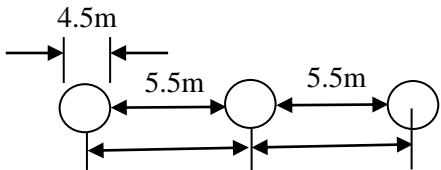## Sub: Power Systems - I

Time: 3 Hrs   Max. Marks: 70

Answer any Five Questions choosing one from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	Marks	CO	BL
	UNIT-I			
1	**a)** What are the factors of selection of the site for hydro electric power stations?	7M	CO1	L1
	b) Describe briefly various components of a nuclear reactor?	7M	CO1	L2
	(OR)			
2	Explain the operation of thermal power station with neat block diagram?	14M	CO1	L2
	UNIT-II			
3	**a)** What is tariff? Briefly explain the two - part tariff & three tariff?	7M	CO2	L2
	b) A consumer has a maximum demand of 200KW at 40% load factor. If the tariff is 100/- per KW of maximum demand plus 10 paise per KWh. Find the overall cost per KWh?	7M	CO2	L3
	(OR)			
4	**a)** Define the following terms**:** Demand Factor, Yearly Load Factor, Plant Capacity Factor, Diversity Factor.	7M	CO2	L1
	b) A generating station has the daily load cycle. <table><tr><td>Time in hours</td><td>0-6</td><td>6-10</td><td>10-12</td><td>12-16</td><td>16-20</td><td>20-24</td></tr><tr><td>Load in KW</td><td>40</td><td>50</td><td>60</td><td>50</td><td>70</td><td>40</td></tr></table> Draw the load curve and find the maximum demand, units generated per day, average load and load factor?	7M	CO2	L3
	UNIT-III			
5	**a)** List various methods of improving string efficiency?	7M	CO3	L1
	b) A three phase over head line is suspended by a suspension type insulator, which consists of three units. The potential across top unit & middle unit are 9KV and 11KV respectively. Calculate, (i) the ratio of capacitance between pin and earth to the self capacitance of each unit. (ii) The line voltage (iii) string efficiency.	7M	CO3	L3
	(OR)			
6	**a)** Discuss the effect of both wind & ice on sag calculation?	7M	CO2	L4
	b) A 33KV transmission line has the following data: weight of conductor=800Kg/Km, length of span=300m, ultimate strength=3500Kg, safety factor=2. Calculate the height above ground at which the conductor should be supported. Ground clearance required is 10m.	7M	CO2	L2
	UNIT-IV			
7	**a)** Write short notes on GMD & GMR?	7M	CO4	L2

	b) Determine the inductance per Km per phase of a single circuit 20KV line of given configuration shown in figure. The conductors are transposed and have a diameter of 4.5Cm. 4.5m 5.5m 5.5m 	7M	CO4	L3

(OR)				
8	**a)** Deduce the expression for line to neutral capacitance for a 3-phase overhead transmission line when the conductors are un-symmetrically placed but transposed.	7M	CO4	L4
	b) Discuss the effect of earth on the capacitance of a 1-phase & 3-phase transmission line.	7M	CO4	L4

UNIT-V

9	**a)** What are the requirements of insulating material?	7M	CO3	L1
	b) A 3-core, 3-phase metal sheeted cable on testing for capacitance gave the following results: (i) capacitance between all conductors bunched & sheath=0.90µf (ii) Capacitance between two conductors bunched with sheath and 3rd conductor=0.4µf. With the sheath insulated find the capacitance. 1. Between any two conductors 2. Between any two bunched conductors and the 3rd conductor 3. Calculate the capacitance to neutral and charging current taken by the cable when connected to 11KV, 3-phase, and 50Hz system.	7M	CO3	L4

(OR)				
10	**a)** What is corona? State the factors that affect the Corona loss? What are the methods of reducing corona effect?	7M	CO2	L1 L2
	b) A 110KV, 3-phase, 50Hz transmission line, 175Km long consists of three 1cm diameter standard copper conductors spaced in 3m Delta arrangement. Temperature taken at 26°C & barometric pressure as 74cm. Assume surface irregularity factor mo=0.85, m_v for local corona is 0.72, and m_v for general corona is 0.82. Find, (i) disruptive voltage (ii) visual corona voltage for local corona (iii) visual corona voltage for general corona and (iv) Power loss due to corona using peek's formula under fair weather & wet conditions.	7M	CO2	L4

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Code: **(1803303)**

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech III SEMESTER (R18) Regular Examinations, 2021
BASIC MECHANICAL ENGINEERING
(*CIVIL ENGINEERING*)
Model Question Paper

Time:3 hours   Max Marks: 70

Answer any five questions. Selecting one question from each unit
All questions carry equal marks

UNIT I

1. (a) Derive the expression for p dv work for polytrophic process.   (7 Marks)

   (b) Explain the equation of state for perfect gas?   (7 Marks)
OR

2. Explain Kelvin Plank and Clausius statements of the second law of Thermodynamics
                                                                                                   (14 Marks)

UNIT II

3. (a) Explain with neat sketch the working of Babcock and Wilcox boiler.   (7 Marks)
   (b)Explain the working of four stroke petrol engine.   (7Marks)

OR

4.   Explain the Components and Working Of Centrifugal Pump & reciprocating pump?
                                                                                                   (14 Marks)

.   ## UNIT III
5. (a) Explain about refrigerator, heat engine, and heat pump with neat diagrams. (7 Marks)
   (b) What is psychometry .Explain the following terms
       [a] specific humidity   [b] Dry bulb temperature
       [c] Degree of saturation   (7Marks)
OR
6 Explain the working of vapour compression refrigeration system with neat diagram
                                                                                                   (14Marks)

UNIT 1V

7. (a) Explain the working of hydro electric power plant with neat sketch. (14 Marks)

OR

8. **(a)** Write the mechanical properties of materials. (7 Marks)

   (b) Describe thermal power station with a neat sketch?

(7Marks)

UNIT V

(9) what is mechanism. Explain whit worth quick return motion mechanism with neat diagram

(14Marks)

OR

(10) Explain different types of operations performed on lathe machine ? (14Marks)

Code: (1803304)
K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B. Tech III semester (R18) Regular Examinations, JAN-2021
MANUFACTURING PROCESSES
(Mechanical Engineering)
MODEL QUESTION PAPER

Time: 3 hrs   Max Marks: 70

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

UNIT-I

1) Explain the concept of Allowances? Write different types of allowances?

(OR)

2) Define pattern and briefly explain about any six types of patterns with a neat sketch

UNIT-II

3) Describe briefly the types of hot chamber die-casting machines with a neat sketch?

(OR)

4) Explain in detail the working of a cupola furnace with a neat sketch.

UNIT-III

5) Explain Briefly about TIG and MIG welding with a neat sketch.

(OR)

6) With a neat sketch, explain the working principle of submerged arc welding process.

UNIT-IV

7) With a neat sketch, explain Electron beam welding ?

(OR)

8. a) Write a short note on soldering and brazing.
   b) Explain plasma arc welding with a neat sketch.

UNIT – V

9) How do you classify extrusion processes? Explain Hydrostatic Extrusion with a neat sketch.

(OR)

10. a) With a neat sketch explain "Smith forging".
    b) Explain any four forging defects with a neat sketch.

Code: **1803305**

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech III SEMESTER (R18)Regular Examinations, JAN-2021
STRENGTH OF MATERIALS
(Mechanical Engineering)
Model Question Paper

Time:3 hours   Max Marks: 70

Answer any five questions. Selecting one question from each unit
All questions carry equal marks

UNIT I

1. a) Derive the relationship between the elastic modulii.   (8 marks)

b) A reinforced short concrete column 250mm X 250mm in section is reinforced with 8 steel bars in 2500 mm^2. The column carries a load of 390KN. If the modulus of elasticity for steel is 15 times that of concrete. Find the stresses in steel and concrete.

(6 marks)

OR

2.   a) Derive the expression for the strain energy stored in a body when the load is suddenly applied.   (7marks)

b) A brass bar having cross sectional area of 1000 mm^2 is subjected to axial forces as shown in fig. Find the total elongation of the bar, Take E=1.05×10^5 N/mm^2

(7 marks)
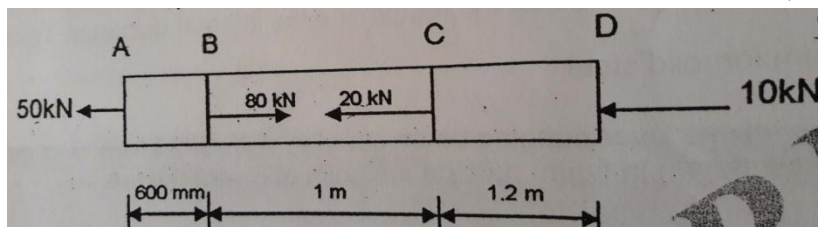
UNIT II

3. a) what are the different types of beams. Differentiate between a point load and uniformly distributed load.   (6 Marks)

b) A simply supported beam of 9m span is loaded as shown in figure. Draw the bending moment and shear force diagram indicating principal values.   (8 marks)
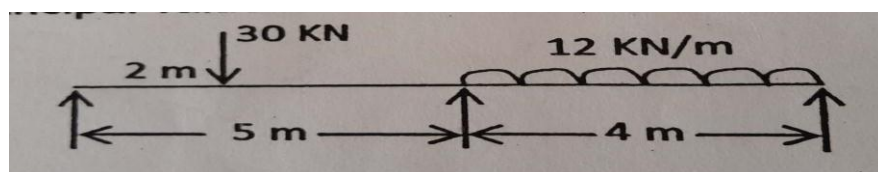
OR

4 .a) Define shear force and bending moment with sign conventions   (4 Marks)

b) Draw shear force and bending moment diagram for the shown in fig indicating principal values   (10 marks)

UNIT III

5. a) Write the assumptions of theory of simple bending   (4 Marks)

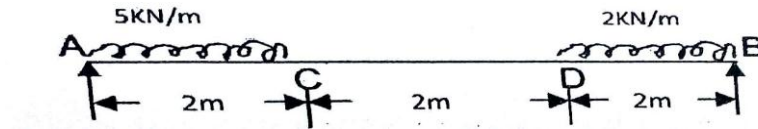b) A timber beam of rectangular section is to support a load of 20 KN over a span of 4m. If the depth of the section is to be twice the breadth and the stress in the timber is not to exceed 60 N/mm^2, find the dimensions of the cross section. How would you modify of the beam it were a concentrated load placed at the centre with the same ratio of breadth to depth.   (10 Marks)

OR

6. a) Derive the shear stress distribution over rectangular section   (7 marks)

b) The shear force acting on a section of a beam is 50 KN.The of the beam is of T-shaped of dimensions 100mm×100mm×20mm.The moment of inertia about the horizontal axis is $314.221 \times 10^4 mm^4$.Calculatethe shear stress at the neutral axis and at the junction of the web and the flange.   (7 marks)

UNIT 1V

7. state the assumptions and Derive the theory of pure torsion equation   (14 Marks)

OR

8. A beam AB of 6m span in simply supported at the ends and in loaded as shown in fig. Determine (i) deflection at C (ii) Max deflection (iii) slope at end A. Take E= $2X10^5 N/mm^2$ and I= 2000 cm^4 (14Marks)
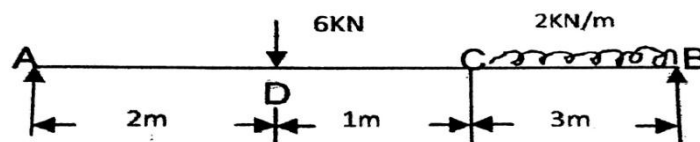
UNIT V

9 a) Derive the formula for longitudinal and circumferential stresses   (7Marks)

 b).A cylindrical shell 2.4 m long 0.6 meter in diameter is made up of 12 mm thin plate. Find the change in length and diameter when the shell is subjected to an internal pressure of $2N/mm^2$. Take E= $2x10^5$ N/mm^2 and μ=0.25   (7 Marks)

OR

10.A compound cylinder formed by shrinking one bite onto another is subjected to an internal pressure of 50 N/mm^2. Before the fluid in admitted, the internal and external diameters of the compound cylinder are 100 mm and 180 mm and the diameter at the junction is 150 mm.If after striking on, the radial pressure at common surface is 8 N/mm^2, calculate the final stresses set up by the section.   (14 marks)

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech III SEMESTER (R18)Regular Examinations, JAN-2021
MATERIAL SCIENCE AND ENGINEERING
(Mechanical Engineering)
Model Question Paper

Time:3 hours   Max Marks: 70

Answer any five questions. Selecting one question from each unit
All questions carry equal marks

UNIT I

1. (a) Briefly explain about mechanism of crystallization   (4Marks)
  (b) Define the Grain size, and list out the methods to Determination of Grain size
     Recommended by the ASTM, Explain any one method   (10 Marks)
OR
2. (a) Define solid solution, List out the types of solid solutions, Explain substitutional solid
     Solution with neat sketch   (10 Marks)
 (b)   State and Explain Hume Rother's Rules   (4 Marks)

UNIT II

3. (a) Briefly explain about Phase rule and Lever rule   (4 Marks)
  (b) Discus different types of Phase diagrams, Explain Eutectic type of phase diagram of if
    'Two metals are completely soluble in liquid state and completely insoluble in solid state'
     With neat sketch   (10Marks)
OR

4. Explain Iron-Ironcarban (Fe-Fe$_3$c) Equilibrium diagram with neat sketch, explain the effect
   Of Alloying elements on Iron-Ironcarban Equilibrium diagram   (14 Marks)

.   **UNIT III**
5. (a) Classify the basic types of Cast-iron, Explain the compositions ,properties, Applications
      And Microstructure of Malleable cast- iron with neat sketch   (7 Marks)
   (b) Explain the compositions, properties, Applications and Microstructure of Grey cast-iron
       With neat sketch   (7Marks)
OR
6 (a) Classify the basic types of steels, Explain the compositions, properties, Applications and
      Microstructure of plain carbon steels with neat sketch   (7 Marks)
   (b) Explain the Hadfield manganese steels with its compositions, properties and
      Applications   (7Marks)

UNIT 1V

7. (a) Construct and Explain TTT Diagram for Eutectoid steels with neat sketch (6Marks)

(b) Briefly explain flame hardening and induction hardening, with neat sketch?

(8Marks)

OR

8.(a) Define Power metallurgy process How many steps are considered it, explain production

of Metal powder by mechanical process with neat sketch (7 Marks)

(b) Explain the sintering process in powder metallurgy process with neat sketch

(7Marks)

UNIT V

(9) Write short notes of the compositions, properties and Applications on Copper and its Alloys

(14Marks)

OR

(10) Write short notes of the compositions, properties and Applications on Aluminum and its Alloys (14Marks)

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

B.Tech. III semester (R18) Regular Examinations JAN-2021
THERMODYNAMICS

(Mechanical Engineering)
MODEL QUESTION PAPER

Time:3hrs   Max. Marks: 70

Answer anyFive questions, selecting one Question from each Unit
All Questions carry equal marks

UNIT -I

1.(a) What is a thermodynamic system? What is the difference between a closed system and anopen system? Givefew examples for closed and open systems.   **(8 M)**

(b) Calculate the work done in a piston-cylinder arrangement during an expansion process is given by the equation P = (V^2 + 6V) bar. Assume that during the expansion process the volume changes from 1 m^3 to 4 m^3.   **(6 M)**

OR

2.(a) Define and explain Zeroth law of thermodynamics.   **(7 M)**
(b) Gas from a bottle of compressed Helium is used to inflate an inelastic flexible balloon,originally folded completely flat to a volume of 0.5 m^3. If the barometer reads 760 mm of Hg, what is the amount of work done upon the atmosphere by the balloon?   **(7 M)**

UNIT -II

3.(a) Define 'internal energy' and prove that it is a property of a system.   **(7 M)**
(b) 1.5 kg of liquid having a constant specific heat of 2.5 KJ/Kg K is stirred in a well insulated chamber causing the temperature to rise by 15^0C. Find (i) Change in internal energy and (ii) Work done for the process

OR

4.(a) Write down the general energy equation for a steady flow system and simplify when applied for the steam turbine.   **(6 M)**

(b) At the inlet to a certain nozzle the enthalpy of the fluid is 3025 KJ/Kg and the velocity is 60 m/s. At the exit from the nozzle the enthalpy is 2790 KJ/Kg. The nozzle is horizontal and there is negligible heat loss from it. (i) Find the velocity of the fluid at the exit. (ii) If the inlet area is 0.1 m^2 and specific volume at inlet is 0.19 m^3 /Kg, find the rate of flow of fluid.   **(8 M)**

UNIT - III

5.(a) State and explain the second law of thermodynamics **(8 M)**

(b) An engine operating on a Carnot cycle works with in temperature limits of 600 K and 300 K. If the engine receives 2000 kJ of heat, evaluate the work done and thermal efficiency of the engine. **(6 M)**

OR

6.(a) Define Clausius Inequality and prove it **(7 M)**

(b) A piston-cylinder arrangement contains 0.05 m^3 of nitrogen at 1 bar and 280 K. The piston moves inwards and the gas is compressed isothermally and reversibly until the pressure becomes 5 bar. Determine the (i) change in entropy (ii) Work done Assume nitrogen to be a perfect gas. Gas constant for nitrogen = 0.297 KJ/Kg K.

UNIT - IV

7.(a) Show that for an ideal gas $C_P - C_v = R$

(b) The usual cooking gas (mostly methane) cylinder is about 25 cm in diameter and 80 cm in height. It is charged to 12 MPa at room temperature of 27^0C. Assuming the ideal gas law, find the mass of the gas filled in the cylinder.

OR

8.(a) Derive an expression for an air standard efficiency of an Otto cycle.

(b) A diesel engine has a compression ratio of 15 and heat addition at constant pressure takes place at 6% of stroke. Find the air standard efficiency of the engine.

UNIT - V

9.(a) Describe the process of formation of steam and give its graphical representation also. **(8 M)**

(b) Find the specific volume and enthalpy of the wet steam at 18 bar, dryness fraction of 0.9. **(6 M)**

OR

10.(a) What do you understand by the mean temperature of heat addition? **(6 M)**

(b) Saturated steam at 18 bar abs. enters the turbine of a steam power plant and expands to a condenser pressure of 0.8 bar. Determine the Rankine efficiency **(8 M)**

TIME: 3HRS   **Max. Marks: 70**

Note: Answer any *five* of the following
Choosing *one* from each unit

UNIT-I

1.(a)	Explain the operation of a PN junction diode under forward bias condition.	7M
(b)	Explain the operation of a bridge full wave rectifier. Also draw input and output waveforms.	7M

(OR)

2.(a)	Explain the operation of a half wave rectifier with the help of circuit diagram.	7M
(b)	Write a short note on junction breakdown mechanisms.	7M

UNIT-II

3.(a)	Explain the operation of an npn transistor.	7M
(b)	Draw the circuit of a BJT in CB configuration and explain the operation. Also draw input and output characteristics curves.	7M

(OR)

4.(a)	Explain the operation of an n-channel JFET.	7M
(b)	Explain the operation of a BJT connected in CE configuration and explain the operation.	7M

UNIT-III

5.(a)	Analyze the effect of negative feedback in an amplifier circuit.	7M
(b)	Draw the circuit of a Colpitt's oscillator and explain its operation.	7M

(OR)

6.(a)	Classify the feedback circuits and draw the block diagrams.	7M
(b)	Explain the operation of an RC phase shift oscillator.	7M

UNIT-IV

7.(a)	Draw the architecture of 8086 processor and explain.	7M
(b)	Explain minimum mode of 8086.	7M

(OR)

8.(a)	Draw the structure of flag register and explain about each flag.	7M
(b)	Explain maximum mode of 8086.	7M

UNIT-V

9.(a)	Draw the architecture of 8051 and explain.	7M
(b)	Write about 8051 interrupts.	7M

(OR)

10.(a)	Draw the architecture of 8096 and explain.	7M
(b)	Write about the features of ARM.	7M

KSRM COLLEGE OF ENGINEERING(AUTONOMOUS), KADAPA

B. TECH. III SEM ECE (R18) MODEL PAPER

SUB: ELECTRONIC DEVICES AND CIRCUITS

TIME: 3HRS   **Max. Marks: 70**

Note: Answer any *five* of the following
Choosing *one* from each unit

	UNIT-I	
1.(a)	Explain the operation of a PN junction diode under forward bias condition.	7M
(b)	Discuss diode capacitances with the help of equations.	7M
	(OR)	
2.(a)	Explain the working principle of Bridge rectifier with derivations. Differentiate with Full Wave Rectifier.	7M
(b)	The Half wave rectifier circuit is supplied with a 230 V AC through 3:1 step down transformer with a resistive load of 10 KΩ, the diode forward resistance is 75 Ω and transformer secondary winding resistance 10 Ω. Calculate Vm, Im, Iav, Vav and P$_{dc}$.	7M
	UNIT-II	
3.(a)	Explain the operation of an NPN transistor.	7M
(b)	Draw the circuit of a BJT in CB configuration and explain the operation. Also draw input and output characteristics curves.	7M
	(OR)	
4.(a)	Explain the construction and operation of an n-channel JFET.	7M
(b)	Compare & contrast MOSFET with JFET.	7M
	UNIT-III	
5.(a)	What are the drawbacks in fixed bias? How they are eliminated in self bias? Explain this with required circuit diagrams & equations.	7M
(b)	What are the techniques of bias compensation in BJT? And explain at least 3 techniques.	7M
	(OR)	
6.(a)	In a fixed bias circuit a Si transistor with β = 100 is used, VCC = 6 V, RC = 3 KΩ, RB = 530 KΩ. Draw the DC load line, determine the Q point, What is the stability factor?	7M
(b)	Explain JFET voltage divider bias.	7M
	UNIT-IV	
7.(a)	Derive input impedance, output impedance, current gain & voltage gain for CE amplifier using simplified hybrid model.	7M
(b)	Explain the effect of coupling capacitor on low frequency response.	7M
	(OR)	
8.(a)	Draw the circuit diagram of n-channel JFET CS amplifier and derive the expressions for voltage gain Av, input impedance Z$_i$ and output impedance Z$_o$	7M
(b)	Compare CS,CD and CG FET amplifiers.	7M
	UNIT-V	
9.(a)	With neat diagram, explain the construction and operation of SCR with its characteristics.	7M
(b)	Explain the construction and operation of UJT.	7M
	(OR)	
10.(a)	Explain the CMOS construction and its operation.	7M
(b)	Explain the operation of LED. Mention its applications.	7M

K.S.R.M.COLLEGE OF ENGINEERING, KADAPA-03
B.TECH III SEM ECE (R18)(AUTONOMOUS) MODEL QUESTION PAPER
SUB: **DIGITAL SYSTEM DESIGN**

Time: 3Hrs   Max.Marks:70

Answer ALL questions
All questions carry equal marks

UNIT -1

1. a)Convert the following numbers   (10M)
   i) $(4310)_5$ to base 10
   ii) $(C3DF)_{16}$ to base 2
   iii) $(6054.263)_8$ to base 16
   iv) $(420.6)_{10}$ to base 8
   v) $(12120)_{10}$ to base 6
   b) Encode the word DATA into 7-bit ASCII code   (4M)

(OR)

2. a) Convert the following numbers in to Gray code   (5M)
   i.$(96)_{10}$ ii. $(234)_8$
   b) Subtract the following numbers by using BCD code   (9M)
   i. 920-356   ii. 476.7-258.9   iii. 206.7-147.8

UNIT-2

3. a) Simplify the following Boolean function for minimal POS using K-map   (8M)
   F(A,B,C,D)= $\sum$(1,2,5,6,9)+d(10,11,12,13,14,15)
   b) Find the complement of F=wx+yz , then show that FF'=0 and F+F'=1   (6M)

(OR)

4. a)Reduce the following Boolean expressions to the indicated number of
   literals(6M)
   i. A'C'+ABC+AC'   to   three literals
   ii. (x'y'+z)'+z+xy+wz to three literals
   iii. A'B(D'+C'D)+B(A+A'CD)   to one literal
   b. Simplify the following Boolean function using tabulation method   (8M)
   F(A,B,C,D)=$\sum$(0,1,2,3,5,7,8,9,11,14)

UNIT-3

5. a)Design a 4-bit binary to gray code converter.   (7M)
   b) Implement the following Boolean function with a 4:1 MUX and external gates.
   F(A,B,C,D)=$\sum$(1,3,4,11,12,13,14,15)   (7M)

(OR)

6. a) Construct a 5-to-32 line decoder with four 3-to-8 line decoders with enable and
   2- to-4 line decoder.   (7M)
   b) Define Hazard? Explain the types and Hazard free realization.   (7M)

UNIT-4

7.a) Design a mod-12 synchronous counter using T-flip-flop.   (7M)
   b) Draw the state diagram and the state table for a sequence detector to detect
   the sequence 1010 and implement by using D-flip-flop   (7M)

(OR)

8. a)Design a 3-bit up-down counter which counts up when the control signal M=1 and
   counts down when M=0.   (7M)
   b) Explain the flip-flop operating characteristics   (7M)

UNIT-5

9. a)Design a combinational circuit using a ROM .The circuit accepts 3-bit binary
   number and generates an output binary number equal to the square of the input
   number.   (7M)
   b) Compare the three combinational PLD's- PROM , PLA and PAL   (7M)

(OR)

10. a) Explain about the RAM types and its internal structure in detail   (7M)
    b) Design a BCD to XS-3 code converter using a PLA   (7M)

K.S.R.M.COLLEGE OF ENGINEERING, KADAPA-03
B.TECH III SEM ECE (R18)(AUTONOMOUS) MODEL QUESTION PAPER
SUB: Signals and Systems

Time: 3Hrs   Max.Marks:70

Answer ALL questions
All questions carry equal marks
Unit-I

1. (a) What are the different classifications of continuous time signals & explain it.   8M
   (b) Draw the following signals by applying basic operations on unit step signal.   6M
      i.) u(-2t+3)   ii.) u((t/2) - 2)
(Or)
2. (a) Explain the conditions for existence of Fourier series Expansion for periodic signals.   4M

   (b) Expand the signal show in below figure by using trigonometric Fourier series expansion.   10M
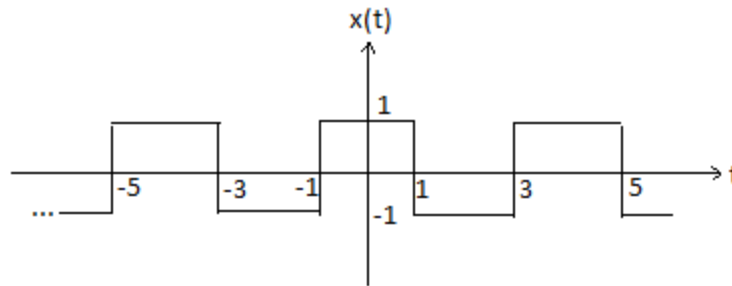
Unit-II

3. (a) State and prove convolution in time & integration properties of Fourier Transform   7M
   (b) Find the Fourier transform of unit impulse, unit step & Rectangular function.   7M
(Or)
4. (a) Explain about Fourier Transform for periodic signals.   7M

   (b) Find Fourier transform of $x(t) = \sum_{n=-\infty}^{\infty} \delta(t - nT)$ 7M

Unit-III
5.   Explain the process of sampling in detail with neat sketches   14M
(Or)
6. a) Discuss magnitude and phase distortion in LTI systems.   7M
    b) Explain about distortion less transmission through LTI systems.   7M
Unit-IV
7. Compute & plot the convolution y(t) of the given signals:
       (i) x(t) = u(t-3) – u(t-5),   h(t) = u(t).   7M
       (ii) x(t) = u(t),   h(t) = u(t).   7M
(Or)
8. Find the DTFT of:
       (i) x(n) = $(1/3)^n$ u(n + 3)   7M
       (ii) x(n) = $(1/2)^n$ for   n= 0,2,4,......   7M
                  = 0   other wise

Unit-V

9. (a) Find the Laplace transform of: $x(t) = e^{-(t-2)}(t-2)u(t-2)$ 7M

   (b) Find inverse of following Laplace transform: 7M

   $X(s) = (1/(s + 1)) - (2/(s - 1))$

   If ROC is $-1 < Re(s)$

(Or)

10. (a) State and prove z –transform time reversal & time shifting properties.   7M

    (b) State and prove initial & final value theorems in Z-Transforms   7M

KSRM COLLEGE OF ENGINEERING (AUTONOMOUS): KADAPA

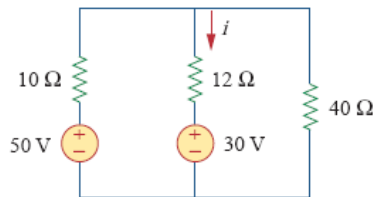B.Tech III Semester (R-18) ECE End Examination **Model Paper**

Time: 3Hours   Subject: Network Theory   Max.Marks:70 Marks

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Note: Answer all **Five** questions.

UNIT-I

1. a) Determine the Current i in the Circuit shown using Superposition Theorem   10M

   b)State Thevenin's Theorem   4M

(OR)

2. a)Determine the maximum power that can be delivered to the variable resistor R in the circuit of   7M
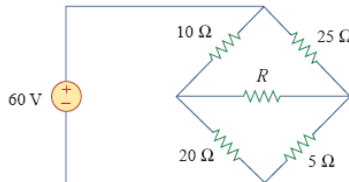
   b) Derive the Expression for Maximum power when the Circuit is excited by a DC Supply.   7M

UNIT-II

3. a)Obtain the transient response for the series RC network for DC excitation.   7M

   b) In the circuit shown below the switch s is kept first at position 1 and steady state condition is reached .At t=0, the switch is moved to position 2,Find the current in both the cases.7M
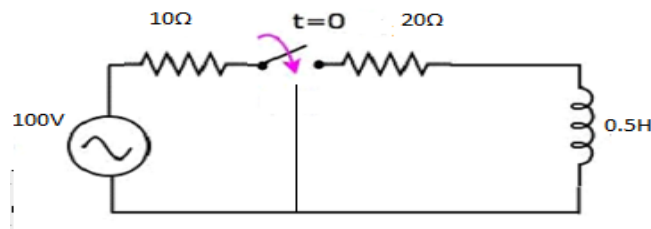
(OR)

4. Derive the Current Expression for a Series R-L-C Circuit when it is excited by an AC Source   14M

UNIT-III

5. Determine the half-power frequencies of a Series resonance circuit   14M
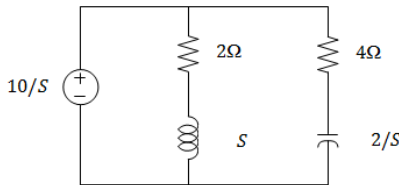
(OR)

6. Derive the Expression for the Coefficient of coupling K   14M

UNIT-IV

7. a)Write the necessary conditions for the driving point impedance   10M

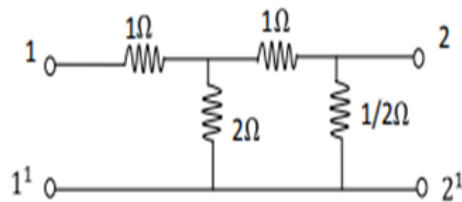   b)obtain the driving point impedance and source current given below   4M

(OR)

8. Draw the pole-zero plot of the given transfer function and obtain the time domain response $I(s) = \dfrac{2S}{(1+S)(S2+2S+4)}$ 14M

UNIT-V

9. a)Define the relation between Y-Parameters in terms of ABCD parameters7M

   b)Find Z-Parameters of the network   7M

(OR)

10. Determine the Interrelation between two port Networks (Series,Parallel and Cascade)   14M