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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: GEO-TECHNICAL ENGINEERING -1 (CE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain the classification of soils by IS classification system   7M
   (b) A soil sample has a porosity of 30% the specific gravity of solids is 2.60. Calculate (i) void ratio, (ii) dry density (iii) unit weight if the soil is 50% saturated and (iv) unit weight if the soil is completely saturated.   7M

(OR)

2. (a) A core cutter 125 mm high and 120 mm in diameter weighs 10.80 N when empty. It is used to determine the in situ density of a compacted soil in an embankment. The weight of the core cutter full of compacted soil is 30.10 N. The water content of the soil is 12.2%. Determine the in situ dry unit weight and void ratio.   7M
   (b) An airport runway fill needs 800,000 m^3 of soil compacted to a void ratio of 0.78. There are two borrow pits **A** and **B** from where the required soil can be taken and transported to the site.   7M

Borrow pit	in-situ void ratio	Transportation cost
A	0.85	Rs. 12/m^3
B	1.01	Rs. 10/m^3

Which of the two borrow pits would be more economical?

UNIT – II

3. (a) Derive the expression to determine the average coefficient of permeability in the horizontal direction for a stratified soil deposit.   7M
   (b) A soil strata consists of 3 layers of thickness 1m, 1.5m and 2.0 m having the co-efficient of permeability of 2×10^{-3}cm/s, 1.5×10^{-3}cm/s and 3×10^{-3}cm/s respectively. Estimate the average co-efficient of permeability in the direction i) parallel to the bedding plane ii) normal to the bedding plane.   7M

(OR)

4. (a) What are the characteristics and uses of flow nets?   7M
   (b) A uniform soil deposit has a void ratio 0.60 and specific gravity of 2.65. The natural ground water is at 2.50 m below natural ground level. Due to capillary moisture, the average degree of saturation above ground water table is 50%. Determine the neutral pressure, total pressure and effective pressure at a depth of 6.0 m. Draw a neat sketch   7M

UNIT – III

5. (a) Explain in detail the construction of Newmark's chart with an influence value of 0.002.   7M
   (b) A ring foundation is of 3.0 m external diameter and 2.0 m internal diameter. It transmits a uniform pressure of 90.0 kN/m^2. Calculate the vertical stress at a depth of 1.50 m directly beneath the centre of the loaded area   7M

(OR)

6. (a) The four legs of a transmission tower form in plan a square of side 4m and together carry a total load of 200kN. Compute the increase in vertical stress at a depth of 3m vertically below a Leg. Use Boussinesq's theory.   7M
   (b) Find the intensity of vertical pressure at a point 4m directly below 20 kN point load acting at a horizontal ground surface. What will be the vertical pressure at a point 2 m horizontally away from the axis of loading but at the same depth of 4m and directly under the load at a depth of 3 m?   7M

UNIT – IV

7. (a) In a consolidation test the pressure on a sample was increased from 150 to 300kN/m². The void ratio after 100% consolidation under 150kN/m² was 0.945, and that under 300kN/m² was 0.812. The coefficient of permeability of the soil was 25 x 10-6 mm/s and the initial height of the sample was 20mm. Determine (i) the coefficient of compressibility, (ii) the coefficient of volume compressibility   7M

(b) Describe log time fitting method.   7M

(OR)

8. (a) Differentiate between compaction and consolidation?   7M

(b) A stratum of normally consolidated clay 7 m thick is located at a depth 12m below ground level. The natural moisture content of the clay is 40.5 percent and its liquid limit is 48 percent. The specific gravity of the solid particles is 2.76. The water table is located at a depth 5 m below ground surface. The soil is sand above the clay stratum. The submerged unit weight of the sand is 11 kN/m³ and the same weighs 18 kN/m³ above the water table. The average increase in pressure at the center of the clay stratum is 120 kN/ m² due to the weight of a building that will be constructed on the sand above the clay stratum. Estimate the expected settlement of the structure.   7M

UNIT-V

9. (a) Draw the line diagram of Direct shear test. State the advantages and disadvantages of Direct shear test.   7M

(b) The loading period for a new building extended from May 1995 to May 1997. In May 2000, the average measured settlement was found to be 12 cm. It is known that the ultimate settlement will be about 36 cm. Estimate the settlement in May 2005. Assume double drainage to occur. (time-settlement relationship assumes that the time datum to be midway through the loading or construction period)   7M

(OR)

10. (a) Write a note on the laboratory triaxial shear test.   7M

(b) The following data relate to a triaxial compression tests performed on a soil sample: 7M

Test No.	Chamber pressure (kPa)	Maximum deviator stress (kPa)	Pore pressure at maximum deviator stress (kPa)
1	80	175	45
2	150	240	50
3	210	300	60

Determine the effective shear strength parameters of the soil, graphically only

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. End Examinations of April/May 2019
SUB: HYDRAULIC MACHINERY (CE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) What is meant by dimensional analysis and what are its uses. Also explain the different methods of dimensional analysis 7M

   (b) A model with length scale ratio, model to prototype equal to x, of a Mach 2 supersonic aircraft is tested in a wind tunnel where in air is maintained at atmospheric temperature and a pressure of is times atmospheric pressures. Find the speed of the model in the tunnel. Given that the velocity of sound in atmospheric air=Z 7M

(OR)

2. (a) What are the conditions for the kinematic similarity to exist between model and prototype? 7M

   (b) Explain in detail about Buckingham's pi theorem of dimensional analysis. Give one example 7M

UNIT – II

3. (a) Find the expression for the force exerted by the jet on a flat vertical plate moving in the direction of the jet. 7M

   (b) A jet of diameter 150mm strikes a flat plate normally with a velocity of 20m/sec. The plate is moving with a velocity of 5m/sec in the direction of the jet and away from the jet. Find i. The force exerted by the jet on the plate ii. Wok done by the jet on the plate per second 7M

(OR)

4. (a) Derive the expression for stationary and moving flat plate with sketch 7M

   (b) A jet of water having a velocity of 40m/sec strikes a curved vane, which is moving with a velocity of 20m/sec. The jet makes an angle of 300 with the direction of motion of the vane at inlet and leaves at an angle of 90^0 to the direction of motion of the vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock. 7M

UNIT – III

5. Explain Governing of turbines, cavitations in turbines and similarity between the model and prototype. Also mention the different types of draft tubes 14M

(OR)

6. An impulse turbine of 2.75 m diameter is rated at 11000kW at 300 r.p.m under a head of 490 m. It uses 2.7 m³/sec discharge if the turbine is operated under a head of 400m. 14M
   (i) What will be the speed, power and discharge.
   (ii) Determine the size of the wheel to develop 7000kW power under a head of 300 m. Also determine the speed and discharge

UNIT – IV

7. (a) Explain the method of selection of centrifugal pumps through the characteristic curves 7M

   (b) A centrifugal pump has the following dimensions: inlet radius=80mm,outlet radius=160mm, width of impeller at inlet=50mm, vane angles at inlet and outlet are 260 and140. Width of impeller at outlet=50mm. Assuming shockless entry, determine the discharge and the head developed by the pump when the impeller rotates at 90radians/second. 7M

(OR)

8. (a) Find an expression for the work done by the pump on water. 7M

   (b) Find the minimum speed at which a centrifugal pump will start functioning against a head of 7.5m of diameter of the impeller at the outlet and inlet area, which are 100m and 50cm respectively. 7M

UNIT-V

9. (a) Explain with a neat sketch and working principle of a double acting reciprocating pump. 7M

   (b) Explain negative slip of a reciprocating pump and state the reasons for the same. 7M

(OR)

10. A double acting reciprocating pump has a piston of diameter 220mm and a stroke of length 600mm. It sucks water from a sump. In which the level of water is 4m below the centre line of the pump. The length of the suction pipe is 6.5m with diameter 150mm. The friction factor 4f is 0.024 and separation occurs at 2.4m of water absolute. Determine the maximum speed of the pump when there is 14M
    i) No air vessel on the suction side,   ii) A large air vessel on the suction side close to the cylinder

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: BUILDING CONSTRUCTION (CE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1.   Discuss about orientation and functional requirements of a building.   14M

(OR)

2.   (a) Explain Guidelines for planning and drawing of Residential Buildings.   7M

     (b) What are the standard dimensions for various building units.   7M

UNIT – II

3.   What do you mean by design of brick walls and how do you estimate the brick wall   14M
     thickness of a high rise building.

(OR)

4.   Explain briefly about classifications of stone masonry.   14M

UNIT – III

5.   (a) Briefly explain about different types of lintels.   7M

     (b) Explain about the importance and details of concrete floors.   7M

(OR)

6.   Define arch and explain about different types of arches?   14M

UNIT – IV

7.   Explain about types of doors and windows?   14M

(OR)

8.   Explain method of installation of fixtures and fastenings for doors and windows and 14M
     plumbing system?

UNIT-V

9.   What are the principles, benefits and disadvantages of Green buildings?   14M

(OR)

10. Discuss in detail about development of intelligent building and its limitations.   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: SURVEYING - II (CE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Describe the procedure to determine the elevation when the distance to the object cannot be measured   7M
    (b) Find the R.L. of top of a Church spire 'C' from the following data   7M

Inst. station	Reading on BM	Vertical angle	R.L. of B.M	Dist. AB	Remarks
A	2.625	$19^o\ 48'$	500.000	50 m	A and B are in line with the top of Church spire 'C'
B	1.510	$14^o\ 25'$			

Also find the distance between Church spire 'C' and station A. Draw a neat sketch.

(OR)

2. (a) Explain the method used to decide the intervisibility of stations.   7M
    (b) Explain the different types of towers and signals used in triangulation.   7M

UNIT – II

3. (a) Derive the expressions for the elements of a compound curve.   7M
    (b) The chainage of the intersection of two straights having the deflection angle of 50° is 1680.50m. If the radius of the curve is 450m, calculate the following: 7M
    i) tangent distance,   ii) length of the curve,
    iii) Chainages of P.C. and P.T.   iv) length of the long chord
    v) Apex distance, and   vi) Mid-ordinate.
    viii) Degree of curve

(OR)

4. (a) Derive the expressions for the elements of a Reverse curve.   7M
    (b) A vertical curve lies between two gradients of +0.6% and -0.8%. Rate of change of gradient for the curve is 0.05% per 20m. If the elevation and chainage of the point of intersection are 950.5m and 858.75m, respectively. Find the length of the vertical curve, chainage of the points on the curve, and elevations of the points on the curve at 20 m intervals for the first half.   7M

UNIT – III

5. (a) Explain the term mean sea level. Explain the method used to arrive at the mean sea level at a place.   4M
    (b) Explain how horizontal and vertical control is achieved during hydrographic surveying.   10M

(OR)

6. (a) What is GPS? Explain the applications of GPS in Civil engineering.   7M
    (b) Explain the three segments of GPS with their functions.   7M

UNIT – IV

7. (a) Explain briefly the equipment and procedure used for terrestrial photogrammetry.   7M
    (b) Derive an expression for the scale of aerial photographs.   7M

(OR)

8. (a) Explain the principle of Photogrammetry. Write a short note on photo-interpretation.   7M
    (b) Define the term parallax and derive an expression to find parallax.   7M

UNIT-V

9. (a) Explain briefly about Total Station? Compare Total Station with Theodolite.   7M
    (b) Explain how the area of the given boundary can be found using Total station.   7M

(OR)

10. (a) Explain the resection method using Total station.   7M
    (b) Explain the different sources of errors may occur, while surveying with Total station.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular and Supple. Examinations of April/May 2019
SUB: MECHANICS OF MATERIALS - I (CE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Define, i) Hooke's law, ii) Poison's ratio, iii) Modulus of elasticity, iv) Bulk modulus, v) Factor of safety, vi) Ductility, vii) Toughness   7M

   (b) The tensile test was conducted on mild steel bar. The following data was obtained from the test. Diameter of the steel bar = 16mm, Gauge length of the bar = 80mm, Load at proportionality limit = 72 kN, Extension at the load of 60 kN = 0.115mm, Load at failure = 80kN, Final gauge length of bar = 104mm, Diameter of rod at failure = 12mm, Determine i) Young's modulus, ii) Percentage elongation   7M

(OR)

2. (a) Derive a relationship between modulus of elasticity and bulk modulus.   7M

   (b) A bar of brass 25 mm diameter is enclosed in a steel tube of 50 mm external diameter and 25 mm internal diameter. The bar and the tube fastened at the ends and are 1.5 mm long. Find the stresses in the two materials when the temperature raises from 30 c to 80c. Take, E_{steel}=200GPa, E_{brass}=100GPa, α_{steel}=11.6x10^{-6} /c, α_{brass}=18.7x10^{-6} /□c.   7M
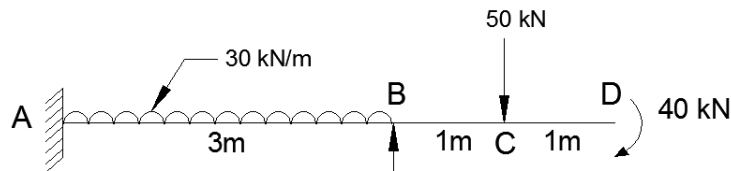
UNIT – II

3. (a) Show that the shear stress on the Principal plane is zero.   7M

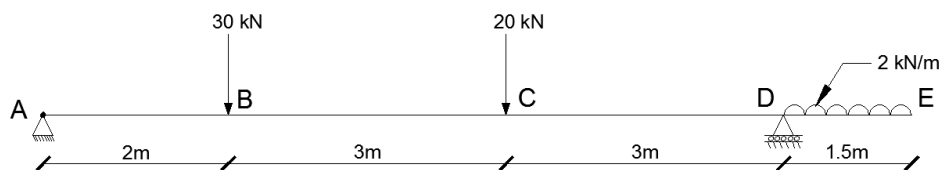   (b) Draw the shear force, bending moment diagrams for the beam shown in below figure   7M
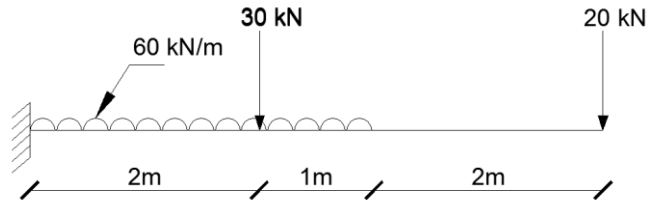
(OR)

4. (a) For the cantilever beam shown in figure plot the SFD and BMD.   7M

   (b) For the overhanging beam shown in figure plot the SFD and BMD.   7M

UNIT – III

5. (a) Derive the bending equation of simple beams MI=fy=ER Writing all the assumptions made. **7M**

   (b) A rectangular beam 200 mm deep and 300 mm wide is simply supported over a span of 8 m. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120 N/mm^2. **7M**

(OR)

6. A T-Beam with a flange of 100 mm x 20 mm with a web of 20mm x 100mm is used as a simply supported beam over a span of 8 m. it carries a UDL of 1.5 kN/m throughout, Determine the maximum tensile stresses and maximum compressive stresses and plot the variation across the depth of the beam. **14M**

UNIT – IV

7. A beam AB, 6 m long has a moment of inertia of 450×10^6 mm^4 and loaded as shown in fig. Determine the following using double integration method **14M**
   i) Slope at A , ii) Deflection at mid span, iii) Maximum deflection
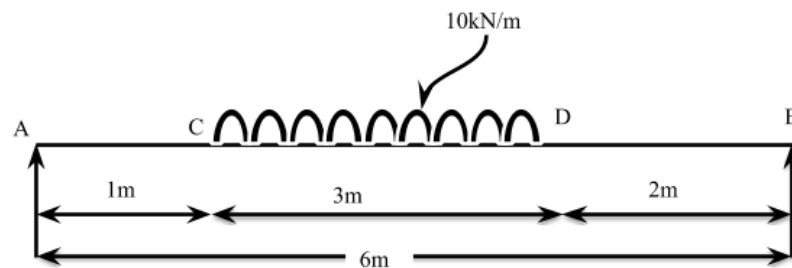
(OR)

8. Find the deflection at points C and D of the beam loaded as shown in fig below, by moment area method. Given E=200 GPa, I=66.67×10^6 mm^4. **14M**
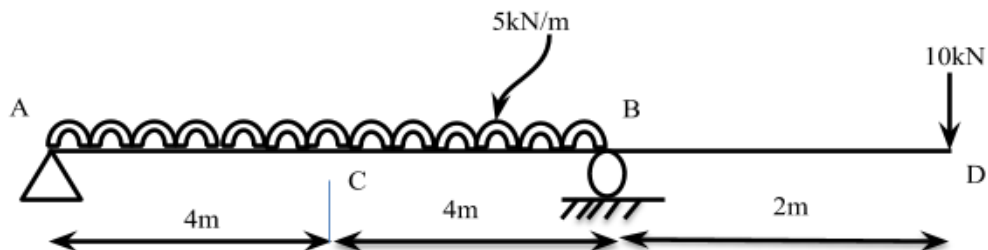
UNIT-V

9. (a) Derive the expression for closely-coiled helical springs subjected to an axial twist. **7M**

   (b) A close-coiled helical spring of 100 mm mean diameter is made of 10 mm diameter rod and has 20 turns. The spring carries an axial load of 200 N. Determine the shearing stress. Taking the value of modulus of rigidity= 84GN/m^2, determine the deflection when carrying this load. Also calculate the stiffness of the spring and frequency of free vibrations for a mass hanging from it. **7M**

(OR)

10. (a) Derive the torsion equation with the usual notations. **7M**

    (b) A solid shaft transmits 20kW of Power, rotating at 2rps, Determine the required diameter of the shaft if the shearing stress is not to exceed 40 MN/m^2 and angle of twist is limited to 6^0 in a length of 3 m. Take G=83×10^3 N/m^2. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (CE)

Time : 3 Hours   Max.
Marks: 70

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

UNIT - I

1. (a) Explain the classification electrical elements.   7M
    (b) Using nodal analysis, determine node voltages V_1 and V_2 for the circuit shown below.   7M
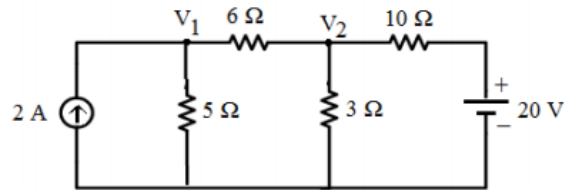
(OR)

2. (a) Find R_{eq} for the circuit shown below   7M
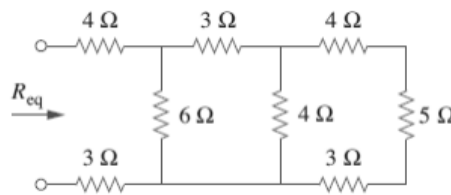
    (b) Write the mesh (loop) equations for the circuit shown below and then find i_x, i_y and v. All   7M
        resistances are in ohms.
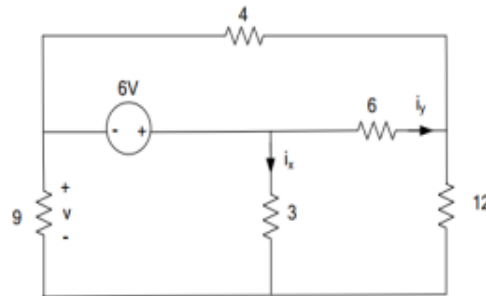
UNIT – II

3. (a) Obtain the Mathematical expression for Generated EMF or EMF Equation of Generator and   7M
        explain each term.
    (b) Calculate the generated emf by 4-pole wave wound generator having 65 slots with 12   7M
        conductors per slot when driven at 1200 rpm the flux per pole is 0.02 Weber

(OR)

4. (a) Derive the EMF Equation of Transformer and explain.   7M
    (b) A single phase 2000/250 V, 50Hz transformer has the core area of 36 cm^2 and maximum flux   7M
        density of 6 Wb/m^2. Calculate the number of turns on primary and secondary winding.

UNIT – III

5. (a) Derive the expression for induced E.M.F per phase in a three phase alternator.   7M
    (b) How do you determine regulation by synchronous impedance method.   7M

(OR)

6. What are Lissajous figures? How phase and frequency will be measured using CRO.   14M

UNIT – IV

| 7. | (a) | Explain the operation of half-wave rectifier with input and output waveforms. | 7M |
| | (b) | Derive Expressions for Rectification Efficiency, Ripple factor and Form factor for an Half-wave Rectifier. | 7M |

(OR)

| 8. | (a) | In a full wave rectifier the required DC voltage is 10V and the diode drop is 0.5V.Calculate AC r.m.s input voltage required in case of bridge rectifier circuit and the centre tapped full wave rectifier circuit. | 7M |
| | (b) | Explain the operation of bridge rectifier with input and output waveforms. | 7M |

UNIT-V

| 9. | (a) | Explain the V-I characteristics of SCR. | 7M |
| | (b) | With the help of a neat diagram explain different current components in an NPN bipolar junction transistor. | 7M |

(OR)

| 10. | | Compare the parameters of all the four different types of negative feedback amplifiers. | 14M |

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: POWER SYSTEMS - I (EEE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Discuss the factor affecting the economics of power generation.   7M
    (b) A Power station has the daily load cycle as under: 7M
        260 MW for 6 hours; 200 MW for 8 hours; 160 MW for 4 hours; 100 MW for 6 hours. If the
        power station is equipped with 4 sets of 75 MW each,
        Calculate (i) Daily load factor, (ii) Plant capacity factor and (iii) Daily requirement if the
        calorific value of oil used were 10,000 kcal/kg and the average heat rate of station were 2860
        kcal/kwh.

(OR)

2. (a) Explain about Load Curve and Load Duration Curve.   7M
    (b) The monthly readings of a consumers meter are as follows maximum demand 50KW, energy   7M
        consumed is 36,000KWh and reactive energy is 23,400KVAR. If the tariff is Rs. 80 per KW
        of maximum demand plus 8 Paise per unit plus 0.5 paise per unit for each 1% of power factor
        below 86%. Calculate the monthly bill of the consumer.

UNIT – II

3. (a) Explain any two methods to increase the value of string efficiency, with suitable sketches.   7M
    (b) State the types of insulators and the voltage levels at which they are used.   7M

(OR)

4. (a) Define string efficiency. What is meant by stringing chart?   4M
    (b) Derive an expression for sag and tension in a power conductor strung between two supports at   10M
        equal heights also taking into account the wind and ice loadings.

UNIT – III

5. (a) Derive an expression for inductance of a three phase transmission line with unsymmetrical   10M
        spacing.
    (b) Distinguish between GMD and GMR   4M

(OR)

6. (a) Derive an expression for a capacitance of a single phase transmission line.   10M
    (b) Define Transposition of lines. Why transmission lines are transposed?   4M

UNIT – IV

7. (a) What is the purpose of interconnector in a DC ring main distributor?   4M
    (b) Compare radial and ring main distribution systems. Gives its advantages and disadvantages.   10M

(OR)

8. (a) What is meant by primary feeder loading? Give some of the factors which will affect the   7M
        design loading of a feeder.
    (b) Explain basic design practice of secondary distribution system and also discuss about   7M
        secondary banking.

UNIT-V

9. (a) Explain the formations of corona. What are the factors which affect corona?   9M
    (b) An insulation resistance of single core cable is 500 MΩ/km. Diameter of core is 3mm and   5M
        resistivity of insulation is 5×10^{12} Ω-m. Determine insulation thickness.

(OR)

10. (a) What is grading of a cable? Write the formula for the capacitance of the single core cable.   4M
    (b) Explain the methods of grading of cables with neat diagrams and also derive the equations.   10M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ELECTRICAL MACHINES-II (EEE)

Time : 3 Hours   Max. Marks: 70

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

UNIT – I

1. (a) Explain the construction of a single phase transformer?   7M
    (b) Explain the phasor diagram no load condition?   7M

(OR)

2. (a) Derive the emf equation of single phase transformer?   6M
    (b) A 150 kVA, 1- phase, 11000 / 440 V transformer gave the following results in the short circuit test with 200 V applied to the primary and secondary short circuited, the primary current was full load value and the input power was 1350 W. Calculate the secondary potential difference and the % of regulation when the full load current was Passing at a0.8 p. f. lagging with normal primary voltage.   8M

UNIT – II

3. (a) Explain the experimental procedure for pre determination of voltage regulation by conducting OC and SC Test?   7M
    (b) Explain conversion two winding transformer to Auto transformer?   7M

(OR)

4. (a) Determine the load sharing of two transformer having the induced emf's of E_a and E_b with impedances of Z_a and Z_b 7M
    (b) Two single phase transformer of having induced emf's of 220V and 210V under no load with an impedances of 0.5+j1and 0.4+j1.1 ohms. A load of 25KW at 0.8 pf lagging connected at terminals. Determine load current flowing in each transformer if the terminal voltage is 200V?   7M

UNIT – III

5. (a) Compare the deferent type's connection made in for poly phase transformers?   7M
    (b) Determine parameters of 3 winding transformer by conducting OC and SC test?   7M

(OR)

6. (a) Prove that the resultant field produced in 3 phase induction motor is rotating?   7M
    (b) What are the main parts of 3 phase induction motor and explain each?   7M

UNIT – IV

7. (a) Explain the power stages in 3 phase induction motor?   7M
    (b) A 1100V, 50Hz delta connected induction motor has a star-connected slip ring rotor with a phase transformation ratio of 3.8. The rotor resistance and standstill leakage reactance are 0.013 Ohm and 0.25 Ohm per phase respectively. Neglecting stator impedance and magnetizing current determine.   7M

        i) The rotor current and power factor at start with slip-rings shorted.

        ii) The rotor current and power factor at 4% slip with slip-rings shorted.

        iii) The external rotor resistance per phase required to obtain a starting current of 100A in the stator supply lines.

(OR)

8.   What are the deferent tests have to conduct to draw the circle diagram on 3 phase Induction motor and explain?   14M

UNIT-V

9. (a) What is the necessity of starter? What are the different starting methods of 3 phase Induction Motor?   8M
    (b) Explain about cogging and crawling of 3 phase induction motor? What are the remedies to avoid the cogging effect?   6M

(OR)

10. (a) What are the different types of speed control methods of 3 phase Induction Motor?   8M
    (b) Explain the principle of operation of Induction Generator?   6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ELECTRICAL & ELECTRONICS MEASUREMENTS (EEE)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　　　　　　　Max.
Marks: 70

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

UNIT - I

1.		Derive the torque of a moving iron instrument. Explain briefly the various errors in moving iron instrument.	14M

(OR)

2.	(a)	Derive the expression for deflection torque and control torque in measuring instruments	8M
	(b)	The inductance of a moving iron ammeter with a full scale deflection of 90 at 1.5 A is given by the expression L= $200+4\theta-\theta^2-\theta^3$ µH, where is the deflection in radian from the zero position. Estimate the angular deflection of the pointer for a current of 1.0 A	6M

UNIT – II

3.		With a neat sketch of phasor diagram, explain the construction and working principle of a single phase induction type energy meter.	14M

(OR)

4.	(a)	List of errors in electro dynamometer wattmeter	6M
	(b)	A 3-phase 500 V motor load has a power factor of 0.4. Two watt meters are connected to measure the input. They show the input to be 30 kW. Find the reading of each meter	8M

UNIT – III

5.	(a)	What are the disadvantages of measurement of inductance using maxwell's bridge method	7M
	(b)	With a neat phasor diagram explain how the capacity of unknown capacitor can be determined using schering bridge	7M

(OR)

6.		Identify and draw the phasor diagram of the bridge whose arms of a five node bridge are as follows:	14M

arm ab: an unknown impedance (R , L) in series with a non-inductive variable resistor r ,
arm bc: a non-inductive resistor R = 100 Ω
arm cd: a non-inductive resistor R = 200 Ω;
arm da a non-inductive resistor R = 250 Ω;
arm de: a non-inductive variable resistor r,
arm ec: a loss-less capacitor C = 1 uF, and *arm be:* a detector.
An AC supply is connected between *a* and *c*.
Also calculate the resistance and inductance R and L. When under balance conditions r_1 = 43.1 Ω and r = 229.7 Ω?

UNIT – IV

7.	(a)	How is potentio meter used in the calibration of voltmeter and ammeter	7M
	(b)	How can an AC potentio meter be used for the measurement of self reactance of a coil	7M

(OR)

8.		Draw the phasor diagram of potential transformer. Derive the expression for its transformation ratio and phase angle errors.	14M

UNIT-V

9.	(a)	What are the essential components of CRO	6M
	(b)	Draw and explain the general block diagram of a cathode ray oscilloscope. How is frequency measured in CRO	8M

(OR)

10.	(a)	How can be measure the voltage and current in Lissajous pattern	7M
	(b)	Explain the digital voltmeter in ramp and integrating type	7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: GENERATION OF ELECTRICAL POWER (EEE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) What are the factors to be considered for selection of site for a thermal power station   7M
   (b) Explain the function of Cooling towers and boilers in thermal Power stations.   7M

(OR)

2. Explain the following components with relevant diagrams   14M
   (i)Economizer   (ii) Super heater
   (iii) condenser   (iv) fuel handling system
   (v) Coal and ash handling plant
   .

UNIT – II

3. (a) What are the factors of selection of the site for hydro electric stations   7M
   (b) With neat sketch explain the operation of Run off river plant.   7M

(OR)

4. (a) With the help of neat diagram explain the construction ,working of boiling water reactor   7M
   (b) What is meant by chain reaction in nuclear power plant and explain the process of nuclear fission   7M

UNIT – III

5. (a) With neat sketches, list out the components of flat plate and concentrated plate collector   7M
   (b) What are the applications of solar ponds   7M

(OR)

6. Describe in brief, the different energy storage methods used in the solar system   14M

UNIT – IV

7. (a) Write short notes on i) Savonius rotor, ii) Darrieus rotor   7M
   (b) Discuss the performance characteristics of wind.   7M

(OR)

8. (a) With the help of neat sketch, explain Horizontal axis wind mil   7M
   (b) With a neat diagram, explain how wind energy can be converted into electrical energy.   7M

UNIT-V

9. (a) What is the basic principle of ocean thermal energy conversion (OTEC)   7M
   (b) What are the difficulties in tidal power developments   7M

(OR)

10. (a) Explain the different types of ocean thermal energy conversion systems.   7M
    (b) What are the factors affecting biogas generation.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: SWITCHING THEORY AND LOGIC DESIGN (Common to EEE & ECE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1.	(a)	Express Decimal Numbers in 2421 code	10M
	(b)	Write the 1's and 2's Complement of 1110011	4M

(OR)

2.	(a)	Convert the Given Gray code number 1011011011110010 to equivalent binary code	7M
	(b)	Perform Subtraction for 1020-2056 by using 10's complement form	7M

UNIT – II

3.	(a)	Simplify the Boolean expression F=WYZ+XY+XZ'+YZ	7M
	(b)	Prove that XY+X'Z+YZ=XY+X'Z	7M

(OR)

4.		Express the following function in sum of minterms and product of maxterms F(A,B,C,D)=B'D+A'D+BD	14M

UNIT – III

5.	Implement a 64:1 MUX using 16:1 and 4:1 MUX	14M

(OR)

6.	Design a full adder circuit using decoder and logic gates	14M

UNIT – IV

7.	Derive PLA and PAL Programming tables for a combinational circuit that squares a 3 bit number	14M

(OR)

8.	Design a 4-bit number square generator using ROM	14M

UNIT-V

9.	(a)	Give the implementation procedure for a SR latch using NOR gates	7M
	(b)	Explain how a JK Flip-flop is converted into D flip-flop and T flip-flop	7M

(OR)

10.	Design a 3-bit up/down counter. Draw its timing diagrams	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ANALOG ELECTRONIC CIRCUITS (EEE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain the procedure for measuring h parameters from the input and output characteristics for a BJT in CE configuration.   7M

    (b) A transistor in CB circuit has the following set of h- parameters. $h_{ib} = 20\Omega$, $h_{fb} = 0.98$, $h_{rb} = 3x10^{-4}$, $h_{ob} = 0.5x10^{-5}$. Determine the values if R_i, Ro, Av, and A_i, A_{VS}, A_{IS} if $R_s= 600\Omega$ and R_L=1.5KΩ.   7M

(OR)

2. (a) Derive the expressions for voltage gain, input impedance and output impedance for the FET amplifier shown below.   7M
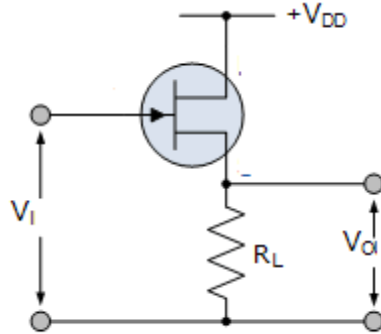
    (b) Explain i) Miller's theorem.   ii) simplified hybrid model of BJT   7M

UNIT – II

3. (a) Derive the expressions for voltage gain and input impedance for Darlington pair amplifier with a relevant circuit diagram.   7M

    (b) The lower cutoff frequency for single stage amplifier is f_L. Derive the expression for lower cutoff frequency for n identical stages and calculate the its value for f_L=412 Hz when 4 stages are cascaded.   7M

(OR)

4. (a) Explain different coupling mechanisms for cascading amplifiers and give their relative merits and demerits.   7M

    (b) Draw the circuit for RC coupled two stage CE amplifier and derive the expressions for overall voltage gain, overall current gain, input impedance and output impedance. (Use approximate model for BJT).   7M

UNIT – III

5. (a) With required expressions, explain the effect of negative feedback on   10M
         i) gain, ii) nonlinear distortion ,   iii) noise,   iv) frequency distortion, v) bandwidth

    (b) For a negative feedback amplifier, the gain is 200, bandwidth is 6 MHz and feedback factor β=0.01. Calculate the Desensitivity factor and bandwidth for the amplifier with feedback.   4M

(OR)

6. (a) Explain Barkhausen's criteria for sustained oscillations.   4M
    (b) For a transistorized RC phase shift oscillator, derive the expression for frequency of   10M
         oscillations

UNIT – IV

7. (a) Draw the diagram of a transformer coupled class A power amplifier and prove that it   7M
         has maximum power efficiency of 50%
    (b) Explain in detail, the different classes of power amplifiers.   7M

                                                    (OR)

8. (a) With a circuit diagram and waveforms, explain the operation of class B push pull   7M
         amplifier and prove that the maximum power efficiency is 78.5%.
    (b) Explain the phenomena i) Zero cross over distortion ii) thermal stability   7M

UNIT-V

9. (a) With circuit diagrams and wave forms, explain the operation of a negative peak series   7M
         clippers with and without reference voltage. Draw the corresponding transfer
         characteristics.
    (b) Draw the RC differentiator circuit and explain its operation for step input and ramp   7M
         input and square wave input.

                                                    (OR)

10. (a) With a circuit diagram and waveforms, explain the operation of a Monostable   7M
         multivibrator and derive the expression for pulse width.
    (b) Explain the switching characteristics of a BJT with a circuit diagram.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: PROBABILITY THEORY & STOCHASTIC PROCESSES (ECE)
Time : 3 Hours   Max. Marks: 70
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Define and explain the following density functions   14M
    (i)Binomial   (ii)Exponential (iii)Uniform   (iv)Rayleigh
                                          (OR)
2. Consider the probability density f(x)=$ae^{-b|x|}$ where x is a random variable whose   14M
    allowable values range from -∞ to ∞. Find the (i) CDF $F_X^{(x)}$ (ii) Relationship between **a**
    and **b**   (iii) The probability that the outcome x lies b/w 1 and 2.

UNIT – II

3. (a) Find the MGF of the random variable whose moments are given by $m_n = (n+1)! \, 2^n$.   7M
    (b) Define Expectation. State and prove properties of Expectation.   7M

                                          (OR)
4. (a) State and prove the properties of variance of a random variable.   7M
    (b)   Find the characteristics function for f(x) = $e^{-|x|}$.   7M

UNIT – III

5. (a) State and prove Central limit theorem.   7M
    (b)   The joint density function of x and y is given by   7M
$$f_{XY}^{(x,y)} = \begin{cases} ax^2 y & 0 < y < x < 1 \\ 0 & else\ where \end{cases}$$
    i) Find a so that the function is a valid density function
    ii) Find the marginal density functions.
                                          (OR)
6. (a) State and prove the properties of the Covariance function.   7M
    (b)   The joint density function for X and Y is   7M
$$f_{XY}^{(x,y)} = \begin{cases} \dfrac{xy}{9} & 0 < x < 2\ and\ 0 < y < 3 \\ 0 & else\ where \end{cases}$$
    i) Show that x and y are statically independent
    ii) Show that x and y are uncorrelated.

UNIT – IV

7. (a) Write about the following ergodic process   6M
    i)Mean ergodic process   ii)Correlation ergodic process
    (b) A stationary process has an ACF given by   8M
$$R(\tau)=\frac{25\tau^2 +36}{6.25\tau^2+4}$$
    Find the mean value, mean square value and variance of the process.
                                          (OR)
8. (a) State and prove any three properties of the cross power density spectrum.   7M
    (b)   Find the CCF for the PSD $S_{XY}^{(w)} = \frac{1}{25+w^2}$.   7M

UNIT-V

9. (a) Derive the relation between PSDS of I/P and O/P random process of an LTI system.   7M
    (b) Define the following systems   7M
    (i) LTI system (ii) Causal system   (iii) Stable system   (iv) Noise bandwidth.
                                          (OR)
10. (a) Write about band pass and band limited processes.   7M
     (b) Explain the concept of band limited process and list out its properties.   7M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ELECTROMAGNETIC WAVES & TRANSMISSION LINES (ECE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain propagation of uniform plane wave in perfect dielectric. What is significance of it?   7M

    (b) A uniform plane wave is travelling at a velocity of 2.5×10^5 m/s having wave length $\lambda = 0.25$ mm in non-magnetic good conductor. Calculate the frequency of wave and conductivity of a medium.   7M

(OR)

2. (a) Explain the difference between the intrinsic impedance and surface impedance of a conductor. Show that for a good conductor, the surface impedance is equal to the intrinsic impedance.   7M

    (b) Find skin depth of surface impedance of an aluminium at 100MHz having conductivity $\sigma = 5.8 X 10^7$ mho/m, $\mu_r = 100$.   7M

UNIT – II

3. (a) Define Brewster angle and derive the expression for Brewster angle when a wave is parallely polarized.   7M

    (b) Find the ratio $\left(\dfrac{E_r}{E_i}\right)$ and $\left(\dfrac{E_t}{E_i}\right)$ at the boundary for the normal incidence for oblique incidence at $\theta_i = 10^0$. For region 1, $\varepsilon_{r1} = 8.5$, $\mu_{r1} = 1$ and $\sigma_1 = 0$, region2 is free space. Assume perpendicular polarization.   7M

(OR)

4. (a) Define and distinguish between terms perpendicular polarization and parallel polarization for the case of reflection by a perfect conductor under oblique incidence.   7M

    (b) A radio station transmits power radially around the spherical region. The desired electric field intensity at a distance of 10km from the station is 1mV/m. Calculate the corresponding magnetic field, power density and power transmitted by station.   7M

UNIT – III

5. (a) Derive the expression for attenuation constant, phase shift constant and phase velocity for a distortion less transmission line.   7M

    (b) A transmission line has $Z_0 = 700 \angle -13.4^0 \Omega$ is inserted between a generator of $200\,\Omega$ and a load of $400\,\Omega$. The attenuation and phase constants of a line are $\alpha = 0.00712$ *nepers / km* and $\beta = 0.0288$ rad/km. Calculate the insertion loss if length is 200km.   7M

(OR)

6. (a) Prove that a line of finite length and terminated by characteristic impedance Z_0 is equivalent to a line finite length.   7M

    (b) A voltage of 45V is applied to a 10 km long field quad cable. The receiving end voltage is 7.868V and its lag behind by 110.2^0. Calculate The attenuation constant and phase constants of the cable, if it is properly terminated.   7M

UNIT – IV

7. (a) Define the reflection coefficient and derive the expression for input impedance in terms of reflection coefficient.   7M

   (b) A 50Ω transmission line is terminated by an unknown impedance. The VSWR is 4 and the first minimum is formed at 2 cm from the load end. The frequency of operation is 1GHz.Design a single stub line matching for above conditions.   7M

(OR)

8. (a) Describe how impedance matching is achieved using single stub matching. What are the advantages and disadvantages compared to double stub matching?   7M

   (b) A load (50-j100)Ω is connected across a 50Ω line. Design a short circuited stub to provide matching between the two at a signal frequency of 30MHz using smith chart.   7M

UNIT-V

9. (a) What is waveguide? Discuss in detail the theory of waveguides with reference to TM mode of propagation of electromagnetic waves.   7M

   (b) Calculate the cut - off frequencies for the TE_{01},TE_{11}, and TM_{12} modes in a rectangular metal waveguide of dimensions 2cm X1cm.   7M

(OR)

10. (a) What is electromagnetic cavity resonator? Describe the excitation of TM waves in the class of cavity resonators produced by placing a plane end faces on a length of a cylindrical waveguide.   7M

   (b) Calculate the values of critical guide wavelength in an air filled rectangular waveguide, with internal dimensions 7.62cm X2.54cm for the normal H_{10} mode at a frequency of 3GHz.   7M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: PULSE AND DIGITAL CIRCUITS (ECE)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain in detail about RC High Pass Circuit for Sinusoidal and Step Inputs with neat diagrams?   7M

   (b) Explain in detail about RC Low Pass Circuit for Sinusoidal and Step Inputs with neat diagrams?   7M

(OR)

2. (a) Explain in detail about RC High Pass Circuit with pulse Input with neat diagrams for different time constants?   7M

   (b) What is an attenuator? Explain its types.   7M

UNIT – II

3. (a) State and prove clamping circuit theorem.   7M

   (b) Explain in detail about different types of Shunt Clippers?   7M

(OR)

4. (a) What is a clipper? Explain different types of Series Clippers?   7M

   (b) Explain in detail about Transistor Clippers?   7M

UNIT – III

5. (a) Explain in detail about Transistor as Switch?   7M

   (b) Explain the operation of a monostable multivibrator with necessary waveforms and circuits?   7M

(OR)

6. (a) Explain in detail about Schmitt trigger Circuit?   7M

   (b) Explain the operation of Bi-stable Multivibrator?   7M

UNIT – IV

7. (a) What is Time Base generator and Explain the general features of a time base signal?   7M

   (b) Explain in detail about Exponential Sweep Circuit?   7M

(OR)

8. (a) Explain in detail about UJT and Sweep Circuit generation using UJT?   7M

   (b) Explain in detail about Miller and Bootstrap Sweep Circuits?   7M

UNIT-V

9. Explain the operation of linear bidirectional sampling gate using Transistors?   14M

(OR)

10. (a) Draw the circuit diagram of diode-resistor logic OR, AND gates and explain its operation   10M

    (b) Compare IC logic families   4M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ELECTRONIC CIRCUIT ANALYSIS (ECE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain the concept of amplifier with suitable example.   7M
    (b) Explain the CE amplifier with Fixed bias.   7M

(OR)

2. (a) Explain the FET amplifier with voltage divider bias.   7M
    (b) Explain the differences between BJT and FET amplifiers in detail.   7M

UNIT – II

3. (a) Explain the analysis of CB configuration in detail using approximate model.   7M
    (b) A CE amplifier is driven by a voltage source of internal resistance r_s=800Ω, and the load   7M
        impedance is a resistance R_L=1000Ω. The h-parameters are h_{re}=2×10^{-4}, h_{ie}=1KΩ, h_{fe}= 50 and
        h_{oe}=25µA/V. Compute the current gain, output resistance using exact analysis.

(OR)

4. (a) Draw the Hybrid model for the transistor in three different configurations.   7M
    (b) Explain the analysis of a transistor amplifier circuit using h-parameters.   7M

UNIT – III

5. (a) Explain the Common Source amplifier with resistive load.   7M
    (b) Explain about Common Gate stage.   7M

(OR)

6. (a) Draw the basic Darlington bias circuit and derive the AC input impedance, AC output
        impedance.   7M
    (b) Explain the frequency response of Multistage amplifier.   7M

UNIT – IV

7. (a) Explain the general characteristics of negative feedback amplifier in detail.   7M
    (b) A voltage series negative feedback amplifier has a voltage gain without feedback of A=500,   7M
        input resistance R_i=3KΩ, output resistance R_o= 20kΩ, β=0.01. Calculate the voltage gain,
        input resistance, and output resistance of the amplifier.

(OR)

8. (a) Draw the block diagram of Oscillator and what are the conditions for oscillators. Derive the   7M
        general equation for the LC oscillator.
    (b) Draw the neat diagram of Hartley oscillator and derive the expression for f_o and h_{fe}.   7M

UNIT-V

9. (a) Explain the following   7M
        (i) Q-factor,   (ii) Q-factor of a Capacitor,   (iii) unloaded and loaded Q
    (b) Draw the Capacitance coupled single tuned amplifier and it's equivalent circuit and explain.   7M

(OR)

10. (a) Draw the neat diagram of transformer coupled transistor amplifier and explain.   7M
    (b) In Class-A amplifier, $V_{CE(max)}$ = 15V, $V_{CE(min)}$ = 1V. Find the overall efficiency for i) series-fed   7M
        load, ii) transformer coupled load.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: ANALOG COMMUNICATIONS (ECE)

Time : 3 Hours   Max.
Marks: 70

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

UNIT - I

1. (a) Define modulation and explain need of modulation   7M
   (b) Discuss about the modulation of AM wave using square-law modulator   7M

(OR)

2. (a) State Hilbert Transform and write its properties   7M
   (b) With the help of neat circuit diagram explain envelop detector.   7M

UNIT – II

3. (a) Briefly Explain about Wide band frequency modulation   7M
   (b) The FM signal has a sinusoidal modulation frequency 15Khz and a modulation   7M
       index β=2 using carson rule. Find the transmission bandwidth

(OR)

4. (a) Explain the principle operation of Armstrong method of generation of FM signal 7M
       with neat diagram.
   (b) Compare AM and FM   7M

UNIT – III

5. (a) Draw the block schematics of super heterodyne receiver and explain the operation 7M
       of each block.
   (b) Explain the important of Automatic Gain Control (AGC) and discuss simple AGC   7M

(OR)

6. (a) Briefly Explain the tracking characteristics of Radio receivers   7M
   (b) Describe the FM Stereo with neat diagram.   7M

UNIT – IV

7. (a) Derive an expression for output SNR for DSB-SC system   7M
   (b) Explain threshold effect in Angle modulation   7M

(OR)

8. (a) Define noise figure, Noise temperature and derive noise figure for cascaded   7M
       networks
   (b) Explain the purpose of pre-emphasis and de-emphasis circuits and the working of   7M
       these circuits

UNIT-V

9. Explain the method of generation and detection of PAM signals with neat   14M
   schematics

(OR)

10. Discuss the method of generation and detection of a PWM signal with neat   14M
    schematics

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: MANUFACTURING TECHNOLOGY (ME)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) List main advantages of the casting process.
    (b) State the typical applications of casting process as used in the automobile sector.

(OR)

2. (a) What are the various elements that comprise the gating system?
    (b) Describe the objectives of gating systems in any casting

UNIT – II

3. (a) What are the functions of flux in melting metals and alloys?
    (b) Describe the operation of a cupola furnace for melting cast iron.

(OR)

4. (a) Describe the composition of the mould material in the shell-moulding process.
    (b) Briefly enumerate the steps in sequence for producing casting from shell moulding.

UNIT – III

5. (a) Why is welding extensively used?
    (b) What are the kinds of temporary fabrication methods you know of?

(OR)

6. (a) Explain Oxy-acetylene gas welding with a neat sketch.
    (b) Explain the working principle of Thermit welding process with a neat sketch.

UNIT – IV

7. (a) Explain briefly about MIG welding.
    (b) Explain briefly about TIG welding.

(OR)

8. (a) Write a short note on soldering and brazing.
    (b) Explain the process of diffusion welding.

UNIT-V

9. (a) What are the advantages of hot working over cold working?
    (b) Explain Hydrostatic Extrusion with a neat sketch.

(OR)

10. (a) Explain the operations that are normally provided in forging.
    (b) Explain any four forging defects with a neat sketch.

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: THERMAL ENGINEERING - I (ME)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Explain with suitable sketches the working of a four-stroke spark-ignition engine.   7M
    (b) Compare the relative advantages and disadvantages of four-stroke and two-stroke engines.   7M

(OR)

2. (a) Differentiate between S.I and C.I engine   7M
    (b) Discuss the difference between theoretical and actual valve timing diagrams of diesel engine.   7M

UNIT – II

3. What is Carburetor? Explain the working of Zenith carburetor with neat sketch.   14M

(OR)

4. (a) How is the circulation accomplished in a thermo-syphon system? What is the drawback of this system?   7M
    (b) Explain the battery operated ignition system with a neat sketch   7M

UNIT – III

5. (a) What is Octane number? How is it found?   6M
    (b) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.   8M

(OR)

6. (a) Explain the effect of various engine variables on SI engine knock.   7M
    (b) What is delay period and what are the factors that affect it?   7M

UNIT – IV

7. Following data relate to 4 cylinder four stroke petrol engine. Air fuel ratio by weight is 16:1, calorific value of the fuel = 45200kJ/kg, mechanical efficiency = 82%, air standard efficiency = 52%, relative efficiency = 70%, volumetric efficiency = 78%, stroke/bore ratio = 1.25, suction condition = 1 bar and 25^0, speed = 2400 rpm and power at brakes = 72 kW, calculate the (i) Compression ratio, (ii) Indicated thermal efficiency, (iii) Brake specific fuel consumption, (iv) Bore and stroke.   14M

(OR)

8. What is the significance of heat balance sheet? Discuss the procedure to draw heat balance sheet for C.I. engine.   14M

UNIT-V

9. (a) What are the advantages of multi stage compressors over single stage compressor? Derive the condition of minimum work with complete intercooling in a two stage compressor?   8M
    (b) Differentiate between reciprocating and rotary compressor   6M

(OR)

10. (a) Derive an expression for volumetric efficiency of an air compressor? Discuss the factors affecting the volumetric efficiency?   8M
    (b) A single stage single acting compressor delivers 15 m^3/min of free air from 1 bar to 8 bar. The speed is 300 rpm. Clearance is 1/16 of swept volume. Take n=3 and L/D = 1.5. Find diameter and stroke of the compressor.   6M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: KINEMATICS OF MACHINERY (ME)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1.	(a)	Differentiate between a machine and a structure? Mention any two examples of each one.	6M
	(b)	Define the mobility of the mechanism?	8M

(OR)

2.	(a)	Define mechanism and distinguish between lower pairs and higher pairs?	6M
	(b)	What do you mean by inversion? Explain inversions of four bar mechanisms.	8M

UNIT – II

|		
3.	Explain the peaucelleir mechanism with a neat sketch.	14M

(OR)

4.	(a)	Derive the conditions of correct steering for Ackermann's Steering gear with a neat sketch.	7M
	(b)	Explain the Double Hook's joint with a neat sketch.	7M

UNIT – III

5.	Locate all the Instantaneous centers of a slider crank mechanism?	14M

(OR)

6.	Locate Instantaneous Centre of coincident points P & Q of the following mechanism.	14M
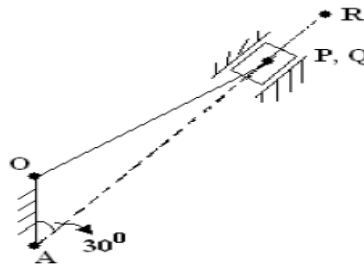
UNIT – IV

|		
7.	Explain with sketches the different types of cams and followers.	14M

(OR)

8.	Discuss the displacement, velocity and acceleration diagrams when the follower moves with uniform acceleration and retardation.	14M

UNIT-V

9.	An epicyclic gear train consists of an arm and two gears A and B having 30 and 40 teeth respectively. The arm rotates about the center of the gear A at a speed of 80rpm counter-clockwise. Determine the speed of the gear B if (i) the gear A is fixed, and (ii) the gear A revolves at 240rpm clockwise instead of being fixed.	14M

(OR)

10.	An epicyclic gear train, as shown in figure, is composed of a fixed annular wheel A having 150 teeth. The wheel A is meshing with wheel B which drives wheel D through an idler wheel C, D being concentric with A. The wheels B and C are carried on an arm which revolves clockwise at 100rpm about the axis of A and D. If the wheels B and D have 25 teeth and 40 teeth respectively, find the number of teeth on C and the speed and sense of rotation of C.	14M
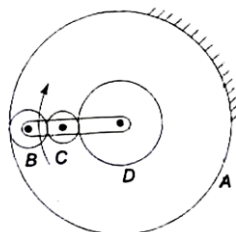
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: MECHANICS OF FLUIDS (ME)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Differentiate between absolute and gauge pressures. 4M

   (b) In a stream of glycerin in motion, the velocity gradient at a certain point is 0.3 m/s per meter. Calculate the shear stress at the point if the mass density of the liquid is 1275kg/m^3 and the kinematic viscosity is 6.3×10^{-4} m^2/s. 10M

(OR)

2. (a) Express the pascal law and give a real world example of it. 4M

   (b) A differential manometer is connected at the two points A and B of two pipes as shown in Fig. The pipe A contains a liquid of specific gravity is 1.5 while pipe B contains a liquid of specific gravity is 0.9. The pressures at A and B are 1 kgf/cm^2 and 1.8 kgf/cm^2 respectively. Find the difference in mercury level in differential manometer. 10M
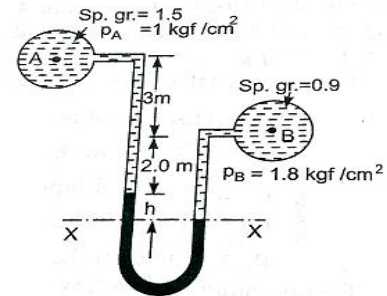
UNIT – II

3. (a) Explain in detail the classification of flows with examples. 7M

   (b) Write the difference between steady and unsteady flow? 7M

(OR)

4. (a) The Steam function for 2-D flow is given by $\Psi= xy$. Determine the velocity at the point P (4,5). Also determine the value of velocity potential at the point (4,5). 8M

   (b) Explain the terms i) Path line ii) Streak line iii) Stream line iv) Steam tube. 6M

UNIT – III

5. Derive Darcy-Weisbach equation? 14M

(OR)

6. List the minor losses of energy in pipe flow. 14M

UNIT – IV

7. (a) Define boundary layer thickness and displacement thickness? 4M

   (b) Find moment thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$ 10M

(OR)

8. (a) Distinguish between drag and lift. 4M

   (b) The boundary layer thickness at 4 m from the leading edge of a flat plat kept over zero angle of to the flow direction is 2 mm. The free stream velocity is 25 m/s. Calculate the boundary layer thickness at 8 mm. 10M

UNIT-V

9. Give the expression for drag and lift forces using dimensional analysis. 14M

(OR)

10. Experiments were conducted in a wind tunnel with a wind speed of 50 km/hr on a flat plate of size 2 m long and 1 m wide. The density of air is 1.15 kg/m^3. The co-efficient of lift and drag are 0.75 and 0.15 respectively. Determine i) the lift force ii) the drag force iii) the resultant force iv) direction of resultant force and v) power exerted by air on the plate. 14M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: COMPOSITE AND NANO MATERIALS (ME)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. Describe pultrusion and prepreg production processes for fabrication of fiber reinforced composites.   14M

(OR)

2. Distinguish particle reinforced composites and fiber reinforced composites with respect to characteristics, advantages, disadvantages and applications.   14M

UNIT – II

3. Discuss the properties and applications of Ceramic Matrix Composites and Carbon-Carbon Composites.   14M

(OR)

4. Explain the functions and properties of matrix phase. Discuss the essential requirements of good matrix material.   14M

UNIT – III

5. Describe the characteristics, properties and applications of: 14M
   (i) Pre-stressed Concrete (PC)
   (ii) Reinforced Cement Concrete (RCC).

(OR)

6. Explain the concept of Post Tensioning in Reinforced Concrete with advantages, disadvantages and applications.   14M

UNIT – IV

7. (a) How do you classify the ceramic materials?   7M
   (b) Discuss different types of glasses.   7M

(OR)

8. Describe the fabrication of glass by: 14M
   (i)   Rolling
   (ii)   Casting

UNIT-V

9. Discuss the properties and applications of Shape Memory alloys.   14M

(OR)

10. Discuss the properties and applications of Smart Materials alloys.   14M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: PROBABILITY AND STATISTICS (Common to ME & CSE)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. A random variable X has the following probability function: 14M

x	0	1	2	3	4	5	6	7
$p(x)$	0	K	$2K$	$2K$	$3K$	K^2	$2K^2$	$7K^2+K$

(i) Determine K, (ii) if $P(X < 6)$, (iii) $P(X \geq 6)$, (iv) $P(0<X<5)$, (v) if $P(X \leq K)>1/2$, find the minimum value of K (v) mean and (vi) Variance.

(OR)

2. (a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number of defective items and variance of defective items.   7M

(b) The probability density function is $f(x)=\begin{cases} k(x^2-1), & -1 \leq x \leq 3 \\ 0, & \text{elsewhere} \end{cases}$. Find the value of '$k$'and evaluate $p\left(\dfrac{1}{2} \leq x \leq \dfrac{5}{2}\right)$.   7M

UNIT – II

3. (a) 4 buses arrive at a specified stop at 15-minute intervals starting at 7 a.m. That is, they arrive at 7.00,7.15,7.30,7.45 a.m. and so on. If a passenger arrives at the stop at a time that is uniformly distributed between 7.00 and 7.30 a.m., find the probability that he waits (i) less than 5 minutes for a bus (ii) more than 10 minutes for a bus.   7M

(b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.   7M

(OR)

4. Find the Mean and Variance of the Poisson Distribution   14M

UNIT – III

5. It is claimed that a random sample of 49 tires has a mean life of 15200 km. This sample was drawn from a population whose mean is 15150 kms and a standard deviation of 1200 km. Test the significance at 0.05 level and also find 95% confidence limits.   14M

(OR)

6. (a) The mean breaking strength of the cables supplied by a manufacturer is 1800 with a S.D of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cables have increased. In order to test this claim, a sample of 50 cables is tested. It is found that the mean breaking strength is 1850.Can we support that the claim at 1% level of significance.   7M

(b) Random samples of 400 men and 600 women were asked whether they would like to have a fly over near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level.   7M

UNIT – IV

7. (a) Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (I.R) and engineering ratio (E.R).Calculate the coefficient of correlation. **7M**

Student	A	B	C	D	E	F	G	H	I	J
I.R.	105	104	102	101	100	99	98	96	93	92
E.R.	101	103	100	98	95	96	104	92	97	94

(b) Find the rank correlation for the following data: **7M**

Scores in test x	12	15	24	20	8	15	20	20	11	26
Scores in test y	21	25	35	24	16	18	25	16	16	38

(OR)

8. (a) Define lines of regression and regression coefficients (i) x on y (ii) y on x **7M**

(b) The two regressions of the variables x and y are $x = 19.13 - 0.87\ y$ and $y = 11.64 - 0.50\ x$. Find (i) mean of x's, (ii) mean of y's, (iii) the correlation coefficient between x and y. **7M**

UNIT-V

9. (a) An inspection of 10 samples of size 400 each from 10 lots revealed the following defective units. **7M**

Sample Number	1	2	3	4	5	6	7	8	9	10
No. of Defective units	17	15	14	26	9	4	19	12	9	15

Calculate the control limits for the number of defective units. Plot the control limits and the observations and state whether the process is under control or not.

(b) 15 tape-recorders were examined for quality control test. The number of defects in each tape-recorder is recorded below. Draw the appropriate control chart and comment on the state of control. **7M**

Unit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of Defects	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1

(OR)

10. (a) Explain briefly the terms chance cause and assignable cause. **7M**

(b) What is a control chart? How is it designed? What purpose does it serve? **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: COMPUTER ORGANIZATION (CSE)

Time : 3 Hours   Max.
Marks: 70

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

UNIT - I

1. (a) Explain about Computer Types in Real World?   8M
    (b) Explain about Bus Structures in Computer? With neat Diagram   6M

(OR)

2. (a) Explain about Basic performance equation of computer in detail   7M
    (b) Explain about Functional unit of a computer with neat diagram?   7M

UNIT – II

3. (a) Explain about three types of shift micro operations?   8M
    (b) Explain about memory – reference instructions with format?   6M

(OR)

4. (a) Design a 4-bit adder/sub tractor using full adder and explain its function.   7M
    (b) Design 4-bit Binary incrementer and Explain   7M

UNIT – III

5.   Explain about Booth multiplication algorithm with suitable example.   14M

(OR)

6. (a) Explain about Micro program sequencer with its neat diagram.   8M

    (b) Explain about control memory?   6M

UNIT – IV

7.   What is "Cache Memory"? Explain about various mapping procedures   14M

(OR)

8. (a) Explain about Direct memory Access?   8M
    (b) Explain about Virtual memory with neat diagram?   6M

UNIT-V

9. (a) What is Parallel Processing? Explain.   4M
    (b) Explain about Pipelining with 4-segment pipeline?   10M

(OR)

10. (a) Explain about Hyper Cube Network?   7M
    (b) Explain about parallel arbitration procedure?   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: JAVA PROGRAMMING (CSE)

Time : 3 Hours   Max.
Marks: 70

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

UNIT - I

1.	Define Java ? Explain the three OOPS principles in detail?	14M

(OR)

2.	(a)	Explain in detail about Java Buzz Words?	7M
	(b)	Describe the two control statements of java?	7M

UNIT – II

3.	Define Inheritance and Explain different types of inheritance with an example program for each?	14M

(OR)

4.	(a)	Define package with an example Program?	7M
	(b)	Explain Nested Interface with an example program?	7M

UNIT – III

5.	Explain in detail about Java Built-in Exceptions in detail?	14M

(OR)

6.	Write a java program for Thread creation by extending Thread class and Explain the output?	14M

UNIT – IV

7.	(a)	Explain with a program how mouse events is handled?	7M
	(b)	Explain with a program how Keyboard events is handled?	7M

(OR)

8.	Explain in detail about AWT classes Hierarchy in detail?	14M

UNIT-V

9.	Define Applet and Explain life cycle of an applet with an example Program?	14M

(OR)

10.	With a java program explain the concept of JTable?	14M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: FORMAL LANGUAGES & AUTOMATA THEORY (CSE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Define DFA. Construct a DFA recognizing the language generated by (a+b)*b.   6M

    (b) Convert the following mealy machine into its equivalent Moore machine.   8M

From state	i/p	To state	o/p	i/p	To state	o/p
Q_0	0	Q_1	N	1	Q_3	N
Q_1	0	Q_2	N	1	Q_3	N
Q_2	0	Q_2	Y	1	Q_3	N
Q_3	0	Q_1	N	1	Q_4	N
Q_4	0	Q_1	N	1	Q_4	Y

(OR)

2. (a) Differences between DFA and NFA.   6M

    (b) Convert the following NFA with ε to DFA   8M

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

UNIT – II

3. (a) State and prove pumping lemma for regular languages. Prove that the language of palindromes over {a, b} is not regular using pumping lemma.   9M

    (b) Give the R.E for the language such that every string will have at least one 'a' followed by at least one 'b'.   5M

(OR)

4. (a) Explain how equivalence between two FA is verified with an example.   8M

    (b) What are the applications of regular expressions and finite automaton?   6M

UNIT – III

5. (a) What is GNF? Convert the following grammar to GNF   8M
    $A_1 \rightarrow A_2A_3|A_4A_4$
    $A_4 \rightarrow b|A_1A_4$
    $A_2 \rightarrow b$
    $A_3 \rightarrow a$

    (b) construct the string aaabbabbba from the grammar   6M
    S ->aB/bA
    A -> a/aS/bAA
    B-> b/bS/aBB   by using a) LMD   b)RMD

(OR)

6. (a) Let G be S->AB,A->a, B->C/b, C->D, D->E and E->a. Eliminate unit productions and get an equivalent grammar   7M

    (b) Let G be the grammar S->1A/0B, A-> 0/0S/1AA, B->1/1S/0BB. For the string 00110101, find: (i) The leftmost derivation. (ii) The rightmost derivation. (iii) The derivation tree   7M

UNIT – IV

7. (a) Construct a PDA for recognizing L = { $a^{n+1}b^n$ / n >= 0}. Show the moves of the PDA for the string aaaabbb. 8M

    (b) Design PDA for the language L= {WcW^r W ε (0+1)*} 6M

(OR)

8. (a) Define a PDA and language of a PDA. Construct a PDA for the following language. L={ $a^ib^jc^k$/ i, j, k > 0 and j=i+k } . Show the moves of the PDA for the string aabbbbcc using instantaneous description. 8M

    (b) Construct a PDA that recognizes balanced parentheses 6M

UNIT-V

9. (a) Construct a Turing machine which can accept the strings of the following language. L={ X€{a,b} */ X is a palindrome . Show the moves of the TM for the string aba. 9M

    (b) Write short notes on MPCP and multi tape turing machine 5M

(OR)

10. (a) What is decidability of a problem? Give any two examples of undecidable problems. Prove their undecidability. 7M

    (b) Write short notes on post correspondence problem and check whether the following is PCP or not. 7M

I	A	B
1	11	111
2	100	001
3	111	11

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: DATABASE MANAGEMENT SYSTEMS (CSE)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

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

UNIT - I

1.	(a)	With a neat diagram, explain the structure of a DBMS.	7M
	(b)	Describe the role of DBA in DBMS?	7M

(OR)

2.	Explain the concept of E-R model? Draw an E-R Diagram for the hospital management system. Assume your own entities (Minimum of 5 entities), attributes and relations. Explain in detail?	14M

UNIT – II

3.	(a)	Give the syntax for creating a view in SQL?	7M
	(b)	List the types of privileges available in SQL?	7M

(OR)

4.	(a)	Explain the aggregate functions used with SQL?	7M
	(b)	Differentiate Functions and Procedures?	7M

UNIT – III

5.	What is normalization? Explain all Normal forms?	14M

(OR)

6.	What are the pitfalls in relational database design? With a suitable example, explain the role of functional dependency in the process of normalization.	14M

UNIT – IV

7.	(a)	Define Query processing? Explain Measures of Query Cost?	7M
	(b)	What is serilisability? How can serilisability be ensured?	7M

(OR)

8.	(a)	What is a transaction? Explain with an example?	7M
	(b)	Discuss the different types of transaction failures?	7M

UNIT-V

9.	(a)	Discuss the problems of deadlock and starvation in transaction processing and the different approaches to deal with these problems?	7M
	(b)	Explain Remote Backup Systems?	7M

(OR)

10.	(a)	Which are the various reasons for a transaction to fail?	7M
	(b)	Explain about Timestamp-Based Protocols?	7M

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

B.Tech. IV Sem (R15) Regular & Supple. Examinations of April/May 2019
SUB: OPERATING SYSTEMS (CSE)

Time : 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Describe in detail about operating system functions.   7M
   (b) Explain in detail about System programs.   7M

(OR)

2. (a) Explain the client-server and peer-to-peer models of distributed systems.   7M
   (b) Describe briefly about OS system calls with example.   7M

UNIT – II

3. (a) Assume you have the following jobs to execute with one processor, with the jobs arriving in   7M
      the order listed here:

i	T(pi)
0	80
1	20
2	10
3	20
4	50

      i) Suppose a system uses FCFS scheduling .Create a Gantt chart illustrating the execution
         of these processes?
      ii) What is the turnaround time for process p3?
      iii) What is the average wait time for the processes?

   (b) What is critical section problem? Explain various solutions to critical section problem.   7M

(OR)

4. (a) Describe briefly about process scheduling criteria.   7M
   (b) What is Inter process communication? Explain Peterson's Solution.   7M

UNIT – III

5. Explain and illustrate various page replacement algorithms. Provided reference string   14M
   7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1 with frame size =3.

(OR)

6. (a) Describe in detail about the concept of swapping with example.   7M
   (b) Illustrate and explain the structure of page table.   7M

UNIT – IV

7. (a) What are deadlock characterization? Describe about deadlock prevention mechanisms.   7M
   (b) Explain in detail about recovery from dead lock.   7M

(OR)

8. Describe briefly about various file access methods.   14M

UNIT-V

9. Explain in detail about domain of protection access matrix.   14M

(OR)

10. (a) Describe in detail about security problems.   7M
    (b) Explain in detail the concept of user authentication.   7M