Q.P. Code: 257612 | **SET - 1**

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

B. Tech. IV Semester (R15) Supplementary Examinations of August – 2021

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) Derive an expression for bulk unit weight in terms of its specific gravity of solids, voids ratio, degree of saturation and unit weight of water 7M

(b) The wet density of a glacial deposit is 19.2 kN/m^3 . The specific gravity of the soil is 2.67 and the moisture content of the soil is 12% by dry weight. Calculate: (i) Dry density. (ii) Porosity. (iii) Voids ratio. (iv) Air content. (v) Percentage air voids. 7M

(OR)

2. (a) List the common clay minerals in soil and explain any one in detail. 7M

(b) Explain with sketches various types of soil structures . 7M

UNIT – II

3. (a) Water is flowing under constant hydraulic head of 5 cm through a specimen 50 cm^2 in cross section and 6 cm in height. Calculate the coefficient of permeability and velocity of flow if 1500 cc of water passes in an interval of 30 min. 7M

(b) Describe a test for determining the permeability of clay soil. Obtain the necessary equation 7M

(OR)

4. (a) A soil profile consists of surface layer of sand 3.5m thick (= 16.5 kN/m^3), an intermediate layer of clay 3 m thick (= 19.5 kN/m^3) and the bottom layer gravel 3.5 m thick (= 19.3 kN/m^3). The water table is at the upper surface of the clay layer. Draw total, neutral and effective stress variation diagrams. 7M

(b) What is quick sand condition? List out the conditions that are favorable for quick sand condition. 7M

UNIT – III

5. (a) How do you construct a Newmark's influence chart? Mention its applications. 7M

(b) Discus about influence diagram and pressure bulb. 7M

(OR)

6. (a) Distinguish between Boussinesq and Westergaard stress distribution theories 7M

(b) A load 500 kN acts as a point load at the surface of a soil mass. Estimate the vertical stress at a point 4 m below and 3m away from the point of load using Boussinesq's and Westergaard's theory. 7M

UNIT – IV

7. (a) Explain Terzaghi's theory of consolidation. Discuss the assumption and their validity. 7M

(b) A 3 m thick clay layer beneath a structure is overlain by a permeable stratum and is underlain by an impervious stratum. The coefficient of consolidation of the clay was found to be 0.028 cm 2 /minutes. The final expected settlement of the layer is 80 mm. Determine the time taken for 75% of full consolidation and the time required for 2.5 cm settlement 7M

(OR)

8. (a) Describe the Proctor's modified compaction test for determining filed compaction of a given soil 7M

(b) Distinguish the consolidation of laterally confined soil. 7M

UNIT-V

9. (a) Explain the shear characteristics of sand and normally loaded clays? 7M

(b) What is Coulombs equation for shear strength of soil? Discuss the factors which affect the shear strength parameters of soil. 7M

(OR)

10. (a) What are the merits of tri axial shear test over box shear test? Explain the different 7M

conditions for which soils under tri axial tests can be conducted.

(b) What is critical void ratio& what is meant by lequifaction 7M

Q.P. Code: 257812 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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 'dimensional analysis'? Explain the term 'dimensionally homogeneous equation' with an example. 7M

(b) The resisting force R of a supersonic plane during flight can be considered as dependent upon the length of the aircraft l, velocity V, air viscosity μ, air density ρ and bulk modulus of air K. Express the functional relationship between these variables and the resisting force. 7M

(OR)

2. (a) Explain the geometric, kinematic and dynamic similarities between a prototype and its model. 7M

(b) Define the following non-dimensional numbers: Reynolds' number, Froude's number and Mach's number. What are their significances for fluid flow problems? 7M

UNIT – II

3. (a) Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceed 50% . 7M

(b) A jet of water of diameter 50mm strikes a fixed plate in such a way that the angle between the plate and the jet is 30^0. The force exerted in the direction of the jet is 1471.5 N. Determine the rate of flow of water. 7M

(OR)

4. (a) A jet of water having a velocity of 40m/s strikes a curved vane, which is moving with velocity of 20m/s. The jet makes an angle of 30^0 with the direction of motion of vane at inlet and leaves at an angle of 90^0 with the direction of motion of 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

(b) Define the various heads and efficiencies of a turbine. 7M

UNIT – III

5. (a) Explain the classification of hydraulic turbines. 7M

(b) A Pelton wheel has a mean bucket speed of 10m/s with a jet of water flowing at the rate of 700 litres/s under a head of 30m. The buckets deflect the jet through an angle of 160^0. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume Co-efficient of velocity as 0.98. 7M

(OR)

6. (a) A turbine is to operate under a head of 25m at 200 r.p.m. The discharge is 9 m^3 /s. If the efficiency is 90% find the speed, discharge and power developed by the turbine when working under a head of 20m. 7M

(b) Define the specific speed of a turbine. Derive an expression for the specific speed. What is the significance of the specific speed? 7M

UNIT – IV

7. (a) Obtain an expression for the work done by the impeller of a centrifugal pump on water per second per unit weight of water. 7M

(b) A centrifugal pump is to discharge 0.118m^3 /s at a speed of 1450 r.p.m. against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. 7M

(OR)

8. (a) Obtain an expression for the minimum speed for starting a centrifugal pump. 7M

(b) Explain the characteristic curves of a centrifugal pump. What is the significance of the 7M

characteristic curves ?

UNIT-V

9. (a) What is a reciprocating pump? Describe the principle and working of a reciprocating pump with a sketch. 7M

(b) A single-acting reciprocating pump running at 30 r.p.m., delivers 0.012 m^3/s of water. The diameter of the piston is 25cm and stroke length is 50cm. Determine : (i) Theoretical discharge of the pump, (ii) Co-efficient of discharge and (iii) Slip and percentage slip of the pump. 7M

(OR)

10. A single-acting reciprocating pump has a piston diameter 12.5cm and stroke length 30cm. The centre of the pump is 4m above the water level in the sump. The diameter and length of suction pipe are 7.5cm and 7m respectively. The separation occurs if the absolute pressure head in the cylinder during suction stroke falls below 2.5m of water. Calculate the maximum speed at which the pump can run without separation. Take atmospheric head as 10.3m of water. 14M

Q.P. Code: 258012 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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.	(a)	Explain Guidelines for planning and drawing of Residential Buildings?	7 M
	(b)	What are the standard dimensions for various building units?	7 M
		(OR)	
2.	(a)	Explain about principles of planning of Buildings?	7 M
	(b)	Explain about building bye laws?	7 M

UNIT – II

3.		Explain briefly about classifications of stone masonry?	14 M
		(OR)	
4.		Explain with neat sketches English and Flemish Bonds.	14 M

UNIT – III

5.	(a)	Explain the classifications of Arches.	7 M
	(b)	Write about the raw materials of concrete.	7 M
		(OR)	
6.	(a)	Explain the types of Roofs.	7 M
	(b)	Briefly explain about different types of lintels?	7 M

UNIT – IV

7.		Explain about types of doors and windows?	14 M
		(OR)	
8.		Write the methods of damp proofing for foundations.	14 M

UNIT-V

9.		What is an intelligent building. What are the benefits and limitations for intelligent buildings?	14 M
		(OR)	
10.		Explain the design criteria for green buildings.	14 M

Q.P. Code: 258212 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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) Explain with a sketch, how to find the elevation of an object, whose base is inaccessible and instrument stations are in the same plane. 7M

(b) Determine the elevation of the top of a light house from the following data. 7M

Inst. at	Staff reading on B.M	Vertical angle	Remarks
A	0.835	+ 24°40'	R.L of BM = 160.00 m
B	0.950	+16º 20'	AB = 30 m

Stations A and B and the top of the light house are in the same verticle plane.

(OR)

2. (a) Describe briefly the classification of Triangulation Systems. 7M

(b) Explain the equipment and methods used for precise levelling. 7M

UNIT – II

3. (a) Explain the basis on which the length of a transition curve is decided. 7M

(b) A curve of radius 420m is to be setout by offsets from the long chord. The deflection angle is 60°. Calculate the offsets from the tangent point at 20 m intervals for the half of the curve. 7M

(OR)

4. (a) Explain the terms tangent correction and chord gradient, 7M

(b) A vertical curve lies between two gradients of +0.6% and -0.9%. Rate of change of gradient for the curve is 0.075% per 30 m. If the elevation and the chainage of point of intersection are 1430 m and 985.5 m, respectively, find the chainages of the tangent points and apex of the curve. 7M

UNIT – III

5. (a) Explain the various purposes of "Hydrographic Surveying". 7M

(b) Explain the different methods of locating sounding positions. 7M

(OR)

6. (a) Explain the three components of GPS with their functions. 7M

(b) Explain the applications of GPS in Surveying and Engineering. 7M

UNIT – IV

7. (a) Define and explain the following terms: 7M
(i) Exposure station, (ii)Nadir point, (iii) Principal point, (iv) Scale of photograph

(b) Explain the purpose and use of Terrestrial Photogrammetry 7M

(OR)

8. (a) Define Photo-interpretation. Explain the features that help to identify objects in photograph. 7M

(b) Write a short note on the following: 7M
(i) Stereoscopic vision (ii) crab and drift,

UNIT-V

9. (a) Explain the features and capabilities of Total Station. 7M

(b) Explain with a neat sketch, how the area of given field can be measured with single station setup using Total Station 7M

(OR)

10. (a) Explain the steps involved in setting up Total Station for taking observations. 7M

(b) Explain with a neat sketch how you setting out a layout of a building with total station. 7M

Q.P. Code: 258412 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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) Draw a typical stress-strain curve for mild steel, indicate salient point and define them. 7M

(b) Derive the relationship between modulus of elasticity and bulk modulus. 7M

(OR)

2. (a) A tapering rod has diameter d1 at one end and it tapers uniformly to a diameter d2 at the other end in a length L. If the modulus of elasticity is E, find the change in length when subjected to an axial force P. 7M

(b) Explain the term factor of safety and modulus of rigidity. 7M

UNIT – II

3. (a) A simply supported beam of 10m span is loaded as shown in Figure. Draw the B.M.D. and S.F.D. indicating principal values. 7M

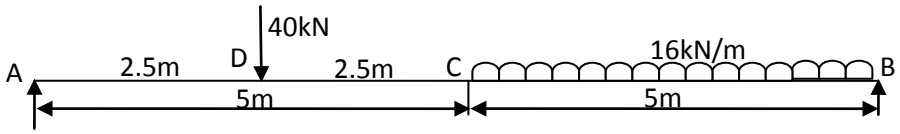
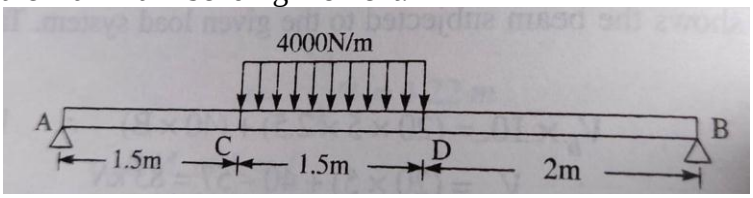


Figure 1

(b) Draw the SFD and BMD for the beam shown in Figure. Also find the position and magnitude of the maximum bending moment. 7M



(OR)

4. (a) A beam of 10 meters long has supports at its ends A and B. It carries a point load of 5kN at 3 meters from A and a point load of 5kN at 7 meters from A and a uniformly distributed load of 1kN per meter between the point loads. Draw SFD and BMD for the beam. 7M

(b) A beam of length (l+2a) has supports 'l' apart with an overhang 'a' on each side. The beam carries a concentrated load 'W' at each end. Construct SFD and BMD. 7M

UNIT – III

5. (a) Derive the relationship between (F/Y) = (E/R) 7M

(b) A beam of I section 640mm deep and 250mm wide has a flange 20mm thick and web 15mm thick. It carries a uniformly distributed load of 80kN/m over the whole span. Find the extreme bending stress for the section and state if the stress is permissible. Safe stress in bending is 160N/mm^2. 7M

(OR)

6. (a) Enumerate the assumptions made in the theory of simple pure bending. 4M

(b) A cast iron test beam 20mm x 20mm in section and 1m long and supported at the ends fails when a central load of 640 N is applied. What uniformly distributed load will break a cantilever of the same material 50 mm wide, 100 mm deep and 2 meters long. 10M

UNIT – IV

7. (a) A simply supported beam of span l carrying a uniformly distributed load of 'w' per unit run over the whole span. Estimate the deflection at center and slope at ends. 7M

(b) A cantilever of length 4 meters carries a uniformly distributed load of 5000 N/m for a length of 2.5 meters from the fixed end and a point load of 1000 N at the free end. If the section is rectangular 240mm side and 480mm deep, find the deflection at the free end. Take E = 12000 N/mm^2. 7M

(OR)

8. (a) A horizontal cantilever of uniform section and length 'l' carries two point loads, W at the free end and 2W at a distance a from the free end. Calculate the slope and deflection at the free end. (Use Conjugate Beam Method). 7M

(b) A cantilever of length 'l' carries a u.d.l. of 'w' per unit run over the whole length. Calculate the slope and deflection at the free end. (Use Conjugate Beam Method). 7M

UNIT-V

9. (a) Derive the torsion equation $\frac{T}{J} = \frac{f_s}{R} = \frac{G\theta}{l}$. List out the various assumptions made in the theory of pure torsion. 7M

(b) A hollow steel shaft 240mm external and 160mm internal diameter is to be replaced by a solid alloy shaft. If both the shafts should have the same polar modulus, find the diameter of the solid alloy shaft and the ratio of the torsional rigidities. Consider modulus of rigidity of steel is 2.4 times the modulus of rigidity of alloy. If alternatively, the two shafts should have the same torsional rigidity, find the ratio of their polar moduli. 7M

(OR)

10. (a) A steel shaft transmits 105kW at 160rpm. If the shaft is 100mm in diameter, find the torque on the shaft and the maximum shearing stress induced. Find also the twist of the shaft in a length of 6m. Consider C = 8X10^4 N/mm^2. 7M

(b) A solid circular shaft transmits 75kW at 200 r.p.m. Calculate the shaft diameter if the twist in the shaft is not exceed 1^{o}in 2 meters of shaft and the shearing stress is limited to 50 N/mm^2. Where C = 1X10^5 N/mm^2. 7M

Q.P. Code: 258612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	State and explain Kirchhoff's laws.	7M
	(b)	Explain in detail the volt-ampere relationship of R, L and C elements with neat diagrams	7M
		(OR)	
2.	(a)	Differentiate between active and passive elements.	7M
	(b)	Define the following: (i) Potential Difference (ii) Resistance (iii) Inductance (iv) Capacitance (v) Work (vi) Power and (vii) Energy	7M

UNIT – II

3.	(a)	Derive the emf equation of a transformer	7M
	(b)	Explain the procedure to conduct short circuit test on a transformer	7M
		(OR)	
4.	(a)	Derive the emf equation of a dc machine	7M
	(b)	Explain the significance of Swinburne test and What you can attain from this test	7M

UNIT – III

5.	(a)	Draw and explain the V-I characteristics of a PN junction Diode.	7M
	(b)	Compare Half wave rectifier, Full wave rectifier and Bridge rectifier in any four aspects	7M
		(OR)	
6.		Explain the operation of a half wave rectifier with waveforms and Derive expressions for ripple factor and efficiency.	14M

UNIT – IV

7.		Explain the Input and output characteristics of a CE transistor with relevant diagrams	14M
		(OR)	
8.		Explain the operating modes of SCR and also expain its V-I characteristics.	14M

UNIT-V

9.	(a)	Derive the emf equation of an alternator. Explain pitch factor and distribution factor	8M
	(b)	List the differences between salient pole and non salient pole synchronous generators?	6M
		(OR)	
10.	(a)	Convert the following numbers into decimal numbers (i) 1011011101101110_2 (ii) $A0CB.EE_{16}$	7M
	(b)	Perform the subtraction (-6) - (-13) using signed 2's complement representation	7M

Q.P. Code: 357612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	Define and explain the importance of the following terms in generation : (i) connected load (ii) maximum demand (iii) demand factor (iv) average load.	6M
	(b)	A generating station has a maximum demand of 25MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find (i) the reserve capacity of the plant (ii) the daily energy produced and (iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded	8M

(OR)

2.	(a)	Explain the different types of Tariffs.	6M
	(b)	A factory has a maximum load of 240 kW at 0·8 p.f. lagging with an annual consumption of 50,000 units. The tariff is Rs 50 per kVA of maximum demand plus 10 paise per unit. Calculate the flat rate of energy consumption. What will be annual saving if p. f. is raised to unity?	8M

UNIT – II

3.	(a)	Explain the Methods of Improving String Efficiency	6M
	(b)	In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency	6M

(OR)

4.	(a)	What is a sag in overhead lines ? Discuss the disadvantages of providing too small or too large sag on a line.	6M
	(b)	Discuss the advantages and disadvantages of (i) pin-type insulators (ii) suspension type insulators.	6M

UNIT – III

5.	(a)	Derive an expression for the loop inductance of a single phase line	6M
	(b)	Calculate the inductance of each conductor in a 3-phase, 3-wire system when the conductors are arranged in a horizontal plane with spacing such that D31 = 4 m ; D12 = D23 = 2m. The conductors are transposed and have a diameter of 2·5 cm	6M

(OR)

6.	(a)	What is skin effect ? Why is it absent in the d.c. system ?	6M
	(b)	Deduce an expression for line to neutral capacitance for a 3-phase overhead transmission line when the conductors are (i) symmetrically placed (ii) unsymmetrically placed but transposed	8M

UNIT – IV

7.	(a)	Explain the design features of A.C distributed systems	6M
	(b)	A single phase a.c. distributor AB 300 metres long is fed from end A and is loaded as under : (i) 100 A at 0·707 p.f. lagging 200 m from point A (ii) 200 A at 0·8 p.f. lagging 300 m from point A The load resistance and reactance of the distributor is 0·2 Ω and 0·1 Ω per kilometre. Calculate the total voltage drop in the distributor. The load power factors refer to the voltage at the far end	8M

(OR)

8.	(a)	Write the Differences between d.c. and a.c. distribution	6M
	(b)	Calculate the voltage drop for AC Distribution system fed at one end and power factor referred to receiving voltage.	8M

UNIT-V

9.	(a)	Derive an expression for the insulation resistance of a single-core cable	7M
	(b)	Find an expression for the most economical conductor size of a single core cable	7M

(OR)

10.	(a)	Explain the following methods of cable grading : (i) Capacitance grading (ii) Intersheath grading	7M
	(b)	Explain the following terms with reference to corona : (i) Critical disruptive voltage (ii) Visual critical voltage (iii) Power loss due to corona	7M

Q.P. Code: 357812 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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) Describe the principle of operation of single-phase transformer. 7M

(b) In a 25 KVA, 2000/200V, single phase transformer the iron and full load copper losses are 350 W and 400W, respectively. Calculate the efficiency at unity power factor on i) Full-load ii) half-load. 7M

(OR)

2. (a) Discuss the different losses and effect of frequency and voltage on the losses in single phase transformer. 7M

(b) A 50-kVA, 4400/220-V transformer has $R_1 = 3.45\ \Omega$, $R_2 = 0.009\ \Omega$. The values of reactance are $X_1 = 5.2\ \Omega$ and $X_2 = 0.015\ \Omega$. Calculate for the transformer 7M
(i) equivalent resistance as referred to primary
(ii) equivalent resistance as referred to secondary
(iii) equivalent reactance as referred to both primary and secondary
(iv) equivalent impedance as referred to both primary and secondary

UNIT – II

3. (a) Describe the Sumpner's test on single-phase transformer 7M

(b) A 15 KVA, 1000/400 Volts single phase transformer gave the following test results 7M
Open circuit test: 400 V, 0.8 A, 50 W
Short circuit test: 60V, 10A, 45 W
Calculate the efficiency and voltage regulation at full load 0.85 power factor lag.

(OR)

4. (a) Illustrate the parallel operation of transformers with equal voltage ratios. 7M

(b) In auto-transformer volume and weight of Cu is saved. Justify. 7M

UNIT – III

5. (a) Discuss the connections of Y-Y and Δ-Δ of three phase transformer. 7M

(b) Two transformers connected in open-delta supply a 400-kVA balanced load operating at 0.866 p.f. (lag). The load voltage is 440 V. What is the (a) kVA supplied by each transformer? (b) kW supplied by each transformer? 7M

(OR)

6. (a) Distinguish between slip ring and squirrel cage induction motors. 7M

(b) Develop an equivalent circuit of three phase induction motor. 7M

UNIT – IV

7. (a) Derive the torque equation of three phase induction motor. 7M

(b) A 6 pole, 50 Hz, 3-phase induction motor running on full load with 3% slip develops a torque of 160 Nm at its pulley rim. The friction and windage losses are 210 W and the stator copper and iron losses equal to 1640 W. Calculate overall efficiency at full load. 7M

(OR)

8. (a) Describe the performance of three phase induction motor using no-load test. 7M

(b) A 110-V, 3-φ, star-connected induction motor takes 25 A at a line voltage of 30V with rotor locked. With this line voltage, power input to motor is 440 W and core loss is 40 W. The d.c. resistance between a pair of stator terminals is 0.1 Ω. If the ratio of a.c. to d.c. resistance is 1.6, find the equivalent leakage reactance/phase of the motor and the stator and rotor resistance per phase. 7M

UNIT-V

9. (a) Discuss the star to delta starter connection of three phase induction motor. 7M

(b) Explain the effects of crawling and cogging on induction motor. 7M

(OR)

10. (a) Discuss the DOL starter connection of three phase induction motor. 7M

(b) Illustrate the speed control of three phase induction motor using line frequency. 7M

Q.P. Code: 358012 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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. (a) What are the advantages and basic requirements of the ammeter shunt and voltmeter series resistances? 6M

(b) A D'Arsonval galvanometer has the following data: 8M
Flux density of 8×10^{-3} Wb/m^2, number of turns of 300, length of coil is 15 mm, width of coil is 30 mm, spring constant is 2.5×10^{-9} Nm/rad, moment of inertia is 10×10^{-9} kg-m^2, damping constant is 2×10^{-9} Nm/rad - s^{-1}, resistance of the coil is 80 Ω. Calculate the deflection of galvanometer for a current of 1 μA.

(OR)

2. (a) Derive the expression for deflection angle for moving iron instrument. 8M

(b) The inductance of a moving iron ammeter with a full scale deflection of 90º at 1.5 A, is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3)$ μH, where θ is the deflection in radians from the zero position. Estimate the angular deflection of the pointer for a current of 1 A. 6M

UNIT – II

3. (a) How controlling torque can be produced in the power factor meter? Derive the expressions for deflecting torque and controlling torque? 6M

(b) The meter constant of a 230 V, 15 A watt-hour meter is 2400 revolutions per KWh. The meter is tested at half load and rated voltage and unity power factor. The meter is found to make 100 revolutions in 150 seconds. Determine the meter error at 1/4th load. 8M

(OR)

4. An electrodynamometer wattmeter is used of measurement of power in a single phase circuit. The load voltage is 150 V and the load current is 10 A at a power factor of 0.2. The wattmeter voltage circuit has a resistance of 3000 Ω and an inductance of 25 mH. The current coil has a resistance of 0.2 Ω and negligible inductance. The frequency is 50 Hz. Estimate the percentage error in the wattmeter reading when pressure coil is connected: 14M
(i) On the supply side
(ii) On the load side

UNIT – III

5. (a) Derive the balancing condition for kelvin's double bridge for measurement of resistance. 8M

(b) Explain how high resistance can be measured using loss of charge method? 6M

(OR)

6. (a) What are the different bridges used for measurements of resistance, inductance, capacitance and frequency? Mention their ranges of measurements. 6M

(b) Derive the balancing condition for Desauty's Bridge. 8M

UNIT – IV

7. (a) What is the necessity of instrument transformers in measuring of voltage and currents? 6M

(b) A single phase potential transformer has a turns ratio of 3810/63. The nominal secondary voltage is 63 V and the total equivalent resistance and leakage reactance referred to the secondary side are 2 Ω and 1 Ω respectively. Calculate the ratio and phase angle errors when the transformer is supplying a burden of 100 + j 200 Ω. 8M

(OR)

8. (a) Explain the different types of AC potentiometers. 6M

(b) What is standardization? Explain standardization procedure of Crompton DC 8M

Potentiometer?

UNIT-V

9.	(a)	Explain the how can we measure 1 V of unknown voltage can be measured by considering 5 V as reference input with the help of successive approximation type digital voltmeter.	8M
	(b)	Derive the expression for deflection on the CRT screen, deflection sensitivity and deflection factor.	6M

(OR)

10.	(a)	A CRT has an anode voltage of 2000 V and parallel deflecting plates 2 cm long and 5 mm apart. The screen is 30 cm from the centre of the plates. Find the input voltage required to deflect the beam through 3 cm. The input voltage is applied through amplifiers having an overall gain of 200	6M
	(b)	Explain the vertical and horizontal amplifier of Cathode Ray Tube with neat block diagrams.	8M

Q.P. Code: 358212 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	Draw a general layout of a modern thermal power plant. Explain the function and principle of operation of different components in a thermal power station.	10M
	(b)	Explain any four factors to be considered for selection of site for a thermal power station.	4M
		(OR)	
2.	(a)	Explain about the functions of economizer and super heater in a thermal power plant.	7M
	(b)	Explain about Fire tube boiler used in a thermal power station.	7M
		UNIT – II	
3.	(a)	Explain about the functions of the following related to hydro power station: (i) Dam (ii) Spillways (iii) Surge tank (iv) Penstock.	8M
	(b)	Explain the essential factors which influence the choice of site for a hydro-electric power plant	6M
		(OR)	
4.	(a)	What is a nuclear reactor? Draw the schematic diagram of a nuclear reactor and explain in detail the basic components of nuclear reactor.	10M
	(b)	What are the disadvantages of nuclear power plant?	4M
		UNIT – III	
5.	(a)	Differentiate between flat plate collectors and concentrating collectors.	7M
	(b)	Classify the methods of solar energy storage. Describe the thermal energy storage system	7M
		(OR)	
6.	(a)	Explain the advantages and disadvantages of geothermal energy over the other forms of energy.	7M
	(b)	What are the main applications of geothermal energy? Explain	7M
		UNIT – IV	
7.	(a)	Explain with neat sketch working and different components of vertical axis wind mill.	8M
	(b)	Write short notes on applications of wind energy.	6M
		(OR)	
8.	(a)	Derive the expression for power developed due to wind.	7M
	(b)	Discuss the advantages and disadvantages of wind energy,	7M
		UNIT-V	
9.	(a)	What is biomass? What are the different sources used to extract biomass energy?	6M
	(b)	Explain the constructional details and working of any one type of Biogas Digester with the help of a neat diagram.	8M
		(OR)	
10.	(a)	Explain the working of ocean thermal energy conversion (OTEC) plant.	7M
	(b)	What is a tidal cycle? Define spring and neap tides. Discuss the reasons for tide formation.	7M

Q.P. Code: 358412 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

SUB: Switching Theory and Logic Design (ECE & 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 is hamming code? How is the hamming code word tested and corrected?	8M
	(b)	Subtract 798.46 from 435.12 using 10's complement method.	6M
		(OR)	
2.	(a)	What are error detecting codes? Explain in detail.	6M
	(b)	Covert 105.15_{10} to binary, octal & hexadecimal.	8M

UNIT – II

3.		Obtain the minimal SOP expression for the switching function using k-map $Y=\Sigma m(1,5,7,13,14,15,17,18,21,22,25,29) + \Sigma d(6,9,19,23,30)$. Draw and explain the logic diagram.	14M
		(OR)	
4.	(a)	Use the tabulation procedure to obtain the minimal expression for the following function: $F(w, x, y, z) = \Sigma m(1,3,4,6,7,11,13,15) + \Sigma d(8,12)$	8M
	(b)	Convert the given expression in to canonical SOP form $Y = AC + AB + BC$.	6M

UNIT – III

5.	(a)	Draw the schematic diagram and truth table for full adder. Draw the logic diagrams with relevant expressions.	7M
	(b)	Draw and explain a 4-bit binary carry look ahead adder.	7M
		(OR)	
6.	(a)	Implement the following function with 4X1 MUX. $F(A, B, C)= \Sigma(1,2,4,7)$	7M
	(b)	Design the 4-input priority encoder using logic gates.	7M

UNIT – IV

7.	(a)	Give the logic implementation of a 32 X 4 bit ROM using decoder of suitable size.	7M
	(b)	Implement the following Boolean function with PLA $F1(A,B,C)=\Sigma(0,1,3,4)$, $F2(A,B,C)=\Sigma(1,2,3,4,5)$	7M
		(OR)	
8.	(a)	Discuss the classification of semiconductor memories.	8M
	(b)	Explain the architecture of PLA.	6M

UNIT-V

9.	(a)	With the help of circuit diagram and functional table, explain the working of D Flip-Flop.	7M
	(b)	Convert JK Flip-Flop to SR Flip-flop	7M
		(OR)	
10.	(a)	With the help of circuit diagram, graphic symbol and characteristic table, explain the JK flip-flop.	7M
	(b)	Design a four-bit binary Ripple Counter using D flip-flops and then explain the same.	7M

Q.P. Code: 358612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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) For what reason, a transistor at low frequencies is analyzed using hybrid-parameters and why not impedance and admittance parameters? Analyze a Common Emitter Amplifier with $R_s = 1K\Omega$ and $R_L = 10K\Omega$ at low frequencies for Voltage gain, Current Gain, Input impedance and Output impedance? 7M

(b) Compare the Common Emitter, Common Collector and Common Base configurations in terms of Voltage gain, Current Gain, Input impedance and Output impedance? Explain the use cases of each configuration? 7M

(OR)

2. (a) Analyze an Emitter Follower with $R_s = 1K\Omega$ and $R_L = 10K\Omega$ at low frequencies for Voltage gain, Current Gain, Input impedance and Output impedance? 7M

(b) Draw the small model equivalent circuit for a FET? Derive the formulae for Voltage gain, Current Gain, Input impedance and Output impedance for Common Source Amplifier at low frequencies? 7M

UNIT – II

3. (a) Describe the choice of BJT configuration in a cascaded amplifier? If a four stage with a high gain and high input impedance BJT amplifier is required explain why and what configuration should be used at each stage? 7M

(b) Why multistage amplifiers are needed? If three identical cascaded stages have an overall upper 3-dB frequency of 20 KHz and overall lower 3-dB frequency of 20 Hz, what are f_H and f_L of each stage? Assume non-interacting stages. 7M

(OR)

4. (a) If f_H and f_L are the lower cut-off and upper cut-off frequency of a single stage amplifier, then derive the expression for the high 3-dB frequency f_H^*, low 3-dB frequency f_L^* and bandwidth of n identical non interacting stage amplifier? 7M

(b) Draw the BJT RC coupled amplifier and explain the operation? Mention the advantages and disadvantages of it? 7M

UNIT – III

5. (a) What are the characteristics of negative feedback? Explain each one in brief? 7M

(b) With necessary block diagrams, derive the formulae and explain how the voltage gain, input resistance and output resistance affected in a voltage series amplifier? 7M

(OR)

6. (a) Sketch the circuit of a Wien bridge oscillator? Derive the expression for frequency of oscillations? What determines the frequency of oscillations? Will oscillations take place if bridge is balanced? Explain? 7M

(b) Sketch the circuit of a Colpitts oscillator? Derive the expression for frequency of oscillations? 7M

UNIT – IV

7. (a) Derive the expressions for the output power, input power and efficiency of a class-A large signal amplifier? 7M

(b) Draw the diagram of a transformer coupled amplifier and the explain the operation and need for impedance matching? 7M

(OR)

8. (a) Show that the maximum conversion efficiency of an idealized class-B push pull amplifier is 78.5 percent? 7M

(b) Explain the origin of cross over distortion? Describe a method to minimize this 7M

distortion?

UNIT-V

9.	(a)	Explain the operation of monostable multivibrator with neat sketches? Derive the expression for the pulse width?	7M
	(b)	Draw the low pass filter circuit and analyze the circuit for step input?	7M
		(OR)	
10.	(a)	Explain the operation of Schmitt trigger with neat sketches?	7M
	(b)	Draw the low pass filter circuit and analyze the circuit for pulse input?	7M

Q.P. Code: 457612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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.	(a)	A pack contains 4 white and 2 green pencils, another contains 3 white and 5 green pencils. If one pencil is drawn from each pack, find the probability that (i) Both are white. (ii) One is white and another is green	7M
	(b)	Explain about joint and conditional probability	7M
		(OR)	
2.	(a)	Explain with an example discrete, continuous and mixed random variable.	7M
	(b)	Explain Cumulative Distributive function with its properties.	7M
		UNIT – II	
3.		Explain in detail about moments about origin and moments about the mean.	14M
		(OR)	
4.		Explain in detail about Chebyshev's, Markov's and Chernoff's Inequalities	14M
		UNIT – III	
5.		Elucidate in detail Point Conditioning and Interval conditioning with neat derivations	14M
		(OR)	
6.	(a)	State and prove the Central Limit Theorem.	7M
	(b)	Statistically independent random variables X and Y have respective densities $f_x(x) = 2\,u(x)\,e^{-2x}$ and $f_y(y) = 5\,u(y)\,e^{-5y}$ Find the density function of the sum W=X+Y.	7M
		UNIT – IV	
7.	(a)	Explain the relationship between the cross-correlation function and the cross power spectral density.	7M
	(b)	State and prove the properties of Auto correlation function.	7M
		(OR)	
8.	(a)	A random process is defined as X(t) = A cos $(\omega t + \theta)$ where A is a constant and θ is a random variable, uniformly distributed over $(-\pi, \pi)$ check X(t) for stationarity.	7M
	(b)	State and prove the properties of Cross correlation function.	7M
		UNIT-V	
9.	(a)	Prove that the output power spectral density equals the input power spectral density multiplied by the squared magnitude of the transform of the filter.	7M
	(b)	A random process X(t) whose mean value is 2 and autocorrelation function is $R_{xx}(\tau) = 4e^{-2\lvert\tau\rvert}$ is applied to a system whose transfer function is $1/(2+j\omega)$.Find the mean value, autocorrelation, power density spectrum and average power of the output signal Y(t)	7M
		(OR)	
10.	(a)	Derive an expression for power spectral density of LTI system response.	7M
	(b)	Write short notes on band limited and narrow band processes.	7M

Q.P. Code: 457812 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	Derive Wave Equations for conducting and perfect dielectric Media.	7M
	(b)	An EM wave travelling in air is incident normally on boundary between air and a dielectric having permeability same as free space and permittivity as 4. Prove that one-ninth of the incident power is reflected and eight-ninths of it is transmitted into the second medium	7M

(OR)

2.	(a)	Explain the wave propagation in Lossy Dielectric.	7M
	(b)	For plane wave propagation, show that the free space wave impedance is 377 Ω by deriving necessary equation.	7M

UNIT – II

3.	(a)	Explain the different types of polarization of a uniform plane wave.	7M
	(b)	Show that the field existing in the second medium under conditions of total internal reflection is a non-uniform plane wave and slow wave.	7M

(OR)

4.	(a)	Define Brewster angle and Critical angles. State where these are required.	7M
	(b)	A plane wave travelling in free space has an average Poynting vector of 10 Watts/m^2. Find the average energy density.	7M

UNIT – III

5.	(a)	Derive the expression for characteristic impedance	7M
	(b)	Starting from the equivalent circuit, derive the transmission line equations for V and I, in terms of the source parameters.	7M

(OR)

6.	(a)	Derive the primary & secondary constants for a low loss transmission line.	7M
	(b)	An air line has a characteristic impedance of 70 Ω and a phase constant of 3 rad/m at 100 MHz. Calculate the inductance per meter and the capacitance per meter of the line.	7M

UNIT – IV

7.	(a)	Define the reflection coefficient and derive the expression for the input impedance in terms of reflection coefficient	7M
	(b)	A 30m long lossless transmission line with characteristic impedance (zo) of 50 Ω is terminated by a load impedance (Z_L) = 60 + j40 Ω. The operating wavelength is 90m. find the input impedance and SWR using smith chart?	7M

(OR)

8.	(a)	Explain the principle of impedance matching with quarter wave transformer	7M
	(b)	Write about smith chart. How the smith charts are useful to calculate transmission line parameters?	7M

UNIT-V

9.	(a)	Explain the causes for attenuation in parallel plane waveguides	7M
	(b)	Derive the expressions for field components of rectangular wave guide and also derive the expression for cutoff frequency.	7M

(OR)

10.		Derive the expression for the resonant frequency of the semi circular cavity resonator.	14M

Q.P. Code: 458012 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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 Low Pass Circuit for Sinusoidal and Step Inputs with neat diagrams?	8M
	(b)	Explain in detail about RC High Pass Circuit for Sinusoidal and Step Inputs with neat diagrams?	6M

(OR)

2.		Explain in detail about RC Low Pass Circuit for square wave Input with neat diagrams?	14M

UNIT – II

3.	(a)	Explain in detail different types of Shunt clippers along with their transfer characteristics.	7M
	(b)	Explain about a two-level diode clipper and its transfer characteristics.	7M

(OR)

4.	(a)	State and prove clamping circuit theorem.	7M
	(b)	Define clipper and explain different types of Series Clippers?	7M

UNIT – III

5.	(a)	Explain the operation of a monostable multivibrator and derive for the pulse width with necessary waveforms and circuits.	8M
	(b)	Write short notes on Transistor as Switch?	6M

(OR)

6.		Explain in detail about Astable Multivibrator and its types?	14M

UNIT – IV

7.	(a)	Explain the method to achieve frequency synchronization using pulse train as sync signals.	7M
	(b)	What is Time Base generator and explain the general features of a time base signal?	7M

(OR)

8.	(a)	Explain the working of transistor miller sweep circuit.	7M
	(b)	Explain in detail about Exponential Sweep Circuit?	7M

UNIT-V

9.		Explain briefly about CMOS Inverter, RTL NOR gate, Two input ECL NOR gates?	14M

(OR)

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

Q.P. Code: 458212 | **SET - 1**

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

B. Tech. IV Semester (R15) Supplementary Examinations of August – 2021

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)	Give the classification of amplifiers according to frequency and applications.	6M
	(b)	What are the types of distortion occur in amplifier circuits and how they are eliminated?	8M
		(OR)	
2.	(a)	Describe the biasing schemes of BJT amplifiers in detail.	7M
	(b)	What is gain bandwidth product? What is its importance in the design of amplifiers?	7M

UNIT – II

3.		Derive all components of the Hybrid-π model in terms of h-parameters in CE configuration	14M
		(OR)	
4.	(a)	Compare and contrast CE, CB and CC BJT amplifiers.	7M
	(b)	Briefly explain the how transistor acts as amplifier and draw the h-parameter model of a transistor.	7M

UNIT – III

5.	(a)	Deduce the small signal model of a FET amplifier and discuss its frequency response.	7M
	(b)	Design a two stage RC coupled amplifier and discuss its limitations.	7M
		(OR)	
6.	(a)	Design the common drain amplifier circuit and explain its operation.	7M
	(b)	What is the importance of Darlington pair and what are its limitations?	7M

UNIT – IV

7.	(a)	Explain Barkhausen Criterion in oscillator circuits.	6M
	(b)	In a transistorized Hartley oscillator the two inductances are 2mH and 2μH. if the frequency changed from 950kHz to 1050kHz, calculate the change in capacitor required.	8M
		(OR)	
8.	(a)	Describe the advantages and disadvantages of negative feedback in electronic circuits.	6M
	(b)	Derive the expression for Av,Ri, Ro, Ai of voltage series feedback amplifier.	8M

UNIT-V

9.	(a)	Explain how the stability of tuned amplifier is achieved?	6M
	(b)	Derive the expression for efficiency in class B amplifier.	8M
		(OR)	
10.	(a)	List the features of power amplifier.	6M
	(b)	A class B pushpull amplifier derives a load of 16Ω, connected to the secondary of the ideal transformer, the supply voltage is 25V. if the number of turns on the primary is 200 and the number of turns on the secondary is 50, calculate maximum power output, dc power input, efficiency and maximum dissipation per transistor.	8M

Q.P. Code: 458612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	What is modulation? Why is modulation used in communication system?	7M
	(b)	Explain the generation of double sideband suppressed carrier (DSB-SC) modulation. Write the necessary equations.	7M
		(OR)	
2.	(a)	With a block diagram approach explain the operation of FDM scheme.	7M
	(b)	Explain the properties of Hilbert transform.	7M
		UNIT – II	
3.	(a)	What is the difference between direct and indirect methods of FM generation?	7M
	(b)	Explain frequency modulation with a neat diagram	7M
		(OR)	
4.	(a)	Explain the generation of N.B.F.M using narrow band P.M generator	7M
	(b)	Explain the comparisons between FM and A.M techniques.	7M
		UNIT – III	
5.	(a)	Draw the block diagram of superhetrodyne receiver and the function of each block	7M
	(b)	Discuss a simple radio receiver design and also list out the advantages and disadvantages of TRF receiver.	7M
		(OR)	
6.	(a)	Discuss the factors influencing the choice of intermediate frequency (IF) for a radio receiver.	7M
	(b)	With the aid of the block diagram explain TRF receiver.	7M
		UNIT – IV	
7.	(a)	Explain about pre-emphasis and de-emphasis.	7M
	(b)	Explain the terms i) Sources of internal and external noise ii) Noise temperature	7M
		(OR)	
8.	(a)	What is FM threshold effect? How to achieve threshold reduction in FM system?	7M
	(b)	Define noise figure and explain its significance with derivation	7M
		UNIT-V	
9.	(a)	Explain, how a PPM signal can be generated from PWM signal?	7M
	(b)	Compare PAM, PWM and PPM systems	7M
		(OR)	
10.	(a)	Explain the generating and demodulation of PPM	7M
	(b)	Explain PDM generation and detection with a neat block diagram	7M

Q.P. Code: 557612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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. Classify the pattern allowances and distinguish the draft and shrinkage allowance with suitable sketch? 14M

(OR)

2. Discuss the concept of solidification for pure metal and alloy with suitable sketch? 14M

UNIT – II

3. Sketch and describe the steps involved in Investment casting, and explain its applications? 14M

(OR)

4. Explain the constructional details and working of cupola furnace with suitable sketch? 14M

UNIT – III

5. Describe the principle and operation of the Arc welding process and explain the significance of the electrode coating? 14M

(OR)

6. Explain the operation of the plasma cutting with sketch and discuss the merits and demerits of the same? 14M

UNIT – IV

7. Differentiate the TIG and MIG welding with respect to principle and working? 14M

(OR)

8. Sketch and explain the principle and operation of the explosive welding and describe how the explosive weld joint is differ from other weld joint? 14M

UNIT-V

9. Classify the extrusion process and differentiate the forward and backward extrusion with suitable sketch? 14M

(OR)

10. (a) Sketch and explain the roll forging and explain the merits and demerits? 7M

(b) Discuss the remedy for any two major forging defects? 7M

Q.P. Code: 557812 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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. Explain the working principle of four stroke C.I engine with valve timing diagram 14M

(OR)

2. Distinguish between four stroke and two stoke I.C engines ? 14M

UNIT – II

3. Discuss the cooling requirements of an I.C engine. Describe the different methods of cooling and give specific examples where each method is employed? 14M

(OR)

4. With a neat sketch explain the battery coil ignition system? 14M

UNIT – III

5. Explain the combustion process in S.I engines and pre ignition in S.I engines? 14M

(OR)

6. Describe the phenomenon of detonation in I.C engines. On what factors does detonation depend? 14M

UNIT – IV

7. (a) Define brake power , how do you measure brake power in the laboratory? 7M

(b) Explain the method of Morse test for obtaining friction power of a multi cylinder engine? 7M

(OR)

8. The diameter and stroke length of a single cylinder two stroke gas engine, working on the constant volume cycle, are 200mm and 300mm respectively with clearance volume 2.78litres. When the engine is running at 135rpm, the indicated mean effective pressure was 5.2 bar and the gas consumption 8.8m^3/hour. If the calorific value of the gas used is 16350 KJ/m^3.Find (a) Air standard efficiency.(b) Indicated power developed by the engine.(c)Indicated thermal efficiency of the engine. 14M

UNIT-V

9. (a) Describe the working of a single stage reciprocating air compressor? 7M

(b) When is multi stage compression used for air? What are its advantages? 7M

(OR)

10. (a) Explain the principle of operation of centrifugal compressor with the help of neat sketch? 7M

(b) Explain the variation of pressure and velocity in centrifugal compressor? 7M

Q.P. Code: 558012 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

SUB: Kinematics of Machinery (ME)

Time: 3 Hours **Max. Marks: 70**

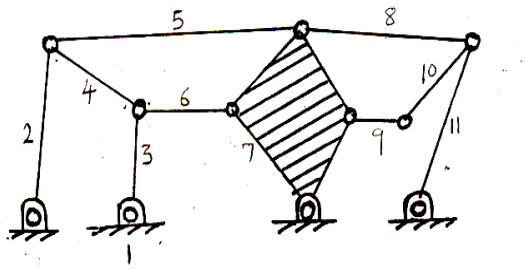
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Explain the inversions of a single slider crank mechanism with neat sketches. 14M

(OR)

2. (a) Calculate the mobility for the given figure. 7M



(b) Explain the types of constrained motion with examples. 7M

UNIT – II

3. Explain how the Scott – Russel mechanism is modified to make it into existence with the help of a neat sketches. 14M

(OR)

4. (a) Derive the condition for correct steering. 7M

(b) Differentiate Davis and Ackermann steering gear mechanisms with the help of neat sketches. 7M

UNIT – III

5. What is the Coriolis acceleration component? In which cases does it occur? How is it determined? 14M

(OR)

6. (a) State and prove Arnold Kennedy's theorem. 7M

(b) A slider crank mechanism has lengths of crank and connecting rod equal to 200 mm and 800 mm respectively locate all the instantaneous centers of the mechanism for the position of the crank when it has turned through 30 degrees from IOC. Also find velocity of slider and angular velocity of connecting rod if crank rotates at 40 rad/sec. 7M

UNIT – IV

7. Discuss the displacement, velocity and acceleration diagrams when the follower moves with SHM. 14M

(OR)

8. A cam operating a knife - edged radial follower has the following data. Follower moves outwards through 50mm during 120° of cam rotation. 14M
Follower dwells for the next 45°.
Follower returns of its original position during next 90°.
Follower dwells for the rest of the rotation.
The displacement of the follower is to take place with uniform velocity during the outward and the return strokes. The least radius of the cam is 50mm. Draw the cam profile.

UNIT-V

9. A pair of involute spur gears with 16 degrees pressure angle and pitch of module is 6 mm to mesh. The number of teeth on pinion is 16 and its rotational speed is 240 rpm. When the gear ratio is 1.75. find in order that the interference is just avoided (i) The addenda on pinion and gear wheel. (ii) The length of path of contact. The maximum velocity of sliding of teeth on either side of the pitch point. 14M

(OR)

10. (a) State and prove law of gearing. 7M

(b) Explain the different forms of tooth with a neat sketch. 7M

Q.P. Code: 558212 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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 U-tube differential mercury manometer is connected between two pipes X and Y. Pipe X contains a fluid (Sp.gr. = 1.59) under a pressure of 103 kN/m^2 and pipe Y contains oil (Sp.gr. = 0.8) under a pressure of 172 kN/m^2 . Pipe X is 2.5 m above pipe Y. The mercury level in the limb connected to pipe X is 1.5 m below the centerline of pipe Y. The level of mercury in the limb connected to pipe Y is below the level of mercury (Sp.gr. = 13.6) in the other limb. Find the manometer reading in centimeters of mercury and show the same as a schematic diagram. 14M

(OR)

2. Distinguish between: 14M
i) Steady flow and unsteady flow ii) Uniform flow and non-uniform flow iii) Rotational and irrotational flow iv) Laminar flow and Turbulent flow

UNIT – II

3. (a) Derive Euler's equation of motion. How will you obtain Bernoulli's equation from Euler's equation. 10M

(b) What are the assumptions made in deriving Bernoulli's equation? 4M

(OR)

4. (a) Describe the following terms: 4M
i) Stream lines ii) Path lines iii) Streak lines iv) Stream tubes.

(b) A pipe of diameter 400 cm carries water at a velocity of 25 m/s. the pressure at the points A and B are given as 29.43 N/cm^2 and 22.563 N/cm^2 respectively while the datum head at A and B are 28 m and 30 m. Find the head loss between A and B. 10M

UNIT – III

5. (a) An oil of specific gravity 0.8 is flowing through a venturi meter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 15 cm. Calculate the discharge of oil through the horizontal venturi meter. Take Cd=0.98. 10M

(b) Define hydraulic gradient line and total energy line? 4M

(OR)

6. (a) What are minor losses? 4M

(b) Derive Darcy-Weisbach equation? 10M

UNIT – IV

7. Find the displacement thickness for the velocity distribution in the boundary layer is given by 14M

$$\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$$

(OR)

8. (a) Define the following i. Laminar Boundary Layer ii. Turbulent boundary Layer iii. Laminar Sub Layer iv. Boundary Layer Thickness 7M

(b) Air flows over a flat plate of 1 m x 1m at a velocity of 6 m/s. Determine Boundary layer thickness at the end of the plate (b) Shear stress at the middle of the plate. 7M

UNIT-V

9. A cylinder rotates at 150 rpm with its axis perpendicular in an air stream which is having uniform velocity of 25 m/s. The cylinder is 1.5 m in diameter and 10 m long. Assuming ideal fluid theory, find i) the circulation ii) lift force and iii) position of stagnation points. Take density of air as 1.25 kg/m^3 14M

(OR)

10. The resistance R to the motion of completely submerged body depends upon the length of the body L, velocity of flow V, mass density of fluid ρ and kinematic viscosity of fluid υ. By dimensional analysis prove that $R = \rho V^2 L^2 \Phi(VL/\upsilon)$. 14M

Q.P. Code: 558412 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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.		Define a Composite material. How are these classified, Explain briefly with neat sketches.	14M
		(OR)	
2.		Explain the importance of size and shape dependence of material properties at the nanoscale	14M

UNIT – II

3.	(a)	Explain in brief the essential requirements of good matrix material	7M
	(b)	Write properties and applications of metal matrix composites	7M
		(OR)	
4.		Explain the properties and applications of Ceramic Matrix Composites(CMC) and Carbon-Carbon Composites(CCC).	14M

UNIT – III

5.	(a)	Discuss Bottom up approach of synthesis of Nanomaterial	7M
	(b)	List any four bottom up approaches for synthesis of nano powders and explain any one of them in detail?	7M
		(OR)	
6.	(a)	Explain briefly about Post-tensioning in reinforced concrete (PTRC)	7M
	(b)	Write properties and applications of particulate composites and Hybrid Composites.	7M

UNIT – IV

7.		Explain the Fabrication of glass by Blowing	14M
		(OR)	
8.	(a)	What are the different types of glasses. Explain briefly.	7M
	(b)	Explain various fabrication methods of glasses	7M

UNIT-V

9.		Describe the properties and applications of nano-phase materials and smart-materials	14M
		(OR)	
10.		Describe smart materials alloys with properties and applications	14M

Q.P. Code: 558612 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

SUB: Probability & Statistics (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. The probability density function of a variate X is 14M

X	0	1	2	3	4	5	6
$p(X)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

(i) Find $P(X<4)$, $P(X\geq 5)$, $P(3<X\leq 6)$

(ii) What will be the minimum value of k so that $P(X\leq 2)>3$

(iii) Also find its mean and variance.

(OR)

2. **(a)** A function is defined as follows: 7M

$$f(x)=\begin{cases}0, & x<2\\ \frac{1}{18}(2x+3), & 2\leq x\leq 4\\ 0, & x>4.\end{cases}$$

Show that it is a density function. Find the probability that a variate having this density will fall in the interval $2\leq x\leq 3$?

(b) If X is a continuous random variable and k is a constant, then prove that 7M

(i) $Var(X+k)=Var(X)$ (ii) $Var(kX)=k^2Var(X)$.

UNIT – II

3. **(a)** The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that 7M
(i) exactly two will be defective (ii) at least two will be defective
(iii) none will be defective.

(b) If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2,000 individuals more than two will get a bad reaction. 7M

(OR)

4. X is a normal variate with mean 30 and S.D. 5, find the probabilities that 14M

(i) $26\leq X\leq 40$ (ii) $X\geq 45$ and (iii) $|X-30|>5$.

UNIT – III

5. **(a)** In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the samples have been drawn from the same population with standard deviation 4? 7M

(b) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of the men in this city are smokers? 7M

(OR)

6. **(a)** The mean weakly sale of soap bars in departmental stores was 146.3. After an advertising campaign the mean weekly sales in 22 stores for a tropical week increased to 153.7 and showed a standard deviation of 17.2. Was the advertising campaign successful? 7M

(b) The following data give the number of aircraft accidents that occurred during the various days of a week: 7M

Day	Mon	Tues	Wed	Thu	Fri	Sat
No. of accidents	15	19	13	12	16	15

Test whether the accidents are uniformly distributed over the week.

UNIT – IV

7. (a) Find the regression line of y on x for the following data. 7M

x	2	4	6	8	10
y	5	7	9	8	11

(b) If θ is the angle between the two regression lines, show that 7M

$\tan\theta = \frac{1-r^2}{r} . \frac{\sigma_x \sigma_y}{\sigma^2_x + \sigma^2_y}$. Explain the significance when $r = 0$ and $r = \pm 1$.

(OR)

8. Find the correlation between x (marks in Mathematics) and y (marks in Engineering Drawing) given in the following data: 14M

x y	10-40	40-70	70-100	Total
0-30	5	20	-	25
30-60	-	28	2	30
60-90	-	32	13	45
Total	5	80	15	100

UNIT-V

9. The following are the values of mean $\overline{X}$ and range R for 10 sub-groups of 5 readings each taken from an inspection. Draw the $\overline{X}$ and R charts with the working and control limits and explain: 14M

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	1.85	1.81	1.75	1.76	1.83	1.76	1.71	1.8	1.77	1.79
Range	0.28	0.14	0.23	0.35	0.26	0.25	0.21	0.08	0.19	0.29

(OR)

10. (a) 15 samples of 200 items each were drawn from the output of a process. The number of defective items in the samples are given below. Prepare a control chart for the fraction defective and comment on the state of control. 7M

Sample Number (i)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Number of defective (np)	12	15	10	8	19	15	17	11	13	20	10	8	9	5	8

(b) Explain the procedure of construction of c-chart. 7M

Q.P. Code: 657612 **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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 Basic operational concepts Computer with Suitable diagram?	8M
	(b)	Compare between Multiprocessor and Multi Computer?	6M
		(OR)	
2.	(a)	Explain about Computer Types in Real World?	8M
	(b)	Explain about Bus Structures in Computer? With neat Diagram	6M

UNIT – II

3.	(a)	Explain about Interrupt Cycle with flow chat?	10M
	(b)	Explain about memory – reference instructions?	4M
		(OR)	
4.	(a)	Explain about three types of shift micro-operations?	8M
	(b)	Explain about memory – reference instructions with format?	6M

UNIT – III

5.	(a)	What is the difference between Hard wired control and Micro programmed control	8M
	(b)	Draw the Division Algorithms flow chart?	6M
		(OR)	
6.		Explain about Booth multiplication algorithm with suitable example.	14M

UNIT – IV

7.	(a)	Explain about Direct memory Access?	8M
	(b)	Explain about Virtual memory with neat diagram?	6M
		(OR)	
8.		What is “Cache Memory”? Explain about various mapping procedures	14M

UNIT-V

9.	(a)	Explain about Instruction Pipeline with neat diagram?	10M
	(b)	What are the Characteristics of Multiprocessors? Explain	4M
		(OR)	
10.	(a)	Explain about Inter Processor Communication in Computer	7M
	(b)	Explain about Multistage Switching network?	7M

Q.P. Code: 657812 | **SET - 1**

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

B. Tech. IV Semester (R15) Supplementary Examinations of August – 2021

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.	(a)	Explain in detail about OOP concepts	7M
	(b)	Describe the primitive data types supported in java.	7M
		(OR)	
2.	(a)	Write a java program to print first 100 Fibonacci numbers.	7M
	(b)	Explain about overloading methods and constructors	7M

UNIT – II

3.	(a)	Write a java program to perform matrix multiplication	7M
	(b)	Explain about multiple inheritance with example	7M
		(OR)	
4.	(a)	What is a method? Explain method overloading with example.	7M
	(b)	Define package. Write down steps to create a package.	7M

UNIT – III

5.		Write a java program to read the input from the user. If the input is –ve number then program should raise the user defined exception.	14M
		(OR)	
6.	(a)	Explain thread life cycle	7M
	(b)	Explain about multithreading concept in java with example program	7M

UNIT – IV

7.		Write a java program that counts number of lines, words, alphabets and special characters in a text	14M
		(OR)	
8.	(a)	Explain in detail about event handling mechanism.	7M
	(b)	Explain about AWT class hierarchy	7M

UNIT-V

9.	(a)	Explain about the ways to create an applet with example.	7M
	(b)	How to pass parameters to an applet? Explain with an example	7M
		(OR)	
10.		Create a applet to display the greeting message to the user "Good Morning" or "Good Evening" based on character pressed 'M' or 'E' respectively.	14M

Q.P. Code: 658012 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

SUB: Formal Languages and 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)	Draw the block diagram of FA and explain each component.	7M
	(b)	Define DFA, NFA, epsilon NFA	7M
		(OR)	
2.		Construct DFA for (i) Even no of a's and odd no of b's (ii) Odd nof a's and even no of b's (iii) Even no of a's and b's and (iv) Odd no of a's and b's	14M

UNIT – II

3.	(a)	Write Regular Expressions for the following languages: i) For the language containing the string over {0, 1} in which there are at least two occurrences of 1's between any two occurrences of 1's between any two occurrences of 0's. ii)The regular expression for the language containing the string in which every 0 is immediately followed by 11. iii)String which should have at least one 0 and at least one 1.	6M
	(b)	Write any two applications of Regular expressions	8M
		(OR)	
4.	(a)	Construct Finite Automata equivalent to the Regular Expression L = ab(aa + bb)(a + b)*a	7M
	(b)	State Pumping lemma and prove that the languages is not regular (i) L = $\{a^ib^i \mid i \geq 0\}$	7M

UNIT – III

5.	(a)	Define CFG and write CFG for the language L = $\{WCW^R \mid W \in (a, b)^*\}$	7M
	(b)	Using Pumping Lemma, Show that L = $\{a^nb^nc^n$ where n >=1} is not CFL	7M
		(OR)	
6.		Convert the following grammar in to GNF. S → XA | BB B → b | SB X → b A → a	14M

UNIT – IV

7.	(a)	Design a PDA which accepts L=$\{WW^R$|W is in (a+b)*}	7M
	(b)	Design a PDA that accepts L=$\{0^n1^{2n}$/n>=1}	7M
		(OR)	
8.	(a)	Design a two stack PDA which accepts L=$\{a^nb^nc^n$: n>=1}.	7M
	(b)	Design a PDA that accepts L={wcw^r / w is in (a+b)* }	7M

UNIT-V

9.	(a)	Construct a TM for language consisting of strings having any no of b's and even no of a's defined over {a,b}.	7M
	(b)	Design a TM to accept strings formed on {0,1} and ending with 000	7M
		(OR)	
10.		Design a TM for accepting strings of the language L={wwr : w ∈ (0+1)* }	14M

Q.P. Code: 658212 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	Explain various levels of data abstraction and their benefits.	7M
	(b)	What are the types of languages a data base system provides? Explain	7M
		(OR)	
2.	(a)	Discuss various Integrity Constraints with suitable examples	7M
	(b)	Explain removing redundant attributes in Entity Sets	7M
		UNIT – II	
3.	(a)	Briefly discuss about aggregate functions in SQL with examples.	7M
	(b)	What is nested sub query? Explain with an example.	7M
		(OR)	
4.	(a)	What is SQL Procedure? Explain with an example	7M
	(b)	Write short notes on tuple relational calculus.	7M
		UNIT – III	
5.	(a)	What is normalization? Discuss second and third normal forms with examples	10M
	(b)	Write about the multivalued dependencies	4M
		(OR)	
6.	(a)	Discuss the problems related to decomposition.	6M
	(b)	Explain BCNF with examples	8M
		UNIT – IV	
7.	(a)	Explain in detail about Query Processing steps.	7M
	(b)	What is Query Optimization? Explain about Transformation of Relational Expressions	7M
		(OR)	
8.	(a)	What is Transaction? Explain ACID properties of a Transaction.	8M
	(b)	Discuss about Serializability in transaction. Explain with an example.	6M
		UNIT-V	
9.	(a)	Explain Multiple Granularity in Concurrency Control.	7M
	(b)	Write short notes on Validation based Protocols.	7M
		(OR)	
10.	(a)	Explain Recovery algorithm with example	7M
	(b)	Write short notes on remote backup systems.	7M

Q.P. Code: 658412 | **SET - 1**

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

B. Tech. IV Sem. (R15) Supplementary Examinations of August – 2021

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)	State and explain different categories of system programs.	7M
	(b)	Explain in detail about operating system structure.	7M
		(OR)	
2.	(a)	Explain the different functions of an operating system.	7M
	(b)	Discuss in detail distributed systems.	7M

UNIT – II

3.	(a)	Explain the requirements that a solution to the critical section problem must satisfy.	7M
	(b)	Discuss process scheduling in detail.	7M
		(OR)	
4.	(a)	What is a process? Explain various process states	7M
	(b)	Explain FCFS and SJF scheduling algorithms	7M

UNIT – III

5.		Consider the following page-reference string: 0,1,2,3,0,1,2,3,0,1,2,3,4,5,6,7 How many page faults occur for the following replacement algorithms, assuming three frames. i) FIFO . ii) Optimal	14M
		(OR)	
6.	(a)	Write short note on segmentation.	7M
	(b)	Explain the structure of the page table.	7M

UNIT – IV

7.	(a)	Write short note on file sharing.	7M
	(b)	Explain different directory implementations.	7M
		(OR)	
8.	(a)	What is deadlock? Explain the necessary conditions for the deadlock to occur.	7M
	(b)	Describe Banker's algorithm to avoid a deadlock.	7M

UNIT-V

9.		Explain user authentication in detail.	14M
		(OR)	
10.		Discuss access matrix implementation techniques.	14M