Q.P. Code: 1801403 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Engineering Geology (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. Explain about process of weathering and significance of weathering. **14M**

(OR)

2. Explain about the branches of Geology and scope in Civil Engineering **14M**

UNIT - II

3. What is optical mineralogy? Discuss the various optical properties in identification of minerals. **14M**

(OR)

4. Write the physical properties and uses of **14M**
(i) Quartz (ii) Calcite (iii) Hornblende (iv) Olivine

UNIT - III

5. Describe the structure and texture of Igneous Rocks. **14M**

(OR)

6. Explain the types, agents, structures and textures of Metamorphic rocks. **14M**

UNIT - IV

7. Discuss the topographical expression of different types of Folds and Faults and their significance in major Civil Engineering works. **14M**

(OR)

8. Classify and describe the various types of faults. **14M**

UNIT - V

9. Write the causes, and types of earthquakes. Explain the Engineering considerations in seismic areas. **14M**

(OR)

10. Explain the factors controlling, water bearing capacity of rocks. Write the Engineering significance of ground water. **14M**

Q.P. Code: 1801404 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Fluid Mechanics (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 viscosity? State and explain the Newtons law of viscosity and give examples of its applications? 7M
   (b) Calculate the specific weight, density and specific gravity of 1 liter of a liquid which weights 7N 7M

(OR)

2. (a) Define a surface tension. Prove that relationship between surface tension and pressure inside a droplet of liquid in excess of outside pressure is given by $p=4\sigma/d$ 7M
   (b) Find the kinematic viscosity of an oil having density 981kg/m^3. The shear stress at a point in oil is 0.2452N/m^2 and velocity gradient at that point is 0.2/sec. 7M

UNIT – II

3. (a) State and prove the Pascal's Law. 7M
   (b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limb is 40cm and the height of fluid in the left from the center of pipe is 15cm below. 7M

(OR)

4. (a) A rectangular plane surface 3m wide and 4m deep lies in water in such a way that its plane makes an angle of 30^0 with the free surface of water. Determine the total pressure force and position of center of pressure, when the upper edge is 2m below the free surface. 7M
   (b) A stone weighs 392.4N in air and 196.2 N in water. Compute the volume of stone and its specific gravity. 7M

UNIT – III

5. (a) Distinguish between 8M
      (i) Steady flow and Unsteady flow (iii) Rotational and irritational flow
      (ii) Uniform flow and non-uniform flow (iv) Laminar and turbulent flow.
   (b) The velocity vector in a fluid flow is given 6M
   $V=4x^3i-10x^2yj+2tk$.
   Find the velocity and acceleration of a fluid particle at (2,1,3) at time t=1

(OR)

6. (a) Define the terms: 8M
      (i) Velocity potential function (iii) steam line
      (ii) Stream function (iv)Path line.
   (b) A 30 cm diameter, conveying water, branches into two pipes of diameters 20cm and 15cm respectively. If the average velocity in the 30cm dimeter pipe is 2.5m/sec, find the discharge in this pipe. Also determine the velocity in 15cm pipe if the average velocity in 20cm diameter pipe is 2m/s. 6M

UNIT – IV

7.	(a)	State Bernoulli's theorem for steady flow of an incompressible fluid. Derive an expression for Bernoulli's equation from first principle and state the assumptions made for such a derivation.	8M
	(b)	An orifice meter with orifice diameter 10cm is inserted in a pipe of 20cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives readings of 19.62N/cm^2 & 9.81 N/cm^2 respectively. Co-efficient of discharge for the Orificemeter is given as 0.6. Find the discharge of water through pipe.	6M

(OR)

8.	(a)	An open circular cylinder of 15cm diameter and 100cm long contains water up to a height of 80cm. Find the maximum speed at which th cylinder is to be rotated about its vertical axis so that no water spills.	7M
	(b)	State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend?	7M

UNIT-V

9.	(a)	What are the methods of dimensional analysis? Describe the Rayleigh's method for dimensional analysis.	8M
	(b)	Define the Dimensionless numbers and their types. Brief explanation about any two types.	6M

(OR)

10.	(a)	Derive on the basis of dimensional analysis suitable parameter to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can denoted by the speed of sound in the medium C.	8M
	(b)	What do you mean by fundamental units and derive units? Give examples.	6M

Q.P. Code: 1801405 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Solid Mechanics - 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 steel of 40mm diameter is fitted in a copper tube of 60mm external diameter and 40mm internal diameter. The assembly is completely fixed at one end while other end is constrained in cross-section by rigid plate. If the temperature of the assembly is raised by 60deg C, calculate the stresses developed in copper and steel. Consider the following material properties. **14M**

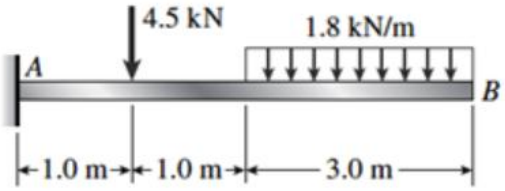
(OR)

2. (a) Find the young's modulus of a rod of diameter 30mm and of length 3000mm which is subjected to a tensile load of 60kN and the extension of the rod is equal to 0.4mm **12M**

(b) Define resilience and Poisson's ratio. **2M**

UNIT – II

3. (a) A cantilever beam is loaded as shown in fig.. Plot the shear force and bending moment diagram. Also find the reactions at the fixed support. What is the bending moment at distance of 0.5m from the fixed support. **12M**

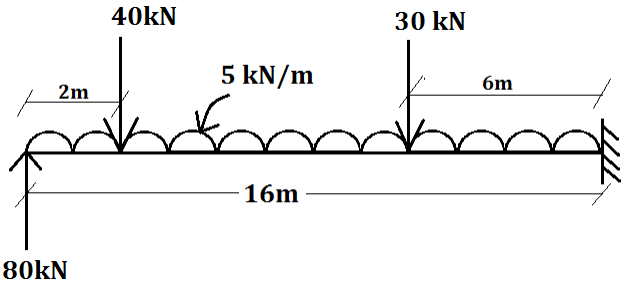


(b) Write the BMD for the beam subjected to clockwise moment at its mid span. **2M**

(OR)

4. (a) Derive the relation between shear force, bending moment and rate of loading at a section of the beam. **5M**

(b) Draw the SFD and BMD for the propped cantilever beam shown in fig. **9M**



UNIT – III

5. A rolled steel Joist of I-Section has flange length of 300 mm. wide and 20 mm thick with a web thickness of 20 mm. and overall depth of I-Section is 600 mm. If this beam carries a UDL of 40 KN/m over the simply supported beam of span 10 m, find the maximum stress produced in the beam **14M**

(OR)

6. (a) What do you mean by simple bending or pure bending? What are the assumptions made in the theory of simple bending? **7M**

	(b)	Derive the equation for pure bending.	**7M**

UNIT – IV

7.		Find out the slope and deflection for a supported beam of length 9m subjected to two-point loads located at an equidistance of 3m from support A and B by using Moment area method.	**14M**

(OR)

8.		Find out the slope and deflection for a supported beam of length 9m subjected to two-point loads located at an equidistance of 3m from support A and B by using double integration method.	**14M**

UNIT-V

9.	**(a)**	A solid shaft of 20mm diameter is used to transmit torque. Find the maximum torque transmitted by the shaft if the maximum shear stress induced in the shafts is 150 N/mm^2	**4M**
	(b)	A hollow shaft of 600 mm. external dia. and 400 mm internal dia. is transmitting a power of 6000 KW at 160 rpm. Find the shear stresses at the outer and inner surfaces of the shaft. Draw the shear stress distribution for the wall of the shaft. Find the twist over a length of 4m of the shaft. Take E = 80GPa	**10M**

(OR)

10.		Derive an expression for the shear stress produced in a circular shaft which is subjected torsion. What are the assumptions made in the derivation?	**14M**

Q.P. Code: 1801406 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Disaster Preparedness & Planning Management (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 Mitigation and vulnerability	6M
	(b)	Write primary types of mitigation actions to reduce long-term vulnerability	8M

(OR)

2.		Explain the Classifications of Disasters	14M

UNIT – II

3.		Write the causes of Man-made Disasters?	14M

(OR)

4.		Write a note on artificial flooding in urban areas and how can we prevent?	14M

UNIT – III

5.		How the disasters show impact on health, psycho-social issues and explain?	14M

(OR)

6.		Explain about the urban disasters	14M

UNIT – IV

7.		Explain the phases in disaster management of structural and non-structural measures?	14M

(OR)

8.		Explain about Post-disaster environmental response?	14M

UNIT-V

9.		Write the Roles and responsibilities of local institutions, NGOs and other stakeholders regards Disaster Management?	14M

(OR)

10.		Explain the activities of National Disaster Management Authority?	14M

Q.P. Code: 1802403 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Electrical 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.		Explain in detail different types of torques developed in measuring instruments.	14M
		(OR)	
2.		Describe the construction working details of an electro dynamometer type instrument.	14M
		UNIT – II	
3.		Explain the constructional details of the three phase energy meter	14M
		(OR)	
4.	(a)	Explain the dynamo meter three phase pf meter	8M
	(b)	Explain driving and braking torques	6M
		UNIT – III	
5.		Explain how the low resistance will be measured by using kelvin's double bridge	14M
		(OR)	
6.		Explain why the Maxwell's inductance capacitance bridge is useful for measurement of inductance of the coils having the storage factor between 1 and 10.	14M
		UNIT – IV	
7.		Describe the design and constructional features used in PT for reduction of ratio and phase angle errors	14M
		(OR)	
8.	(a)	Explain principle and operation of DC Crompton potentiometer	8M
	(b)	Discuss the major sources of errors in CT	6M
		UNIT-V	
9.		Describe in detail the vertical amplifier used in CRO	14M
		(OR)	
10.		Describe the function of attenuators in CROs. Explain how are they designed with particular reference to frequency compensation	14M

Q.P. Code: 1802404 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Control Systems (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

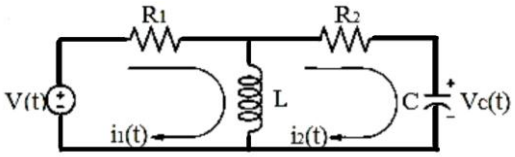
1. (a) Discuss the rules implemented for the reduction of a given block diagram **6M**

(b) Define transfer function. Determine the transfer function of a dc servo motor in field control mode. **8M**

(OR)

2. (a) State Mason's gain formula for deriving transfer function of a system **4M**

(b) Determine the transfer function $\frac{I_2(s)}{V(S)}$ for the electrical system shown in figure below. **10M**



UNIT – II

3. (a) Derive the expression for the time response of an under damped second order system when subjected to unit step input **6M**

(b) The forward path transfer function of a unity feedback system in G(S)= $\frac{2}{S(S+3)}$,Obtain the expression for unit step response of the system **8M**

(OR)

4. Derive the expressions for rise time, peak time and maximum peak overshoot of a second order system **14M**

UNIT – III

5. Sketch the root locus of a unity feedback system whose open loop transfer function is given by G(S)= $\frac{K}{S(S+2)(S+6)}$ **14M**

(OR)

6. (a) For the system to be stable, determine the range of K of a unity feedback system whose open-loop transfer function given by G(S)= $\frac{K}{S(S+2)(S+6)}$ **8M**

(b) Describe the procedure to construct Routh array. **6M**

UNIT – IV

7. Develop Bode plot and state the stability of the system given as G(S)= $\frac{80}{S(S+2)(S+20)}$ **14M**

(OR)

8. Plot the Nyquist plot and assess the stability of the closed-loop system whose open-loop transfer function is given by G(S).H(S)= $\frac{6S+1}{S^2(S+1)(3S+1)}$. **14M**

UNIT-V

9. (a) Explain how a lead-log compensation can be obtained using Bode plots. **6M**

(b) Determine the transfer function of a lead compensator that will provide a phase lead of 500 and gain of 8dB at ω=5rad/sec **8M**

(OR)

10. A unity feedback system has an open loop transfer function G(S)= $\frac{K}{S(S+1)(0.2S+1)}$. Design a phase–lag compensation for the system to achieve the following **14M**

specifications: Velocity error constant Kv= 8, phase margin =40 degrees. Also compare the cross over frequency of the uncompensated and compensated system.

Q.P. Code: 1802406 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Power Systems – 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)	Define regulation of a short 3-phase transmission system and develop an expression for approximate voltage regulation	7M
	(b)	Analyze the long transmission line by rigorous solution	7M
		(OR)	
2.	(a)	Analyze a medium transmission line with nominal π method and draw the phasor diagram?	7M
	(b)	Explain the evaluation of transmission line constants	7M
		UNIT – II	
3.	(a)	Explain the differences between the per unit representations of single phase and three phase systems by deriving necessary equations.	7M
	(b)	What are the steps to be follow to draw Per Unit Impedance/Reactance Diagram?	7M
		(OR)	
4.	(a)	How do you get the short circuit kVA from per unit impedance?	6M
	(b)	A 50kW, three phase, Y connected load is fed by a 210kVA transformer with voltage rating 11kV/415V through a feeder. The length of feeder is 1km and the impedance of the feeder is (0.25+j 4) ohm/km. If the load power factor is 0.8. Determine the p.u impedance of the feeder and load.	8M
		UNIT – III	
5.	(a)	Draw the equivalent circuit and derive the expression for the sub transient reactance of alternator during the short circuit.	6M
	(b)	A 3-phase, 20 MVA, 10 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short-circuit does not exceed 8 times the full load current	8M
		(OR)	
6.	(a)	Explain in detail about the steps to be followed for the symmetrical fault calculations	7M
	(b)	Explain the various methods of connecting short-circuit current limiting reactors in the power system	7M
		UNIT – IV	
7.	(a)	Derive the expression for the fault current and terminal voltage for a line to line fault occurs at the terminal of an unloaded 3-phase alternator.	8M
	(b)	A 3-phase, 11 kV, 25 MVA generator with X0 = 0·05 p.u., X1 = 0·2 p.u. and X2 = 0·2 p.u. is grounded through a reactance of 0·3 Ω. Calculate the fault current for a single line to ground fault	6M
		(OR)	
8.	(a)	Derive an expression for the fault current for a single line to ground fault as an unloaded generator and draw its equivalent circuit	7M
	(b)	Write short notes on the following : (i) Positive sequence network (ii) Negative sequence network (iii) Zero sequence network	7M
		UNIT-V	
9.	(a)	Write the assumptions fast decoupled load flow method.	7M
	(b)	Write an algorithm for the Modification of Zbus Matrix for different cases	7M
		(OR)	
10.	(a)	Describe the procedure of modification of Zbus by adding mutually coupled branch from any two existing buses.	7M
	(b)	Discuss how to form Y Bus by direct inspection with a suitable example	7M

Q.P. Code: 1802405 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

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 construction of a 3-phase cage type induction motor with neat sketch 7M
   (b) A 3 phase induction motor has 2 poles and is connected to 400V, 50Hz supply. Calculate the actual rotor speed and rotor frequency when the slip is 4%. 7M

(OR)

2. (a) Explain the effect of change supply voltage on torque and speed 7M
   (b) Explain the procedure of drawing the circle diagram of an induction motor. 7M

UNIT – II

3. (a) Describe the Autotransformer starter for Induction motor with neat diagram 7M
   (b) Briefly discuss various methods to control the speed of three phase Induction motor 7M

(OR)

4. (a) Explain the equivalent circuit of a single phase induction motor with neat sketch 7M
   (b) Explain the construction and operation of shaded pole Induction motor 7M

UNIT – III

5. (a) Derive the EMF equation of an alternator 7M
   (b) A 3-phase, star connected, 4 pole alternator has 60 slots with 2 conductors per slot. The pitch of the coil is 3 slots less than the pole pitch. The flux per pole is 0.125 wb. Calculate the No load terminal voltage, if the speed of the alternator is 1500 RPM. 7M

(OR)

6. (a) Explain the MMF method of determining the voltage regulation of alternator. 7M
   (b) A 10 KVA, 440v, 50Hz, star connected three phase alternator has the Open circuit characteristic given below: 7M

I_f (A)	1.5	3	5	8	11	15
Terminal voltage(V)	150	300	440	550	600	635

With full load, zero power factor applied on excitation of 14A, produced a terminal voltage of 500 V. On short circuit, 4A excitation was required to give full load current. Determine the full load percentage regulation for 0.8 pf lagging.

UNIT – IV

7. (a) Discuss Blondel's two reaction theory applicable to salient pole synchronous generator. 7M
   (b) Derive the expression for synchronizing power for salient pole synchronous machine 7M

(OR)

8. (a) Discuss the need for connecting the alternators in parallel. Mention the conditions for parallel operation of alternators 7M
   (b) Explain the operation of alternator on infinite bus bar with varying excitation and by keeping steam input as constant. 7M

UNIT-V

9. (a) Explain why the Three Phase synchronous motor is not a self starting motor? 7M
   (b) A 3 ph, 6600V, Y connected synchronous motor delivers 500KW power to a load. Its full load efficiency is 83%. Let Ra = 0.3 Ω/ph and Xs = 3.2 Ω/ph. Find the generated e.m.f and load angle when the machine is operating with 0.8 leading p.f. 7M

(OR)

10. (a) What is mean by Hunting? How to prevent Hunting in a Synchronous motor 7M

(b) Describe how the synchronous motor can operate as synchronous condenser 7M

Q.P. Code: 1803401 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Applied Thermodynamics (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 a neat sketches the working of spark ignition engine 7M
   (b) Explain the working of magneto ignition system with a neat sketch 7M

(OR)

2. (a) Compare four stroke and two stroke cycle engines 7M
   (b) The following readings were taken during a test of a single cylinder four stroke oil engine. Cylinder diameter 250mm, stroke length 400mm, gross mean effective pressure 7bar, pumping mean effective pressure 0.5bar, engine speed 250rpm, net load on the brake 1080N, effective diameter of the brake 1.5m, fuel used per hour 10kg, calorific value of fuel 44300 KJ/Kg, determine i) Indicated power ii) brake power iii) mechanical efficiency iv) indicated thermal efficiency 7M

UNIT – II

3. (a) Prove that the work done per kg of air in a compressor with clearance volume is given by 7M

$$w = \frac{n}{n-1} \times P_1(V_1 - V_4)\left[\left(\frac{P_2}{P_1}\right)^{\frac{n-1}{n}} - 1\right]$$

   (b) Explain with a neat sketch the construction and working of axial flow compressor 7M

(OR)

4. (a) Distinguish between reciprocating air compressor and rotary air compressor 7M
   (b) Find the percentage saving in work by compressing air into two stages from 1bar to 7bar instead of in one stage. Assume compression index 1.35 i8n the both cases and optimum pressure and complete inter cooling in two stage compressor 7M

UNIT – III

5. (a) Explain with a neat sketch the construction and working of babcock and wilcox boiler 7M
   (b) Give the comparison between fire tube boiler and water tube boiler 7M

(OR)

6. (a) Explain with a neat sketches the following boiler mountings i) Water level indicator ii) Pressure gauge 7M
   (b) The following readings were obtained during a boiler trial of 6 hours duration. Mean steam pressure 12bar, mass of steam generated 40000Kg, mean dryness fraction 0.85, mean feed water temperature 30^o C, coal used 4000Kg, Calorific value of coal 33400KJ/Kg, Calculate i) Factor of equivalent evaporation ii) Equivalent evaporation from and at 100^o C iii) Efficiency of the boiler 7M

UNIT – IV

7. (a) Derive the condition for maximum discharge through the steam nozzle is given by 7M

$$\frac{P_2}{P_1} = \left(\frac{2}{n+1}\right)^{\frac{n}{n-1}}$$

   (b) Define the term steam nozzle; explain various types of nozzles 7M

(OR)

8. (a) Explain with a neat schematic diagram of counter flow jet condensers 7M
   (b) A surface condenser is designed to handle 10000Kg of steam per hour. The steam 7M

enters at 0.08bar abs and 0.9 dryness and the condensate leaves at the corresponding saturation temperature. The pressure is constant throughout the condenser. Estimate the cooling water flow rate per hour if the cooling water temperature rise is limited to 10^{o} C.

UNIT-V

9. (a) Distinguish between impulse turbine and reaction turbine 7M

(b) A single row impulse turbine develops 132.4KW at a blade speed of 175m/s. using 2Kg of steam per sec. Steam leaves the nozzle at 400m/s. Velocity coefficient of the blades is 0.9. Steam leaves the turbine blades axially. Determine the nozzle angle, blade angles at entry and exit, assuming no shock 7M

(OR)

10. In a reaction turbine the blade tips are inclined at 35^{o} and 20^{o} in the direction of motion. The guide blades are of the same shape as the moving blades, but reversed in direction. At a certain place in the turbine, the drum diameter is 1m and the blades are 10cm height. At this place the steam has a pressure of 1.75bar and dryness 0.935. If the speed of this turbine is 250rpm, and the steam passes through the blades without shock, find the mass of steam flow and power developed in the ring of moving blades. 14M

Q.P. Code: 1803402 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Fluid Mechanics (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 Newtonian fluid in the clearance between a shaft and a concentric sleeve. The sleeve attains a speed of 50 cm/s, when a force of 40N is applied to the sleeve parallel to the shaft. Determine the speed if a force of 200N is applied. 14M

(OR)

2. A vertical gap 2.2 cm wide of infinite extent contains a fluid of viscosity 2.0 N s/m^2 and specific gravity 0.9. A metallic plate 1.2m × 1.2m × 0.2 cm is to be lifted up with a constant velocity of 0.15 m/sec, through this gap. If the plate is in the middle of the gap, find the force required. The weight of the plate is 40N. 14M

UNIT – II

3. (a) Explain the terms: (i) Dynamic viscosity, and (ii) Kinematic viscosity. Give their dimensions 4M

   (b) A vertical gate closes a horizontal tunnel 5 m high and 3 m wide running full with water. The pressure at the bottom of the gate is 196.2 kN/m^2 . Determine the total pressure on the gate and position of the centre of pressure. 10M

(OR)

4. Define the equation of continuity. Obtain an expression for continuity equation for a three-dimensional flow. 14M

UNIT – III

5. (a) Why is co-efficient of discharge of an orifice meter much smaller than that of venturi meter? 7M

   (b) How will you determine the loss of head due to friction in pipes by using Darcy formula? 7M

(OR)

6. A pipeline 0.225 m in diameter and 1580 m long has a slope of 1 in 200 for the first 790 m and 1 in 100 for the next 790m. The pressure at the upper end of the pipeline is 107.91 kPa and at the lower end is 53.955 kPa. Taking f= 0.032, determine the discharge through the pipe. 14M

UNIT – IV

7. (a) Explain the terms boundary layer, laminar sub-layer and point of separation. 7M

   (b) Explain the factors affecting boundary layer thickness. 7M

(OR)

8. Derive the expression for Von Karman momentum integral equation for boundary layer flow 14M

UNIT-V

9. A man weighing 90 kgf descends to the ground from an aero plane with the help of a parachute against the resistance of air. The velocity with which the parachute, which is hemispherical in shape, comes down is 20 m/s. Find the diameter of parachute. Assume C_D=0.5 and density of air is 1.25 kg/m^3. 14M

(OR)

10. What is magnus effect and give dimensional analysis for drag and lift for fluid on a super sonic plane 14M

Q.P. Code: 1803403 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

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

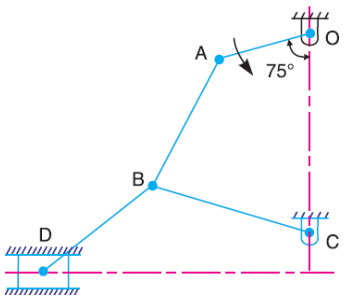
1.	**(a)**	Explain the term kinematic link. Give the classification of kinematic link.	**6M**
	(b)	Explain in detail different types of constrained motions.	**8M**
		(OR)	
2.	**(a)**	What is a machine? Giving example, differentiate between a machine and a structure.	**6M**
	(b)	Sketch and describe the working of crank and slotted lever type quick return mechanism. Give examples of their applications.	**8M**

UNIT – II

3.	**(a)**	What are straight line mechanisms? Give examples.	**6M**
	(b)	Sketch and describe the Peaucellier straight line mechanism.	**8M**
		(OR)	
4.	**(a)**	What is the condition for correct steering?	**6M**
	(b)	Sketch and explain the working of Ackerman steering gear mechanism and discuss their relative advantages	**8M**

UNIT – III

5.	**(a)**	Discuss the three types of instantaneous centres for a mechanism.	**4M**
	(b)	In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°.	**10M**
		(OR)	
6.		In Fig. the angular velocity of the crank OA is 600 r.p.m. Determine the linear velocity of the slider D and the angular velocity of the link BD, when the crank is inclined at an angle of 75° to the vertical. The dimensions of various links are: OA = 28 mm; AB = 44 mm; BC 49 mm; and BD = 46 mm. The centre distance between the centres of rotation O and C is 65 mm. The path of travel of the slider is 11 mm below the fixed point C. The slider moves along a horizontal path and OC is vertical.	**14M**



UNIT – IV

7.	**(a)**	Define the terms as applied to cam :- (a) Base circle, (b) Pitch circle, (c) Pressure angle, and (d) Stroke of the follower.	**6M**
	(b)	Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uniform acceleration and retardation. Derive the expression for velocity and acceleration during outstroke and return stroke of the follower	**8M**
		(OR)	

8. A cam, with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a roller follower, at the end of a valve rod, motion described below : 1. To raise the valve through 50 mm during 120° rotation of the cam ; 2. To keep the valve fully raised through next 30°; 3. To lower the valve during next 60°; and 4. To keep the valve closed during rest of the revolution i.e. 150° ; The diameter of the roller is 20 mm and the diameter of the cam shaft is 25 mm. Draw the profile of the cam when the line of stroke of the valve rod passes through the axis of the cam shaft.. The displacement of the valve, while being raised and lowered, is to take place with simple harmonic motion. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 r.p.m. Draw the displacement, the velocity and the acceleration diagrams for one complete revolution of the cam **14M**

UNIT-V

9. A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio. **14M**

(OR)

10. (a) What do you understand by ‘gear train’? Discuss the various types of gear trains. **7M**

(b) How the velocity ratio of epicyclic gear train is obtained by tabular method? **7M**

Q.P. Code: 1803405 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Instrumentation and Control Systems (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)**	State and explain various types of errors in measurements.	**7M**
	(b)	Explain the various static characteristics of a measurement system.	**7M**
		(OR)	
2.	**(a)**	Write a short on the basic principles of measurement.	**7M**
	(b)	Distinguish between direct and indirect methods of measurements.	**7M**

UNIT – II

3.	**(a)**	Write a short note on bellow gauges for measurement of pressure.	**7M**
	(b)	Explain the inductive transducer for the measurement of displacement.	**7M**
		(OR)	
4.	**(a)**	Explain the working of Bourdon Pressure gauge with diagram.	**7M**
	(b)	Explain the working of thermistor with neat sketch.	**7M**

UNIT – III

5.	**(a)**	Explain the principle of working of vibrometer.	**7M**
	(b)	Describe the different methods used for measurement of speed and explain their advantages and disadvantages.	**7M**
		(OR)	
6.	**(a)**	Explain about cryogenic fuel level indicators.	**7M**
	(b)	Explain the working of magnetic flow meter with neat sketch.	**7M**

UNIT – IV

7.	**(a)**	Explain the working principle of unbounded strain gauge with diagram.	**7M**
	(b)	Write a short on the requirements of materials for strain gauges.	**7M**
		(OR)	
8.	**(a)**	With help of neat sketch explain how torque can be used in the measurement of strain.	**7M**
	(b)	Explain about the wire type strain gauge.	**7M**

UNIT-V

9.	**(a)**	Write a short note on absorption psychrometer with neat sketch.	**7M**
	(b)	Explain the working principle of torsion meter with neat sketch.	**7M**
		(OR)	
10.	**(a)**	What is a closed loop system? Show the various elements of closed loop system and list out the functions of each element.	**7M**
	(b)	List out the advantages of open loop system over the closed loop system.	**7M**

Q.P. Code: 1804402 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Probability Theory and 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) Explain the following. 7M
i) Joint and Conditional probability ii) Total probability

(b) A PC board contains 205 components. Each component has the probability of not failing as 0. 9996.All components are required not to fail if the PC board is not to fail. Each component is independent of all the others as far as failure mechanisms are concerned. Find 7M
i) The probability of exactly one component failing.
ii)The probability of the PC board not failing.
iii) The probability of atmost one component failing.

(OR)

2. (a) Distinguish between distribution and density function of a random variable X. 7M

(b) A Rayleigh density function is given by 7M

$$f_X(x) = f(x) = \begin{cases} x\, e^{\frac{-x^2}{2}}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

i)Find the distribution function $F_X(x)$. ii)Find $P(0.5 \leq X \leq 2.$

UNIT – II

3. (a) State and prove properties of characteristic function of a random variable. 7M

(b) If a probability density function of a random variable X is given by $f_X(x) = e^{-|ax|}$ 7M ,where a and b are real constants. Find the moment generating function, mean and variance.

(OR)

4. (a) State and prove Markov's inequality. 7M

(b) Show that the linear transformation of a Gaussian random variable produces another random variable. 7M

UNIT – III

5. (a) Prove that probability density function of a sum of N independent random variables approaches the Gaussian density function as N tends to infinity. 7M

(b) Given the function $f_{X,Y}(x,y) = f(x) = \begin{cases} b\,(x+y)^2 & for\ -2 < x < 2, -3 < y < 3 \\ 0 & elsewhere \end{cases}$. 7M
i) find the constant b such that this is a valid joint density function.
ii) Determine the marginal density functions $f_X(x)$ and $f_Y(y)$.

(OR)

6. (a) Using the moment generating function show that the Gaussian random variables X and Y are uncorrelated. 7M

(b) The joint density function of X and Y is $f_{X,Y}(x,y0 = f(x) = \begin{cases} \frac{1}{100}, & for\ 0 < x < 5 \\ 0 & elsewhere \end{cases}$. 7M
Find the expected value of the functions i) XY ii) X^2Y and iii) $(XY)^2$.

UNIT – IV

7. (a) State and prove any four properties of the power spectral density. 7M

(b) Telephone calls are initiated through an exchange at a mean average rate of 75 per minute and are described by Poisson process. Find the probability that more than three calls are initiated in any 5 second period. 7M

(OR)

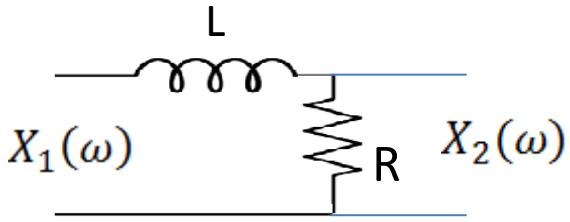
8. (a) Prove that random process $X(t) = A\,cos(\omega_c t + \theta)$ is wide sense stationary random process if it is assumed that ω_c is constant and θ is uniformly distributed over the interval $(0,2\pi)$. 7M

(b) Derive the relation between cross power spectral density and cross correlation. 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 white noise with spectral density $^{N_o}/_2$ is transmitted through a linear network as shown in fig below. Find the output power spectral density and average power. 7M



(OR)

10. (a) Explain the concept band limited process and list out its properties. 7M

(b) A random process whose mean value is 2 and autocorrelation function is $R_{XX}(\tau) = 4e^{-2|\tau|}$ is applied to a system whose transfer function is $\frac{1}{2+j\omega}$ .Find the mean value and average power of the output signal. 7M

Q.P. Code: 1804403 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Analog 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) Derive the expression for the CE short circuit current gain Ai as a function of frequency using Hybrid - π model. 7M
   (b) In hybrid 'pi' model of a transistor at high frequencies, show that the g_m is proportional to the collector current. 7M

(OR)

2. (a) Derive the expressions for voltage gain, input admittance and output admittance for CD-FET at high frequencies. 7M
   (b) Draw the high frequency Common Source FET amplifier circuit. Draw its high frequency equivalent circuit and derive the expression for gain. 7M

UNIT – II

3. (a) Analyze the low the frequency response of BJT amplifier. 7M
   (b) Discuss the response of low pass RC network for step input. 7M

(OR)

4. (a) Discuss the frequency response characteristics of RC-coupled Amplifier. Derive the general expressions for voltage gains at middle, low and high frequencies. 8M
   (b) Three identical non-interacting amplifier stages connected in cascade have an overall gain of 0.3 dB down at 50 kHz compared to mid-band. Calculate the upper cut-off frequency of the individual stages. 6M

UNIT – III

5. (a) Mention the magnitudes of input and output impedances of negative feedback amplifiers and how they are modified from the input and output impedances of normal amplifiers. 8M
   (b) List out the advantages and disadvantages of the introduction of negative feedback in amplifiers? Explain. 6M

(OR)

6. (a) Describe the operation of Colpitts oscillator with neat diagram and derive the expression for frequency of operation. 9M
   (b) In a Transistorized Hartley oscillator, the two inductances are 2 *m*H and 20 *m*H while the frequency is to be changed from 930 kHz to 2050 kHz. Calculate the range over which the capacitor is to be varied. 5M

UNIT – IV

7. (a) Classify of power amplifiers based on its operating point. Distinguish these amplifiers in terms of the conversion efficiency. 6M
   (b) Draw the push-pull power amplifier circuit. Derive the expression for the output current in push-pull amplifier. 8M

(OR)

8. (a) Define tuned amplifier and briefly explain the classification of tuned amplifiers. 6M
   (b) Write short notes on 8M
   (i) Stagger tuned amplifiers, and (ii) Stability of tuned amplifiers

UNIT-V

9. (a) Elaborate MOS and IIL logic families. 7M
   (b) List out the advantages and disadvantages of DTL gates. 7M

(OR)

10. (a) Draw the circuit of TTL gate and explain its operation for negative logic. 7M

(b) Define positive logic. Draw and explain the operation of ADD and OR gates using Diode positive logic. 7M

Q.P. Code: 1804405 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Linear IC Applications (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 operation of dual input, balanced output differential amplifier by performing AC analysis	10M
	(b)	If the differential voltage gain and common mode voltage gain of a differential amplifier are 48dB and 2 dB respectively, then calculate the CMRR	4M
		(OR)	
2.	(a)	Explain the different frequency compensation techniques of an op-amp	7M
	(b)	Explain the operation of dual input, balanced output differential amplifier by Performing DC analysis	7M
		UNIT – II	
3.	(a)	Explain the operation of Non-inverting Op-amp and derive the expression for output voltage?	7M
	(b)	Design an adder circuit using an op-amp to get the output expression $V_0 = -(10V_1 + V_2 + 10V_3)$ Where V_1,V_2 & V_3 are the inputs	7M
		(OR)	
4.	(a)	What is instrumentation amplifier and what are its features .Also Derive an expression for the output voltage of an instrumentation amplifier	7M
	(b)	Explain the operation of inverting and non-inverting AC amplifier	7M
		UNIT – III	
5.	(a)	What is comparator? Explain the operation of inverting & Non-inverting comparator with necessary input &output waveforms	7M
	(b)	Design a first order LPF at a cutoff frequency of 1KHz with a pass band gain of 1	7M
		(OR)	
6.	(a)	In a Schmitt trigger circuit , R1 = 150 Ω ,R2 = 68 KΩ ,V_{in} = 500 mv (P-P) sine wave and the op-amp is type741 with supply voltages = ± 15V.Determine the threshold voltages and draw the output waveform	7M
	(b)	Design a second order high pass filter using op-amp at a cutoff frequency of 1KHz	7M
		UNIT – IV	
7.	(a)	Explain the pin configuration of 555 timer	7M
	(b)	Design a Wien bridge oscillator that will oscillate at 2kHz	7M
		(OR)	
8.	(a)	Explain the operation of Astable multivibrator using 555 timer and derive the expression for frequency of oscillations	7M
	(b)	Explain any two applications of PLL	7M
		UNIT-V	
9.	(a)	A dual slope ADC uses a 16 bit counter and a 4M Hz clock rate .The maximum input voltage is +10v.The maximum integrator output voltage should be -8v .When the counter has cycled through 2^n counts. The capacitor used in the integrator is 0.1μF.Find the value of the resistor R of the integrator	6M
	(b)	Explain different specification of DAC	8M
		(OR)	
10.	(a)	Explain the operation of 8-bit Successive approximation ADC	9M
	(b)	The basic step of a 9-bit DAC is 10.3mv.If 000000000 represents 0v .What output is produced if the input is 101101111	5M

Q.P. Code: 1804406 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Electromagnetic Theory and 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 an expression for electric field intensity due to a finite length line charge along the Z - axis at an arbitrary point P(x, y, z). 9M
   (b) Find the electric field at (2,3,1) if the potential distribution is of the form $3x^2y + xy^2 + 3z$ 5M

(OR)

2. (a) Find the total charge in the volume specified by $0 \le x \le 1, 0 \le y \le 1$ and $0 \le z \le 1$ when $\rho_v = 30x^2y \ \ nC/m^3$ 6M
   (b) The point Charges -1nC, 4nC, and 3nC are located at (0,0,0), (0,0,1) and (1,0,0), respectively. Find the energy in the System 8M

UNIT – II

3. (a) Find magnetic field strength, H, on the Z-axis at a point P (0, 0, h), due to a current carrying circular loop, $x^2 + y^2 = a^2$ in Z=0 plane 7M
   (b) If H is given by H = $y\cos 2x a_x + (y + e^x)a_z$,determine J at the origin. 7M

(OR)

4. (a) State and explain Ampere's law and also mention its applications. 7M
   (b) An infinitely long current element on *x*-axis carries a current of 1.0 mA in a_x direction. Determine H at the point *P* (5, 2, 1). 7M

UNIT – III

5. (a) Derive the boundary conditions for the tangential and normal components of time varying fields at the boundary between dielectric and conductor interfaces 9M
   (b) A parallel-plate capacitor with plate area of $5\,cm^2$ and plate separation of 3mm has Voltage $50\sin(10^3 t)$ V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$ 5M

(OR)

6. (a) If the electric field strength of a radio broadcast signal at a TV receiver is given by $E = 5\cos(wt - \beta y)a_z$ V/m, determine the displacement current density. If the same field exists in a medium whose conductivity is given by 2×10^5 (mho)/m, find the conduction current density. 7M
   (b) In a certain region, $J = (2ya_x + xza_y + z^3a_z)\sin(10^4 t)$ A/m. Find ρ_v if $\rho_v(x, y, 0, t) = 0$ 7M

UNIT – IV

7. (a) Derive the expression for attenuation constant and phase constant in a lossy dielectric medium 7M
   (b) Define Brewster angle and derive an expression for Brewster angle when a wave is Parallel polarized 7M

(OR)

8. (a) For plane wave propagation, show that the free space wave impedance is 377Ω by deriving necessary equation 7M
   (b) State and prove Poynting theorem 7M

UNIT-V

9. (a) Derive the condition for distortion less transmission line 7M
   (b) Derive the expression for propagation constant of infinite transmission line 7M

(OR)

10. (a) Starting from the equivalent circuit, derive the transmission line equations for V and I, in terms of the source parameters 7M
    (b) What is Smith Chart? How it is used to find the impedance, reactance and wavelength of transmission line? 7M

Q.P. Code: 1805403 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

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)	Discuss about various Computer Types.	7M
	(b)	Write about the performance in detail	7M
		(OR)	
2.	(a)	Draw and explain various functional units of a computer	7M
	(b)	Explain various types of computers	7M
		UNIT – II	
3.	(a)	How do register transfer works?	7M
	(b)	Illustrate Arithmetic shift micro operations with suitable example	7M
		(OR)	
4.	(a)	Summarize Hardware implementation of logical micro operations	8M
	(b)	Write about 4-bit binary incrementor	6M
		UNIT – III	
5.	(a)	How does a processor react to an external interrupt? Explain the interrupt cycle with a neat sketch of a flow chart.	7M
	(b)	Illustrate Micro program with example	7M
		(OR)	
6.		Show the step by step multiplication process using Booth algorithm when the following binary numbers are multiplied (+15) * (-13). Assume 5-bit registers that hold signed numbers and draw the flow chart for the corresponding example	14M
		UNIT – IV	
7.	(a)	What is virtual memory? With a neat block diagram explain the virtual memory address translation	7M
	(b)	Differentiate between ‘write-through’ and ‘write back’ cache techniques.	7M
		(OR)	
8.	(a)	Define Pipelining. Discuss about arithmetic pipeline.	7M
	(b)	Explain about RISC Pipeline	7M
		UNIT-V	
9.	(a)	Explain about Interprocessor Arbitration	7M
	(b)	Justify the usage of Direct memory Access	7M
		(OR)	
10.	(a)	Enumerate Modes of Transfer in detail	7M
	(b)	Demonstrate how priority Interrupt is handled.	7M

Q.P. Code: 1805404 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

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) What is system program? List and explain the various categories of system programs. 7M
   (b) Describe any two structures of operating systems. 7M

(OR)

2. (a) List and explain the various services of operating system. 7M
   (b) Write in detail about Dual Mode of Operation? 7M

UNIT – II

3. (a) What is critical section? Write Peterson's solution for critical section problem. 7M
   (b) Discuss the following CPU scheduling with an example: (a) Round robin. (b) Priority 7M

(OR)

4. (a) What are semaphores? Explain solution to producer-consumer problem using semaphores. 7M
   (b) Suppose the following three processes arrive for execution at the arrival times indicated. 7M

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

   (i) What is the average wait time for these three processes using the FCFS algorithm?
   (ii) What is the average wait time, using the non-preemptive SJF algorithm?
   (iii) What is the average wait time, using Shortest Remaining Time First (the preemptive version of SJF)?

UNIT – III

5. (a) Explain contiguous memory allocation method Multiprogramming with Fixed Partitions 7M
   (b) Explain FIFO and LRU page replacement algorithms with suitable examples 7M

(OR)

6. (a) Explain the concept of virtual memory 7M
   (b) Explain Multiprogramming with variable sized partition method in detail. 7M

UNIT – IV

7. (a) Explain different file accessing methods. 7M
   (b) What is a directory? Explain different directory structures. 7M

(OR)

8. (a) Explain the Banker's algorithm for deadlock avoidance with an example. 7M
   (b) Define deadlock. List and explain the four conditions for occurring a deadlock in the system. 7M

UNIT-V

9. (a) What is access matrix? Describe how it can be implemented effectively. 7M
   (b) Describe the services provided by the Kernel I/O subsystem in detail. 7M

(OR)

10. (a) Discuss program threats, system and network threats of operating system in detail. 7M
    (b) What is user authentication? Explain the various approaches for user authentication. 7M

Q.P. Code: 1805405 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Design and Analysis of Algorithms (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. What is an algorithm? And Explain in detail about algorithm specifications. 14M

(OR)

2. (a) What is space complexity? Illustrate with an example, fixed and variable part in space complexity. 7M
   (b) What is asymptotic notations? And write its different types of notations with an example. 7M

UNIT – II

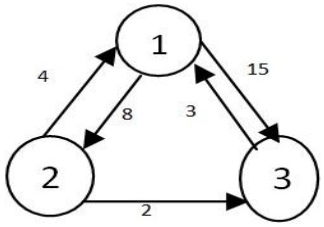
3. (a) Explain quick sort algorithm with an example. 7M
   (b) Explain strassen's matrix multiplication 7M

(OR)

4. Explain the solution to the problem of job sequencing with deadlines for given n=5,the profit p(1:5)=(1,5,20,15,10) and deadline d(1:5)=(1,2,4,1,3) by using Greedy technique. 14M

UNIT – III

5. Solve the all pairs shortest path for following digraph. 14M



(OR)

6. Discuss the 0/1 knapsack problem and solve the 0/1 knapsack problem using purging rule n=3,M=6,(p1,p2,p3)=(1,2,5),(w1,w2,w3)=(2,3,4)? 14M

UNIT – IV

7. (a) Differentiate between BFS and DFS with examples 7M
   (b) Describe in detail how to traverse a graph by using breadth first traversal. 7M

(OR)

8. (a) Explain the graph coloring problem .Draw the state space tree for m=3 colors and n=4 vertices graph. 7M
   (b) What is Hamiltonian cycle? Explain how to find Hamiltonian path and cycle using backtracking. With an example 7M

UNIT-V

9. Solve the Travelling sales person problem using branch and bound method for following instance starting from vertex . 14M

	A	B	C	D	E
A	∞	11	10	9	6
B	8	∞	7	3	4
C	8	4	∞	4	8
D	11	10	5	∞	5
E	6	9	5	5	∞

(OR)

10. (a) Explain about P,NP,NP-COMPLETE,NP-HARD problems with examples for each. 7M
    (b) Write a distinguish between deterministic and non-determistic algorithm with an examples 7M

Q.P. Code: 1805406 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

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)**	What is Object oriented paradigm? Explain any three object oriented programming features	7M
	(b)	Define class and object? Explain the general form of a class with an example	7M
		(OR)	
2.	**(a)**	What is Constructor? With suitable example explain constructor over loading**.**	7M
	(b)	What is the usage of this keyword discuss with an exampl**e**	7M
		UNIT – II	
3.	**(a)**	Explain with an example how to prevent overloading using final in the inheritance	7M
	(b)	When a class called as abstract classes? Explain	7M
		(OR)	
4.	**(a)**	Define package. Write a simple java program to implement package	7M
	(b)	Is interface can be extended? Explain with an example	7M
		UNIT – III	
5.	**(a)**	Explain multiple catch clauses with suitable program	7M
	(b)	What is the need of finally keyword? Explain	7M
		(OR)	
6.	**(a)**	Describe the Thread Life Cycle	7M
	(b)	How to create multiple threads. Explain in brief	7M
		UNIT – IV	
7.	**(a)**	Explain handling keyboard events with an example	7M
	(b)	List AWT controls. Explain Label control	7M
		(OR)	
8.		Discuss the following layout managers with suitable example (i) Border layout (ii) Gridlayout	14M
		UNIT-V	
9.	**(a)**	Discuss about request repainting in the applets	7M
	(b)	Differentiate between applet and application	7M
		(OR)	
10.		Explain the following swing components with an example (i) Checkboxes (ii) Tabbedpanes	14M

Q.P. Code: 1805407 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Formal Languages and Automata Theory (CSE)

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

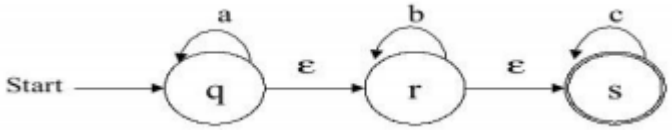
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain the procedure to convert NFA to DFA with suitable example? 7M
   (b) Explain the procedure of minimization of Finite state machine with example? 7M

(OR)

2. Convert the following NFA with ε moves to DFA without ε moves. 14M



UNIT – II

3. (a) List out the identities rules of Regular expression. 7M
   (b) Construct an equivalent FA for the given regular expression (0+1)*(00+11)(0+1)* 7M

(OR)

4. (a) Elaborate the procedure for converting Regular Expression to Finite Automata with suitable example? 7M
   (b) Define Regular Sets? Explain closure properties of regular sets? 7M

UNIT – III

5. Define the Following: 14M
   (i) Regular grammars
   (ii) Context free grammar
   (iii) derivation trees
   (iv) sentential forms
   (v) Right most and leftmost derivation of strings.

(OR)

6. Define Normal Form? Explain the procedure of converting the given CFG to Greiback Norma l Form(GNF) with suitable example? 14M

UNIT – IV

7. (a) Construct a PDA which recognizes all strings that contain equal number of 0's and 1's. 7M
   (b) A PDA is more powerful than a finite automaton. Justify this statement. 7M

(OR)

8. Explain Deterministic Push down Automata with example? 14M

UNIT-V

9. (a) Write about Universal TM? 7M
   (b) Explain in detail about variations of the TM? 7M

(OR)

10. What is a Definition of P and NP problems? Explain NP complete and NP hard problems? 14M

Q.P. Code: 1814402 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Digital System Design (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)	(i) Using 2's Complement, perform $(42)_{10}$ - $(68)_{10}$ (ii) Convert $(3456)_8$ to base 3 and base 7	8M
	(b)	Each of the following arithmetic operations is correct in at least one number system. Determine the possible bases of the numbers in each operation.	6M

(OR)

2.	(a)	Perform $N_1 + N_2$, $N_1 + (-N_2)$ for the following numbers expressed in 2's complement representation. $N_1 = 1001110$ $N_2 = 00001111$	8M
	(b)	Convert the decimal number 246.8 to base 3, base 5 and base 7	6M

UNIT – II

3.	(a)	Implement the Boolean function F = xy + x'y' +y'z with OR and NOT gates only	8M
	(b)	Prove that if W'X+YZ' =0 then WX + Y'(W'+Z') = WX + XZ + X'Z' + W'Y'Z	6M

(OR)

4.		Simplify the Boolean expression using K-map and implement using NOR gates F(A, B, C, D) = ∑m(0, 2, 3, 8, 10, 11, 12, 14) + ∑d(4, 9)	14M

UNIT – III

5.	(a)	Implement a full adder using 4 X 1 multiplexer	7M
	(b)	Implement the following Boolean function using 4 X 1 MUX	7M

(OR)

6.	(a)	Design and Draw a Full Adder	7M
	(b)	Design and draw logic diagram of Full Subtractor using two half subtractors	7M

UNIT – IV

7.		What are the different types of Shift registers. Explain any one of the Shift register	14M

(OR)

8.	(a)	Explain the operation of BCD Ripple counter	7M
	(b)	Design a counter with the following repeated binary sequence: 0, 1, 2, 3, 4, 5, 6. Use JK Flip-Flops	7M

UNIT-V

9.		Explain the operation of PLA and implement the following two Boolean functions with a PLA: $F_1(A, B, C) = \sum(0,1,2,4)$ $F_2(A, B, C) = \sum(0,5,6,7)$	14M

(OR)

10.	(a)	Differentiate between RAM and ROM	7M
	(b)	Briefly explain about FPGAs	7M

Q.P. Code: 1814404 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Basics of Electronics Engineering (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)	What is P-N Junction diode? How is it formed?	7M
	(b)	Explain V-I Characteristics of a zener Junction diode.	7M
		(OR)	
2.	(a)	Explain the operation of half wave rectifier with input and output wave forms.	8M
	(b)	Explain the working principles of LED along with applications.	6M
		UNIT – II	
3.	(a)	Explain the input and output characteristics of common base configuration.	8M
	(b)	Define biasing. Why biasing is necessary in BJT amplifiers?	6M
		(OR)	
4.	(a)	Compare the advantages and disadvantages of biasing schemes.	6M
	(b)	How transistors act as Amplifier? Discuss with neat diagram.	8M
		UNIT – III	
5.	(a)	Explain the structure and operation of JFET with neat diagram.	7M
	(b)	Discuss the transfer characteristics of JFET.	7M
		(OR)	
6.	(a)	Explain the operation of JFET in CG configuration with neat diagram.	8M
	(b)	Compare BJT and JFET in various parameters.	6M
		UNIT – IV	
7.	(a)	What is the necessary condition for oscillation?	5M
	(b)	Draw th circuit diagram of Hartley oscillator and explain its working.	9M
		(OR)	
8.	(a)	Explain the essential difference between Hartley and Colpitts oscillators.	4M
	(b)	Give the equivalent circuit of a quartz crystal. Draw th circuit diagram of Crystal oscillator and explain its working.	10M
		UNIT-V	
9.	(a)	Explain in detail about characteristics and functionality of the Multimeter.	7M
	(b)	Explain briefly the working of Successive approximation DVM.	7M
		(OR)	
10.	(a)	Discuss the principle of CRT along with operation.	6M
	(b)	Explain the Applications of CRO.	8M

Q.P. Code: 1821401 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Mathematics-III (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) Prove that (i) $J_2(x) = J_0''(x) - \frac{1}{x} J_0'(x)$ 7M

(ii) $2J_0''(x) = J_2(x) - J_0(x)$.

(b) Prove that $\int_{-1}^{1} P_m(x)P_n(x)\,dx = \begin{cases} 0, & if\ m \neq n. \\ \frac{2}{2n+1}, & if\ m = n. \end{cases}$ 7M

(OR)

2. (a) Prove that $J_0^2 + 2\,(J_1^2 + J_2^2 + J_3^2 + \cdots) = 1$. 7M

(b) Prove that $P_n(x) = \frac{1}{2^n\, n!} \frac{d^n}{dx^n}(x^2 - 1)^n$. 7M

UNIT – II

3. (a) Find an analytic function $f(z)$ whose imaginary part is $\frac{2\sin x \sin y}{\cos 2x + \cosh 2y}$. 7M

(b) Show that the function $f(z) = z\,Re(z)$ is continuous at origin but not differentiable at origin. 7M

(OR)

4. (a) Show that $u = x^3 - 3xy^2$ is harmonic and find its harmonic conjugate. 7M

(b) Show that $f(z) = log\ z$ is analytic everywhere except at $z = 0$. 7M

UNIT – III

5. (a) Find the bilinear transformation which maps the points $-1,\ 0,\ 1$ into the points $0,\ i,\ 3i$. 7M

(b) Find the image of the triangle with vertices $(0,0), (1,0) and\ (0,\ 1)$ under the transformation $w = (1 - i)z + 3$. 7M

(OR)

6. (a) Under the transformation $= \frac{z-i}{1-iz}$, find the image of the circle $|w| = 1$. 7M

(b) Discuss about the transformations $w = Cosz$. 7M

UNIT – IV

7. (a) Evaluate $\int_{(0,0)}^{(1,1)} (3x^2 + 4xy + ix^2)dz$ along the line $y = x^2$. 7M

(b) Evaluate $\oint_c \frac{\log z}{(z-1)^3} dz$, where c is a circle $|z| = 2$, by using Cauchy's Integral formula. 7M

(OR)

8. (a) Evaluate $\int_{(0,0)}^{(2,1)} z^2 dz$ along 7M

(i) the real axis to 2 then vertically to $2+i$.

(ii) the imaginary axis to i then horizontally to $2+i$.

(b) Evaluate $\oint_c \frac{z^3-\sin 3z}{(z-\frac{\pi}{2})^3}dz$, where $C: |z| = 2$ using Cauchy's integral formula. 7M

UNIT-V

9. (a) Show that $\int_0^\infty \frac{1}{x^4+1}dx = \frac{\pi}{\sqrt{2}}$. 7M

(b) Evaluate $\oint_c \frac{4-3z}{z(z-1)(z-2)}dz$, where $C: |z| = \frac{3}{2}$, using Cauchy's Residue theorem. 7M

(OR)

10. (a) Find all the poles of $f(z) = \frac{1}{z^2+1}$ and find residue at each pole. 7M

(b) Show that $\int_0^{2\pi} \frac{Cos2\theta}{p^2-2p\,Cos\theta+1}dp = \frac{2\pi p^2}{1-p^2}$, $(0 < p < 1)$. 7M

Q.P. Code: 1821402 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Probability & Statistics (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

Values of x	-2	-1	0	1	2	3
$p(x)$	0.1	k	0.2	$2k$	0.3	k

Find the value of k and calculate mean and variance.

(OR)

2. (a) A continuous distribution of a variable X in the range $(-3,3)$ is defined as 7M

$$f(x)=\begin{cases}\frac{1}{16}(3+x)^2, & -3\le x<-1\\ \frac{1}{16}(2-6x^2), & -1\le x<1\\ \frac{1}{16}(3-x)^2, & 1\le x\le 3.\end{cases}$$

Verify that the area under the curve is unity. Show that the mean is zero.

(b) X is a continuous random variable with probability density function given by 7M

$$f(x)=\begin{cases}kx, & 0\le x<2\\ 2k, & 2\le x<4\\ -kx+6k, & 4\le x<6\end{cases}$$

Find k and mean value of X.

UNIT – II

3. (a) It has been claimed that in 60% of all solar heat installations the utility bill is reduced by at least one-third. Accordingly, what are the probabilities that the utility bill will be reduced by at least one-third in (i) four of five installations (ii) at least four of five installations. 7M

(b) Fit a Poisson distribution to the following: 7M

x	0	1	2	3	4
f	46	38	22	9	1

(OR)

4. (a) Buses arrive at a specified stop at 15 min. intervals starting at 7 A.M., that is, they arrive at 7, 7:15, 7:30, 7:45 and so on. If a passenger arrives at the stop at a random time that is uniformly distributed between 7 and 7:30 A.M., find the probability that he waits 7M
(a) less than 5 min. for a bus and (b) at least 12 min. for a bus.

(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

UNIT – III

5. (a) The mean breaking strength of the cables supplied by a manufacturer is 1800, with a standard deviation of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cable has increased. To test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850. Can we support the claim at 1% LOS? 7M

(b) The average marks scored by 32 boys are 72 with a standard deviation of 8, while that 7M

for 36 girls is 70 with a standard deviation of 6. Test at 1% LOS whether the boys perform better than girls.

(OR)

6. (a) Define (i) null hypothesis (ii) critical region (iii) Type-I and Type-II errors (iv) level of significance. 7M

(b) In a sample of 1000 people in Andhra Pradesh, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% LOS? 7M

UNIT – IV

7. The nicotine contents in two random samples of tobacco are given below: 14M

Sample 1	21	24	25	26	27	
Sample 2	22	27	28	30	31	36

Can you say that the two samples came from the same population?

(OR)

8. (a) Two random samples drawn from two normal populations are given below: 7M

x	19	17	26	28	22	23	19	24	26			
y	28	32	40	37	30	35	40	28	41	45	30	36

Obtain the estimates of variance of the population and test whether the two populations have the same variance.

(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-V

9. A machine fills boxes with dry cereal. 15 samples of 4 boxes are drawn randomly. The weights of the sampled boxes are shown as follows. Draw the control charts for the sample mean and sample range and determine whether the process is in a state of control. 14M

Sample Number	1	2	3	4	5	6	7	8
Weights of boxes (X)	10.0	10.3	11.5	11.0	11.3	10.7	11.3	12.3
	10.2	10.9	10.7	11.1	11.6	11.4	11.4	12.1
	11.3	10.7	11.4	10.7	11.9	10.7	11.1	12.7
	12.4	11.7	12.4	11.4	12.1	11.0	10.3	10.7

9	10	11	12	13	14	15
11.0	11.3	12.5	11.9	12.1	11.9	10.6
13.1	12.1	11.9	12.1	11.1	12.1	11.9
13.1	10.7	11.8	11.6	12.1	13.1	11.7
12.4	11.5	11.3	11.4	11.7	12.0	12.1

(OR)

10. (a) Construct a control chart for defectives for the following data: 7M

Sample No.	1	2	3	4	5	6	7	8	9	10
No. inspected	90	65	85	70	80	80	70	95	90	75
No. of defectives	9	7	3	2	9	5	3	9	6	7

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

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Biology for Engineers (ECE & 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)	Discuss the various types of organelles present in the cell	7M
	(b)	Describe the process of mitosis	7M
		(OR)	
2.	(a)	Write the differences in prokaryotic and eukaryotic cell with neat diagrams	7M
	(b)	Five kingdom classification	7M
		UNIT – II	
3.	(a)	What are the proteins? Discuss their importance in immunity	7M
	(b)	Compare the compositional and structural difference of DNA and RNA	7M
		(OR)	
4.	(a)	Write a brief note on carbohydrate classification	7M
	(b)	Explain the steps involved in enzyme production process	7M
		UNIT – III	
5.	(a)	Define malnutrition? State the diseases caused by malnutrition	7M
	(b)	Explain the functions of the respiratory organs in respiratory cycle	7M
		(OR)	
6.	(a)	Describe the steps involved in the physiology of digestive system	7M
	(b)	Explain how excretory system helps in elimination of waste products	7M
		UNIT – IV	
7.	(a)	Describe the structure of eukaryotic gene	7M
	(b)	Explain the steps involved in cloning	7M
		(OR)	
8.	(a)	Write a detailed note on transcription	7M
	(b)	Outline the benefits of rDNA technology	7M
		UNIT-V	
9.	(a)	Types of Immunoglobulins	7M
	(b)	Describe the components of Biosensor with neat diagram	7M
		(OR)	
10.	(a)	Discuss the advantages and disadvantages of genetically modified organisms	7M
	(b)	Explain the steps in production of artificial limbs and joints	7M

Q.P. Code: 1824402 **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Effective Technical Communication (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.		How would you describe good communication?	14M
		(OR)	
2.	(a)	How important is listening in communication?	7M
	(b)	Why and when do we need communication?	7M
		UNIT – II	
3.		Define technical writing. What is technical writing process?	14M
		(OR)	
4.	(a)	Discuss the editing strategies to achieve appropriate technical style.	7M
	(b)	What is Collaborative writing?	7M
		UNIT – III	
5.		Write an essay about ‘ personal goal setting’ and the means to achieve.	14M
		(OR)	
6.	(a)	What is self-esteem?	7M
	(b)	How managing time is important in career planning ?	7M
		UNIT – IV	
7.		Assuming yourself as the Physical Director, place an order for the sports items required for your college. You had received quotation from M/s Khanna Sports, Chandighar. Mention clearly terms and conditions, mode of payment. Also mention the number of items clearly.	14M
		(OR)	
8.	(a)	Prepare minutes of meeting for the recently concluded JNTU Vice Chancellor meeting with all principals.	7M
	(b)	What are the essentials of a report?	7M
		UNIT-V	
9.		Draw a comparison between Business ethics and Engineering ethics.	14M
		(OR)	
10.	(a)	Discuss the role and responsibility of an engineer.	7M
	(b)	Write about the etiquettes in social and office settings,	7M

Q.P. Code: 1825401 | **SET - 2**

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

B. Tech. IV Sem. (R18) Supplementary Examinations of February – 2022

SUB: Managerial Economics & Financial Analysis (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 the law of demand? 6M
   (b) Explain the exceptions and determinants of demand. 8M

(OR)

2. (a) What is supply analysis 4M
   (b) Explain the Managerial Economics relation with other subjects? 10M

UNIT – II

3. What is a Cobb-Douglas Production Function and explain with suitable examples. 14M

(OR)

4. Explain the Internal and External Economies of Scale with suitable examples 14M

UNIT – III

5. (a) What is perfect competition 4M
   (b) Explain the features and characteristics of oligopoly competition 10M

(OR)

6. Find the Number of units that must be sold to earn a profit of Rs. 90,000. 14M

Fixed Factory overhead costs	Rs 60,000
Fixed Selling overhead costs	Rs 12,000
Variable Manufacturing cost per unit	Rs 12
Variable Selling cost per unit	Rs 3
Selling price per unit	Rs 24

UNIT – IV

7. Explain the features of different forms of business organizations? 14M

(OR)

8. (a) What is capital budgeting? 4M
   (b) Explain the various methods of capital budgeting? 10M

UNIT-V

9. A fleet owner purchases delivery trucks on credit. The total credit purchase is of Rs. 50,00,000/-. All new trucks will be used in daily business operations and will not be sold for the next 10 years. The estimated life of trucks is 10 years. Explain in respect to the Double Entry System. 14M

(OR)

10. (a) What are financial statements? 4M
    (b) Explain the different types of financial statements with suitable examples? 10M