Q.P. Code: 1801403 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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 in detail the branches of Geology emphasizing the importance in Civil Engineering projects. **14M**

(OR)

2. What is weathering? Explain the types of weathering. State the merits and demerits of weathering. **14M**

UNIT - II

3. Define mineral and their physical properties. How do these physical properties are helpful in identification of minerals. **14M**

(OR)

4. Describe the various optical properties of minerals. Give examples. **14M**

UNIT - III

5. Briefly explain the formation of Igneous, Sedimentary and Metamorphic rocks. **14M**

(OR)

6. Describe the structure and texture of Sedimentary rocks. **14M**

UNIT - IV

7. Classify and describe the various types of folds diagrammatically. **14M**

(OR)

8. Describe the types of joints and unconformities and their Engineering significance. **14M**

UNIT - V

9. Explain the causes, effects preventive measures to landslides. **14M**

(OR)

10. Explain the Engineering application of Geology in selection and planning of dams. **14M**

Q.P. Code: 1801404 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Define the following properties: Density, Specific weight, Specific gravity, Compressibility and surface tension? state their units of measurements 10M
   (b) Determine the intensity of shear of an oil having viscosity = 1posie. The oil is used for lubricating the clearance between the shaft of diameter 10cm and its journal bearing. The clearance is 1.5mm and the shaft rotates at 150 rpm 4M

(OR)

2. (a) Calculate the capillary effect in mm in a glass tube of 4mm diameter, when immersed in (i) water (ii) mercury. The temperature of liquid is 20^0c and the values of th surface tension of water and mercury at 20^0c in contact with air or 0.073575N/m and 0.51N/m respectively. The angle of contact for water is zero and mercury is130^0. Take density of water at 20^0 c=998kg/m^3 6M
   (b) Explain the following terms: Newtonian fluid, non-Newtonian fluid, real fluid and vapour pressure 8M

UNIT – II

3. (a) State and prove the hydrostatic law?
   (b) A u-tube differential manometer connects two pressure pipes A & B. Pipe A contains carbon tetrachloride having a specific gravity 1.594 under a pressure of 11.772 N/cm^2 . The pipe a lies 2.5 m above pipe. Find the difference of pressure measured by mercury as fluid filling u-tube 7M

(OR)

4. (a) A tank contains water up to a height of 0.5m above the base. An immiscible liquid of specific gravity 0.8 is filled on the top of water up to 1m height calculate: 7M
   (i) Total pressure on one side of the tank.
   (ii) The position of center of pressure for one side of the tank, which is 2m wide.
   (b) Find the density of a metallic body which floats at the interface of mercury of specific gravity 13.6and water such that 40% of its volume is sub-merged in mercury and 60% in water. 7M

UNIT – III

5. (a) Define the following and give one practical example for each: 8M
   (i) Uniform Flow (iii) Steady flow
   (ii) Laminar flow (iv) Turbulent flow
   (b) A 25 cm diameter pipe carries oil specific gravity 0.9 at a velocity of 3m/s. At another section the diameter is 20cm. Find the velocity at this section and also mass rate of flow of oil. 6M

(OR)

6. (a) Define the equation of continuity. Obtain an expression for continuity equation for a three-Dimensional flow. 8M
   (b) If for a two-dimensional potential flow, the velocity potential is given by $\Phi = x(2y-1)$ 6M
   Determine the velocity at the point P (4,5). Determine also the value of stream function at point P

UNIT – IV

7.	(a)	Water is flowing through taper pipe of length 100m having diameters 600mm at the upper end and 300mm at the lower end, at the rater of 50lit/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2.	6M
	(b)	What is venturimeter? Derive an expression for the discharge through a venturimeter.	8M

(OR)

8.	(a)	Show that in case of forced vortex flow, th rise of liquid level at the end is equal to the fall of liquid level at the axis of rotation.	7M
	(b)	A 45^0 reducing bend is connected in a pipe line, the diameters at the inlet and outlet of the bend being 600mm and 300mm respectively. Find the force exerted by water on the bend if the intensity of pressure at inlet to bend is 8.829 N/cm^2 and rate o flow of water is 600 lit/sec.	7M

UNIT-V

9.	(a)	Find an expression for the drag force on smooth sphere of diameter D, moving with a uniform velocity V in a fluid of density ρ and dynamic viscosity μ.	8M
	(b)	Define and explain Reynold's number, Froude's number and Mach number. Derive expression for any above two number.	6M

(OR)

10.	(a)	State Buckingham's Π theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis.	8M
	(b)	What is meant by geometric, kinematic and dynamic similarities? Define the Weber number.	6M

Q.P. Code: 1801405 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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. Derive an expression for volumetric strain for a rectangular bar which is subjected to three mutually perpendicular tensile stress. **14M**

(OR)

2. **(a)** Draw stress-strain curve for brittle and ductile materials **7M**

(b) A straight bar 500mm long is 25mm diameter for 300mm length and 15mm diameter for the remaining length. If the bar is subjected to an axial pull of 15kN, find the extension of the bar. Take E = 200GPa. **7M**

UNIT – II

3. A simply supported beam of span 10m carries UDL of 10kN/m over a entire length of 4m from left support and also from right support. Draw SFD and BMD **14M**

(OR)

4. **(a)** Explain the following. **7M**
i) Different types of beams. (ii) Different types of loadings.

(b) Draw the bending moment and shear force diagram for the following conditions of beams. **7M**
(i) Simply supported beam with point load (ii) simply supported beam with UDL (iii) Cantilever beam with point load at the free end.

UNIT – III

5. **(a)** How to find out neutral axis of a beam and explain its importance **7M**

(b) A cantilever beam of cross-section 90mm width 120mm deep carries a UDL of 12kN/m over the entire length and a concentrated load of 15kN at the right end. Find the bending stress in the beam when the length of beam is 10m. **7M**

(OR)

6. A circular shaft of 12 cm dia. is subjected to combined bending and twisting moments. The bending moment being three times the twisting moment. If the direct tensile yield point of material is 350 MN/m2 and factor of safety on yield is 4, find the allowable twisting moment by a) Maximum principal stress theory b) Maximum shear stress theory **14M**

UNIT – IV

7. Find the slope and deflection of a Simply supported carrying central concentrated load 'P' using moment area method. **14M**

(OR)

8. A wooden beam 4m long, simply supported at its ends, is carrying a point load of 7.25 kN at its centre. The cross section of the beam is 140mm wide and 240mm deep. If E for the beam =6x103, find the deflection at the centre. **14M**

UNIT-V

9. Mention the assumptions made in pure torsion equation also derive the expression for pure torsion. **14M**

(OR)

10. **(a)** Define the term: Torsion, torsional rigidity and polar moment of inertia. **7M**

(b) A solid shaft of 20mm diameter is used to transmit torque. Find the maximum torque transmitted by the shaft if the maxim um shear stress induced in the shafts is 150N/mm^2 **7M**

Q.P. Code: 1801406 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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 Disaster Preparedness, hazard and Risksseverity?	6M
	(b)	Explain about the stages of disaster preparedness?	8M

(OR)

2.		Explain the steps in Disaster Preparedness?	14M

UNIT – II

3.		Write the Difference between natural and Manmade and Explain about Natural Disasters?	14M

(OR)

4.		List-out various types of Man-made Disasters and Write the causes, preventive measures of Man-made Disasters?	14M

UNIT – III

5.		How the disasters show impact on environmental, economic, social and explain?	14M

(OR)

6.		Explain about demographic aspects?	14M

UNIT – IV

7.		Define Disaster Management and List out the phases of disaster management?	14M

(OR)

8.	(a)	Write a note on Disaster Management cycle	4M
	(b)	Explain phases in Disaster Management of Prevention, Mitigation and preparedness?	10M

UNIT-V

9.		Write the Roles and responsibilities of Government and community regards Disaster Management?	14M

(OR)

10.		what are policies to the reduction of disaster risk	14M

Q.P. Code: 1802403 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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.		Describe the construction and working of PMMC instrument. Derive the equation for deflection if the instrument is spring controlled	14M

(OR)

2.		Discuss the following types of errors in moving iron instruments.	14M

UNIT – II

3.		Explain the dynamometer wattmeter and also derive the expression for deflection and controlling torques.	14M

(OR)

4.		Explain in detail construction and working of single phase induction type energy meter	14M

UNIT – III

5.	(a)	Derive the general equations for balance for an ac bridges	7M
	(b)	Describe the sources and null detectors that are used for ac bridges	7M

(OR)

6.		Describe the working of low voltage Schering bridge. Derive the equations for capacitance and dissipation factor. Draw the phasor diagram of the bridge under conditions of balance.	14M

UNIT – IV

7.	(a)	Define the following terms (a) transformation ratio, nominal ratio, turns ratio, ratio correction factor and burden	10M
	(b)	explain the effect of secondary burden on the ratio and phase errors	4M

(OR)

8.		Draw the equivalent circuits and phasor diagram of a CT. Derive the expression for the ratio and phase angle errors	14M

UNIT-V

9.	(a)	Describe an overview of applications of CRO	7M
	(b)	Describe different parts of CRT	7M

(OR)

10.		Describe different types of sweeps used in CRO. Explain their sphere of applications	14M

Q.P. Code: 1802404 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

SUB: Control Systems (EEE & ECE)

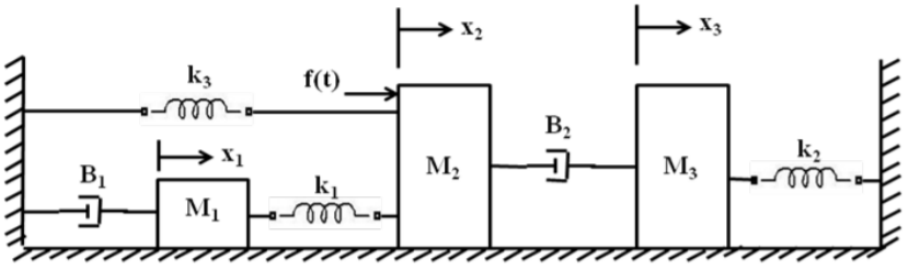
Time: 3 Hours **Max. Marks: 70**

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

UNIT - I

1. (a) Compare open loop and closed loop control system performance **6M**

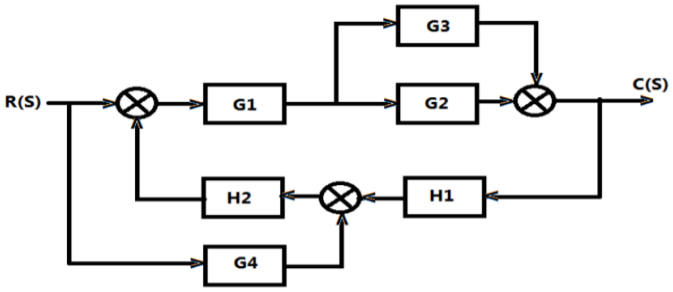
(b) Write the differential equations governing the mechanical system shown in fig.1. **8M**



(OR)

2. (a) Differentiate open loop, closed loop systems and what is the effect of gain in a positive feedback system. **6M**

(b) Determine the overall transfer function $\frac{C(S)}{R(S)}$ of the following system using block diagram reduction method. **8M**



UNIT – II

3. (a) Explain briefly about time domain specifications of a control system **6M**

(b) A unity feedback system is characterized by the open loop transfer function **6M**
G(S)= $\frac{K}{S(S+10)}$ Determine the gain K, so that the system has a damping ratio of 0.5. For this value of K, determine peak time, settling time, peak overshoot.

(OR)

4. Explain the effect PI and PD controller on time response characteristics of a second order systems. **14M**

UNIT – III

5. (a) Explain the general procedure for constructing of Root locus. **8M**

(b) By Routh stability criterion determine the stability of the system represented by characteristics equation $9s^5 - 20s^4 + 10s^3 - s^2 - 9s - 10 = 0$. Comment on the location of characteristic equation. **6M**

(OR)

6. (a) Sketch the construction of root loci for the given loop transfer function. G(S)= $\frac{K}{S(S+1)(s+3)}$. **8M**

(b) Explain the absolute, relative and marginal stability. State the limitations of R- H **6M**

criterion.

UNIT – IV

7. Sketch the Bode plots showing the magnitude in dB and phase angle in degrees as a function of log frequency for the transfer function G(S).H(S)= $\frac{2000}{S(S+1)(S+100)}$. Determine the gain crossover frequency, phase crossover frequency, gain margin and phase margin. Also, determine the gain and the corresponding phase margin for a gain crossover frequency of 50 rad/sec. **14M**

(OR)

8. Sketch the Nyquist plot and there from determine the stability of the closed-loop system whose open-loop transfer function is given by G(S).H(S)= $\frac{K(S+4)}{S^2(S+1)}$. **14M**

UNIT-V

9. **(a)** Define Lead compensator and draw the electrical lead compensator network **8M**

(b) Narrate the conditions when a system requires compensation. **6M**

(OR)

10. **(a)** Explain the realization of Lag Compensator using electrical network and draw the frequency response. **8M**

(b) Explain the Lag compensator design briefly. **6M**

Q.P. Code: 1802405 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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) Discuss in detail about the principle of operation of a 3-phase induction motor 7M
   (b) Compare squirrel cage induction motor and slip ring Induction motor 7M

(OR)

2. (a) Derive the condition for maximum torque of three phase induction motor 7M
   (b) Explain the effect of change supply frequency on torque and speed 7M

UNIT – II

3. (a) Describe the star/delta 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) Using double field revolving field theory explain the torque–slip characteristics of a single phase induction motor. 7M
   (b) Explain the construction and operation of split phase Induction motor 7M

UNIT – III

5. (a) What are the advantages and disadvantages of short pitched and distributed Winding in alternator? 7M
   (b) A 3-phase, 4-pole, 24 slot alternator has its armature coils short pitched by one slot. Determine distribution and pitch factors 7M

(OR)

6. (a) Explain in detail the effect of armature reaction in alternators at various loads and power factors with neat diagrams. 7M
   (b) The following test results were obtained on 6,600 V alternator, 7M

V_{oc} (V)	3100	4900	6600	7500	8300
I_f (A)	16	25	37.5	50	70

A field current of 20 A is sufficient to circulate a full load current on short circuit. Calculate the full load voltage regulation at 0.8 pf lagging by using MMF method.

UNIT – IV

7. (a) Describe slip test method to calculate Xd and Xq in synchronous generator 7M
   (b) Derive the Power output Expression for cylindrical pole synchronous generator

(OR)

8. (a) With relevant equations, explain the load sharing procedure when two alternators are connected in parallel. 7M
   (b) Discuss the effect of change in excitation on parallel operation of two alternators 7M

UNIT-V

9. (a) Explain the starting methods of Synchronous motors? 7M
   (b) A 2000 V, 3- phase, star connected synchronous motor has an effective resistance and synchronous reactance of 0.2Ω and 2.2Ω per phase respectively. The input is 800 kW at normal voltage and the induced line emf is 2500 V. Calculate the line current and power factor. 7M

(OR)

10. (a) What is hunting how to suppress hunting in synchronous machines? 7M
    (b) List out the types of excitations and explain variations of current and power factor. 7M

Q.P. Code: 1802406 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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)	Discuss the terms voltage regulation and transmission efficiency as applied to transmission line	7M
	(b)	Derive the expressions for regulation and efficiency of a short transmission line. Draw required circuit and phasor diagram.	7M
		(OR)	
2.	(a)	Derive expressions for ABCD constants for lossless long transmission line. Assume distributed parameters for the line.	7M
	(b)	What is the importance of propagation constant in the transmission lines?	7M
		UNIT – II	
3.	(a)	Show that the per unit equivalent impedence of a two winding transformer is the same whether the calculations is made from H.V. side or the L.V. side.	7M
	(b)	Write down the steps necessary to convert system parameters into per unit values	7M
		(OR)	
4.	(a)	Write the advantages of Per Unit form of representation	6M
	(b)	A synchronous generator is rated at 150MVA, 22kV has a reactance of 0.25 p.u and is connected to an over head line through a transformer rated 200 MVA, 230/18 kV star delta with Xp.u is 0.21. Find the p.u reactance by considering the (i) generator ratings and (ii) transformer ratings as base values.	8M
		UNIT – III	
5.	(a)	What is the significance of reactance in symmetrical fault analysis	7M
	(b)	Derive the expression for the short circuit current during the transients in the power system	7M
		(OR)	
6.	(a)	Explain how a synchronous generator is represented in short circuit analysis	7M
	(b)	By drawing the current wave form of the alternator under short circuit derive the relation between transient, sub transient and steady state reactance.	7M
		UNIT – IV	
7.	(a)	What is a 3-Phase unsymmetrical fault? Discuss the different types of unsymmetrical faults that occur in a 3-Phase system	8M
	(b)	The per unit values of positive, negative and zero sequence reactances of a network at fault are 0·08, 0·07 and 0·05. Determine the fault current if the fault is double line-to ground fault.	6M
		(OR)	
8.	(a)	Derive the necessary equations to determine the fault current for a double line to ground fault.	7M
	(b)	Express unbalanced phase currents in a 3-φ system in terms of symmetrical components	7M
		UNIT-V	
9.	(a)	With the help of a neat flow chart, explain the Newton-Raphson method of load flow solution	7M
	(b)	Compare G-S method and N- R methods of load flow solutions	7M
		(OR)	
10.	(a)	Explain the procedure to modify the ZBus when an element is added to the existing network.	7M
	(b)	Derive the basic equations for the load flow study using Gauss-Seidel method. With respect to this method, explain the following: i) Acceleration factor. ii) Handling of PV buses.	7M

Q.P. Code: 1803401 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Describe with a suitable sketch the two stroke cycle spark ignition engine. 7M
   (b) Discuss battery ignition system with a suitable sketch 7M

(OR)

2. (a) How to tell a two stroke cycle engine from a four stroke cycle engine 7M
   (b) 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 2.78 liters. When the engine is running at 135rpm, indicated mean effective pressure was 5.2bar and gas consumption 8.8 m^3/hour if the calorific value of the gas is 16350KJ/m^3. Find i) Air standard efficiency ii) Indicated power developed by the engine iii) Indicated thermal efficiency of the engine 7M

UNIT – II

3. (a) What do you mean by multistage compressor? State its advantages 7M
   (b) A two stage air compressor with complete inter cooling delivers air to the mains at a pressure of 30 bar, suction conditions being 1 bar and 15^0 C. If both cylinders have the same stroke, find the ratio of cylinder diameter for the efficiency of compression of to be maximum. Assume the index of compression to be 1.3 7M

(OR)

4. (a) Prove that the volumetric efficiency of the single stage compressor is given by 7M

$$n_v = 1 + K - K\left(\frac{P_2}{P_1}\right)^{\frac{1}{n}} \text{ where } K = \frac{V_c}{V_S}$$

   (b) Distinguish between reciprocating air compressor and rotary air compressor 7M

UNIT – III

5. (a) Explain with a neat sketch the construction and working of Lamont boiler 7M
   (b) The following data were taken during the test on a boiler for a period of one hour. Steam generated 5000kg, coal burnt 700kg, calorific value of coal 31402kj/kg, quality of stream 0.92, if the boiler pressure is 1.2 Mpa and feed water temperature is 45^0 C, find the boiler equivalent evaporating and efficiency 7M

(OR)

6. (a) Distinguish between high pressure boilers and low pressure boilers 7M
   (b) Enumerate various accessories normally used in a steam generating plant 7M

UNIT – IV

7. (a) What do you mean by super saturated flow? Explain with the help of a h-s diagram 7M
   (b) Derive the expression for the mass of steam discharged through a nozzle 7M

(OR)

8. (a) What are the sources of air in the condenser? Explain the effects of air leakage in a condenser. 7M
   (b) Distinguish between jet condenser and surface condenser 7M

UNIT-V

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

(b) In a simple impulse turbine the nozzles are inclined at 20^0 to the direction of motion of the moving blades. The steam leaves the nozzle at 375 m/s. The blade velocity 165 m/s. Calculate suitable inlet and outlet angles for the blades in order that the axial thrust is zero. The relative velocity of the stream as it flows over the blades is reduces by the 15% by friction. Also, determine the power developed by flow rate of 10 kg/s 7M

(OR)

10. The following data relates to a stage of an impulse reaction turbine. Steam velocity coming out nozzle = 245m/s, nozzle angle = 20^0, the blade mean speed = 145 m/s, speed of rotor = 300 r.p.m, blade height = 10 cm, specific volume of steam at nozzle outlet and blade outlet respectively 3.45 m^3/kg and 3.95 m^3/kg, power developed by the turbine 287 kw, efficiency of the nozzle and blades combindely 90%, carrying over co-efficient 0.82. Find a) heat drop in each stage, b) degree of reaction, c) stage efficiency 14M

Q.P. Code: 1803402 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Briefly explain the principle employed in the manometers used for the measurement of pressure. 7M
   (b) State the advantages of mechanical pressure gauges over the manometers. 7M

(OR)

2. Describe with the help of neat sketches, two different types of manometers. 14M

UNIT – II

3. Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC and the velocity in CE 14M

(OR)

4. Derive Bernoulli's equation of motion. 14M

UNIT – III

5. (a) Derive an expression for the loss of head due to sudden contraction of a pipe. 10M
   (b) Describe the characteristics of laminar and turbulent flows. 4M

(OR)

6. Derive Darcy Weisbach equation. 14M

UNIT – IV

7. State the assumptions under which the boundary layer equations for flow over a flat plate are valid. Explain with a neat sketch the boundary layer characteristics when a fluid is flowing over a flat plate. 14M

(OR)

8. (a) Describe the characteristics of boundary layer with reference to flow over a flat plate. 7M
   (b) What is meant by boundary layer separation? What is the effect of pressure gradient on boundary layer separation? 7M

UNIT-V

9. Derive an expression for the force exerted on a sub-merged vertical plane surface by the static liquid and locate the position of center of pressure 14M

(OR)

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

Q.P. Code: 1803403 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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.	**(a)**	Explain different kinds of kinematic pairs giving example for each one of them.	**8M**
	(b)	Explain the term kinematic link. Give the classification of kinematic link.	**6M**

(OR)

2.	**(a)**	Explain the terms: 1. Lower pair, 2. Higher pair, 3. Kinematic chain, and 4. Inversion.	**6M**
	(b)	Sketch and explain the working of Elliptical trammel.	**8M**

UNIT – II

3.		What are straight line mechanisms? Describe one type of exact straight line motion mechanism with the help of a sketch.	**14M**

(OR)

4.		What is the condition for correct steering? Sketch and show the Davis steering gear mechanism and discuss their relative advantages.	**14M**

UNIT – III

5.		The crank and connecting rod of a theoretical steam engine are 0.5 m and 2 m long respectively. The crank makes 180 r.p.m. in the clockwise direction. When it has turned 45° from the inner dead centre position, determine: 1. velocity of piston, 2. angular velocity of connecting rod, 3. velocity of point E on the connecting rod 1.5 m from the gudgeon pin, 4. velocities of rubbing at the pins of the crank shaft, crank and crosshead when the diameters of their pins are 50 mm, 60 mm and 30 mm respectively.	**14M**

(OR)

6.	**(a)**	State and prove the 'Aronhold Kennedy's Theorem' of three instantaneous centers'.	**4M**
	(b)	Explain with sketch the instantaneous centre method for determination of velocities of links and mechanisms	**10M**

UNIT – IV

7.	**(a)**	Explain with sketches the different types of cams and followers.	**6M**
	(b)	Draw the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion.	**8M**

(OR)

8.		A cam is to give the following motion to a knife-edged follower : 1. Outstroke during 60° of cam rotation ; 2. Dwell for the next 30° of cam rotation ; 3. Return stroke during next 60° of cam rotation, and 4. Dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when (a) the axis of the follower passes through the axis of the cam shaft, and (b) the axis of the follower is offset by 20 mm from the axis of the cam shaft.	**14M**

UNIT-V

9.	**(a)**	Explain the terms: (i) Module, (ii) Circular pitch (iii) Addendum and iv) Diametral pitch	**6M**
	(b)	State and prove the law of gearing. Show that involutes' profile satisfies the conditions for correct gearing.	**8M**

(OR)

10.		In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively. If the arm rotates at 150 r.p.m. in the anticlockwise direction about the centre of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed makes 300 r.p.m. in the clockwise direction, what will be the speed of gear	**14M**

Q.P. Code: 1803405 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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)**	Define measurement and explain its significance in our day to day life.	**7M**
	(b)	Explain the various elements of generalized measurement system with a neat sketch.	**7M**
		(OR)	
2.	**(a)**	Explain the dynamic characteristics of the measurement system.	**7M**
	(b)	How instruments are classified? Explain.	**7M**
		UNIT – II	
3.	**(a)**	Explain the working of Mcleod pressure gauge with neat diagram.	**7M**
	(b)	Explain the working principle of thermocouple with a block diagram.	**7M**
		(OR)	
4.	**(a)**	List out various types of manometers used for pressure measurement and discuss their specific characteristics.	**7M**
	(b)	Explain the working of a capacitive transducer for the measurement of displacement.	**7M**
		UNIT – III	
5.	**(a)**	Explain the working of Non-contact electrical tachometer with neat sketch.	**7M**
	(b)	Explain the working of accelerometer with neat sketch.	**7M**
		(OR)	
6.	**(a)**	Give a brief explanation on working of capacitive level indicator with a neat sketch.	**7M**
	(b)	Write a short note on the Laser Doppler Anemometer (LDA).	**7M**
		UNIT – IV	
7.	**(a)**	Discuss the various types of strain gauges for different applications.	**7M**
	(b)	List out the main advantages of semi-conductor strain gauges.	**7M**
		(OR)	
8.	**(a)**	Explain in detail, the working of Rectangular strain gauge rosettes.	**7M**
	(b)	Explain the method of usage of resistance strain gauges for bending, compressive and tensile strains.	**7M**
		UNIT-V	
9.	**(a)**	Explain the working of load cells with neat sketch and give its usages.	**7M**
	(b)	Compare between open loop and closed loop control systems.	**7M**
		(OR)	
10.	**(a)**	How can you detect the moisture content of gases and explain any one method of it.	**7M**
	(b)	Explain the working of rope brake dynamometer with neat sketch.	**7M**

Q.P. Code: 1804402 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Discuss the relative frequency approach and axiomatic approach of probability. 7M

   (b) One Indian and four American men and their wives are to seated randomly around a circular table. Then what is the conditional probability that the Indian man is seated adjacent to his wife given that each American man is seated adjacent to his wife? 7M

(OR)

2. (a) State and prove Bayes' theorem. 7M

   (b) A random variable X has an exponential probability distribution function given by $f_X(x) = a\, e^{-b|x|}$, where a and b are constants. Find i) the relationship between a and b ii) The distribution function of x. 7M

UNIT – II

3. (a) Find the mean and variance of binomial distribution function. 7M

   (b) Consider that probability density function of a random variable X is 7M

$$f_X(x) = \begin{cases} \frac{1}{K} & -2 \le x \le 3 \\ 0 & elsewhere \end{cases}$$

   and another random variable $Y = 2X$. Then find i) $E[X]$ and ii) $E[Y]$.

(OR)

4. (a) The probability distribution function of random variable X is $P(X) = \frac{2}{3}\left(\frac{1}{3}\right)^x, x = 0,1,2,\ldots.\infty$. Find its first and second moments. 7M

   (b) Explain the concept of Non-Monotonic transformation of a random variable X. 7M

UNIT – III

5. (a) Joint probability density function of X and Y is $f_{X,Y}(x,y) = \frac{1}{4}\, e^{-|x|-|y|}$. 7M

   i) Are X and Y statistically independent random variables?

   ii) Calculate the probability for $X \le 1$ and $Y \le 0$.

   (b) Define and explain any three properties of conditional density function with regard to random variables X and Y. 7M

(OR)

6. (a) State and prove any four properties of the covariance. 7M

   (b) Gaussian random variables X_1 and X_2 whose $\bar{X}_1 = 2, {\sigma_{X_1}}^2 = 9, \bar{X}_2 = -1, {\sigma_{X_2}}^2 = 4$ and $C_{X_1X_2} = -3$ are transformed to new random variables Y_1 and Y_2 such that $Y_1 = -X_1 + X_2$ and $Y_2 = -2X_1 - 3X_2$. Find i) $\overline{X_1^2}$ ii) $\overline{X_2^2}$ iii) $\rho_{X_1X_2}$ iv) ${\rho_{Y_1}}^2$ v) ${\rho_{Y_2}}^2$ vi) $C_{Y_1Y_2}$ and vii) $\rho_{Y_1Y_2}$. 7M

UNIT – IV

7. (a) Explain how the random processes are classified. 7M

(b) Two random processes are defined as 7M
$X(t) = A\ \cos(\omega t + \theta)\ \ and\ Y(t) = B\ \sin(\omega t + \theta)$ where θ is a uniform random variable on $(0,2\pi)$, and $A, B\ and\ \ \omega$ are constants. i) Find the cross-correlation function $R_{XY}(t, t+\tau)$ and ii) Verify $X(t)\ and\ Y(t)$ are jointly wide sense stationary or not.

(OR)

8. (a) Prove that power spectral density and autocorrelation functions are a fourier transform pair. 7M

(b) Two independent random processes $X(t)$ and $Y(t)$ have power spectral densities $S_{XX}(\omega) = \frac{16}{\omega^2+16}$ and $S_{XY}(\omega) = \frac{\omega^2}{\omega^2+16}$ respectively with zero means. Let another random process $U(t) = X(t) + Y(t)$.Then find i) Power spectral density of $U(t)$ ii) $S_{XY}(\omega)$ and iii) $S_{XU}(\omega)$. 7M

UNIT-V

9. (a) Derive the relation between power spectral densities of input and output random processes of an LTI system. 7M

(b) A random noise $X(t)$ having the power spectrum $S_{XX}(\omega) = \frac{3}{\omega^2+49}$ is applied to a network for which $h(t) = u(t)\ t^2\ e^{-7t}$. The network response is denoted by $Y(t)$.i) What is the average power in $X(t)$ ii) Find the power spectrum of $Y(t)$. 7M

(OR)

10. (a) Define the following random processes. 7M
i) Band pass ii) Band limited and iii) Narrow band

(b) Find the noise band width of a system having the transfer function $|H(\omega)|^2 = \frac{1}{1+\left(\frac{\omega}{\omega_o}\right)^4}$, 7M
where ω_o is a real constant.

Q.P. Code: 1804403 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Define f_β and f_T and derive the relation between f_β and fT. 8M
   (b) For a single stage CE amplifier whose hybrid Π parameters are given below. What value of Rs will give 3 dB frequency fH' which is half the value obtained with Rs=0. Hybrid 'Π' parameters are: gm=50 mA/V, rbb′=100Ω, rb′e=1 K Ω, CC=3 pF, Ce=100 pF. 6M

(OR)

2. (a) Draw the high-frequency equivalent circuit diagram of FET and derive the expression for short circuit current gain A and transition frequency. 7M
   (b) Analyze the high frequency model of Common Drain FET amplifier. 7M

UNIT – II

3. (a) Discuss the effect of biasing network and coupling capacitors on the frequency response of an amplifier. 8M
   (b) The high-pass RC circuits act as differentiator. Justify your answer. 6M

(OR)

4. (a) Demonstrate about the capacitor-coupled amplifier and derive its gain. 6M
   (b) Draw the circuit diagram of two stages RC-coupled Amplifier using BJT and its equivalent circuit. Derive the expression for its overall voltage gain. 8M

UNIT – III

5. (a) Define feedback. Prove that the bandwidth of the amplifier increases with negative feedback. 6M
   (b) Draw the block diagrams of different types of negative feedback amplifiers illustrating the sampling of signals at the output port and mixing of signals at the input port. 8M

(OR)

6. (a) Draw the circuit diagram of Wein bridge oscillator. Explain the need for providing both positive and negative feedbacks. 6M
   (b) Derive an expression for frequency of oscillations of RC phase shift oscillator. 8M

UNIT – IV

7. (a) In series fed Class-A power amplifier, explain the importance of the position of operating point on output signal swing. Show that the conversion efficiency is 25%. 7M
   (b) Draw the complimentary symmetry Class-B power amplifier and explain its operation. 7M

(OR)

8. (a) Draw the circuit diagram of a double-tuned amplifier and derive the expression for 3-dB bandwidth. 7M
   (b) Elaborate the effect of cascading single tuned amplifiers on bandwidth. 7M

UNIT-V

9. (a) Implement a negative NOR DTL gate. 7M
   (b) Compare IIL, ECL, MOS and CMOS logic families. 7M

(OR)

10.	(a)	Define positive logic. Draw and explain the operation of NOT and OR gates using diode positive logic.	8M
	(b)	List out the advantages and disadvantages of DCTL gates.	6M

Q.P. Code: 1804405 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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 different DC Characteristics of an Op-amp	9M
	(b)	Compare different differential amplifier Configurations	5M
		(OR)	
2.	(a)	Explain different AC Characteristics of an Op-amp	7M
	(b)	Explain the operation Level Translator with relevant mathematical expressions	7M
		UNIT – II	
3.	(a)	Explain the operation of ideal differentiator with the help of circuit and frequency response characteristics	7M
	(b)	What are the problems associated with the above circuit? Explain how they are overcome in a practical differentiator	7M
		(OR)	
4.	(a)	Explain the operation of precision Half wave rectifier	7M
	(b)	Design a summing amplifier to add three DC input Voltages. The output of the circuit must be equal to two times the negative sum of the inputs	7M
		UNIT – III	
5.	(a)	Explain the operation of triangular wave generator using op-amp and derive the expression for frequency of oscillations	9M
	(b)	Explain the operation of first order LPF using op-amp	5M
		(OR)	
6.	(a)	Explain the operation of Monostable multivibrator using op-amp and derive the expression for pulse width.	9M
	(b)	What are the advantages of Active filters over Passive filters	5M
		UNIT – IV	
7.	(a)	Design a RC phase shift oscillator so that f_0 = 1kHz	7M
	(b)	Explain the functional diagram of IC 555 timer	7M
		(OR)	
8.	(a)	Design a symmetrical square wave generator using 555 timer of frequency 10KHz	7M
	(b)	Explain the operation of PLL	7M
		UNIT-V	
9.	(a)	Explain the operation of 3-bit flash type ADC	6M
	(b)	Draw the circuit diagram of 4-bit R-2R ladder DAC and derive the expression for output voltage	8M
		(OR)	
10.	(a)	Explain Dual slope ADC with neat diagram and relevant mathematical expressions	7M
	(b)	Draw the circuit diagram of 4-bit Inverted R-2R DAC and derive the expression for output voltage	7M

Q.P. Code: 1804406 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Two charges $Q1 = 2\mu C$ and $Q2 = 5\mu C$ are located at (– 3, 7,– 4) and (2, 4, – 1), respectively. Determine the force on $Q2$ due to $Q1$ and the force on $Q1$ due to $Q2$ 7M
   (b) Using Gauss's law, derive the expressions for electric field intensity and electric flux density due to an infinite sheet of conductor of charge density ρ_s C/m^2 7M

(OR)

2. (a) State Gauss's law. Using divergence theorem and Gauss's law, relate the displacement density ' D' to the volume charge density ρ_v 5M
   (b) Derive an expression for Capacitance of a Coaxial Cable 9M

UNIT – II

3. (a) Derive an expression for magnetic field strength, H, due to a current carrying conductor of finite length. 10M
   (b) State Ampere's circuital law. Specify the conditions to be met for determining magnetic field strength H based on Ampere's circuital law 4M

(OR)

4. (a) Explain the concept of Magnetic Scalar and Vector Potential 4M
   (b) A charge of 12 C has velocity of $5a_x + 2a_y - 3a_z$ m/s. Determine force F on the charge in the field of 10M
   (i) $E = 18a_x + 5a_y + 10a_z$ V/m (ii) $B = 4a_x + 4a_y + 3a_z$ Wb/m^2.

UNIT – III

5. (a) Derive the boundary conditions for the tangential and normal components of time varying fields at the boundary between two perfect dielectrics 10M
   (b) Show that the displacement current in a capacitor is equal to the conduction current 4M

(OR)

6. (a) Write Maxwell's equations in different final forms and in word Statements 7M
   (b) If $E = 10Cos(wt - kz)a_x$ V/m, find Electric Flux density (D), Magnetic field Intensity (H) and Magnetic flux density (B) in free space. 7M

UNIT – IV

7. (a) Define uniform plane wave. Prove that uniform plane wave does not have field component in the direction of propagation 8M
   (b) Derive the expression for surface impedance of a conductor 6M

(OR)

8. (a) Explain oblique incidence wave propagation with perpendicular polarization 8M
   (b) Explain skin depth and derive an expression for depth of penetration for good conductor 6M

UNIT-V

9. (a) Derive an expression for characteristic impedance of transmission line 7M
   (b) What is a Smith Chart? and also explain the various applications of smith chart in Transmission line 7M

(OR)

10. (a) Explain about different types of transmission lines and write the applications of 7M

transmission lines

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

Q.P. Code: 1805403 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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)	What is computer? Write about digital computer	7M
	(b)	Illustrate Arithmetic addition and subtraction	7M
		(OR)	
2.	(a)	Describe control unit in detail	5M
	(b)	Explain about IEEE floating point representation with example	9M
		UNIT – II	
3.	(a)	Draw the interconnections of four full-adders (FA) to provide a 4-bit binary adder	7M
	(b)	Write about the Circular shift in detail	7M
		(OR)	
4.		Summarize 4-bit arithmetic circuit in detail	14M
		UNIT – III	
5.		What is addressing mode? Briefly explain various addressing modes.	14M
		(OR)	
6.	(a)	Compare and contrast between the hardwired and micro programmed control units.	7M
	(b)	Draw the flow chart for division algorithm?	7M
		UNIT – IV	
7.		How Cache memory is helpful in improve system performance? Explain	14M
		(OR)	
8.	(a)	Explain Four-Segment Instruction Pipeline.	7M
	(b)	Write a shot note on Parallel Processing	7M
		UNIT-V	
9.	(a)	Enumerate Modes of Transfer in detail	7M
	(b)	Demonstrate how priority Interrupt is handled.	7M
		(OR)	
10.		Summarize the following (i) Input- Output Interface (ii) Asynchronous data transfer	14M

Q.P. Code: 1805404 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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)	Define operating system. Explain the various functions of operating systems.	7M
	(b)	What is system program? List and explain the various categories of system programs.	7M
		(OR)	
2.	(a)	What is a System Call and Explain the types of System Calls in Operating Systems?	7M
	(b)	Write in detail about Dual Mode of Operation?	7M
		UNIT – II	
3.	(a)	Define Process? Explain various states associated with the Process State diagram?	7M
	(b)	What are semaphores? Explain solution to producer-consumer problem using semaphores.	7M
		(OR)	
4.	(a)	What is multithreading? Explain the thread libraries in detail.	7M
	(b)	What is critical section? Write Peterson's solution for critical section problem.	7M
		UNIT – III	
5.	(a)	Explain any two Page Replacement Algorithms with suitable examples.	7M
	(b)	What is Demand Paging? Explain in detail with suitable example.	7M
		(OR)	
6.	(a)	Define Paging? Explain the structure of Page Table.	7M
	(b)	Differentiate among Preemptive and Non Preemptive Scheduling	7M
		UNIT – IV	
7.	(a)	Explain file system mounting operation in detail.	7M
	(b)	Explain the method used for implementing directories.	7M
		(OR)	
8.	(a)	Define deadlock. List and explain the four conditions for occurring a deadlock in the system.	7M
	(b)	Explain the deadlock avoidance with the help of Banker's algorithm.	7M
		UNIT-V	
9.	(a)	Explain about Access Matrix	7M
	(b)	Explain any two techniques for implementing access matrix.	7M
		(OR)	
10.	(a)	Discuss network threats and its protection mechanisms required for operating system in detail.	7M
	(b)	What is user authentication? Explain the various approaches for user authentication.	7M

Q.P. Code: 1805405 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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. (a) what is an algorithm? And write its criteria's. 4M
   (b) Define a time complexity? And using Frequency table method to analyze the time complexity of sum of subset algorithm 10M

(OR)

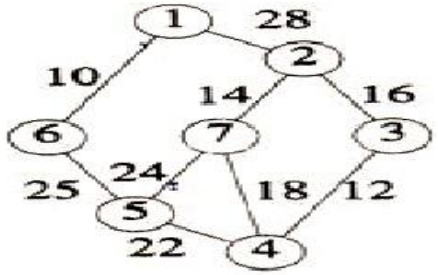
2. (a) What is an asymptotic notation? And write different types of notations with an example? 7M
   (b) Explain Weighted Union and Collapsing Find algorithms with example. 7M

UNIT – II

3. Write an algorithm for merge sort and solve for 310,285,179,652,351,423,861,254,450,520 14M

(OR)

4. What is minimum cost spanning tree? Explain the krushkal's algorithm and to generate shortest path the following graph using Greedy method? 14M



UNIT – III

5. Consider 4 elements (a 1 ,a 2 , a 3 ,a 4) = (do, if , read, while) with P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1) then construct the table of values of w_{ij}, r_{ij}, c_{ij} and also construct OBST as minimum cost tree. 14M

(OR)

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

UNIT – IV

7. Define connected component? Explain about biconnected component and DFS with an example. 14M

(OR)

8. (a) What is back tracking? Explain n-queens problem and draw the state space tree? 10M
   (b) Explain about Graph coloring with example. 4M

UNIT-V

9. Explain travelling salesperson problem and Obtain the optimal tour for following weight matrix and find the cost of tour. 14M

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

(OR)

10. (a) Discuss in detail about NP,NP-HARD and NP- Complete problem. Give examples 7M
    (b) State and Prove Cook's theorem 7M

Q.P. Code: 1805406 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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)**	List the OOP concept and discuss about them	7M
	(b)	Explain about access controls in java	7M
		(OR)	
2.	**(a)**	Explain Overloading methods in Java with example program.	7M
	(b)	Write briefly about Java buzzwords	7M
		UNIT – II	
3.		How to create multilevel hierarchy with inheritance explain with suitable example	14M
		(OR)	
4.	**(a)**	Explain about creating and accessing a package with one example	7M
	(b)	Discuss about implementing interface with an example	7M
		UNIT – III	
5.	**(a)**	Explain the process of Exception Handling in java.	7M
	(b)	Demonstrate with an example about nested try statements	7M
		(OR)	
6.		What are the two approaches for thread synchronization explain each one with an example.	14M
		UNIT – IV	
7.	**(a)**	Write about Mouse and Key events in java	7M
	(b)	Explain about adapter class with an example	7M
		(OR)	
8.		List out the different types of layout managers and explain them.	14M
		UNIT-V	
9.	**(a)**	Explain in detail about applet life cycle with neat sketch	7M
	(b)	How to passing parameters to applet explain with example	7M
		(OR)	
10.	**(a)**	Write about JFrames and JComponents in swings.	7M
	(b)	Explain Checkboxes and Radio button in swings with example program.	7M

Q.P. Code: 1805407 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. 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)	Define Finite Automate and Transition Diagram?	7M
	(b)	Explain Finite state machine with example diagram?	7M
		(OR)	
2.	(a)	Define NFA. What are the differences between DFA & NFA?	7M
	(b)	Illustrate Deterministic finite automaton and Non Deterministic finite automaton?	7M

UNIT – II

3.	(a)	Explain about Arden's theorem, for constructing the RE from a FA with an example?	14M
		(OR)	
4.		Define Regular Expressions? Elaborate the procedure for converting Regular Expression to Finite Automata with suitable example?	14M

UNIT – III

5.		Define the Following: (i) Regular grammars (ii) Context free grammar (iii) derivation trees (iv) sentential forms (v) Right most and leftmost derivation of strings.	14M
		(OR)	
6.	(a)	Define Ambiguous grammar with example?	7M
	(b)	Explain about Chomsky normal form with example?	7M

UNIT – IV

7.	(a)	Define PDA. Design a PDA for equal number of a's and b's.	7M
	(b)	Convert the following CFG to a PDA. S ->aAA , S->aS/bS/a	7M
		(OR)	
8.		Construct PDA from the following Grammar. S-> aB B-> bA/b A-> aB	14M

UNIT-V

9.	(a)	Define Turing Machine? Explain the various types of Turing machine?	7M
	(b)	Explain Universal Turing machine?	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 - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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)	Convert the following into decimal and then to binary (i) 1101_{16} (ii) $ABCDE_{16}$	8M
	(b)	Add and Multiply the following numbers in the given base without converting to decimal (i) 123_4 and 321_4 (ii) 567_8 and 234_8	6M
		(OR)	
2.	(a)	Subtract $(EEE)_{16}$ from $(ECE)_{16}$ using two's complement method	6M
	(b)	Explain binary codes with examples	8M
		UNIT – II	
3.	(a)	Implement the Boolean function F = xy + x'y' +y'z with AND and NOT gates only	8M
	(b)	Simplify the following algebraic expression (X' + XYZ') + (X' + XYZ') (X+X'Y'Z)	6M
		(OR)	
4.		Implement the Boolean function F(A, B, C, D) = A'B' + C'D' + B'C' using the following two level gates: (i) NAND - AND (ii) NOR - OR	14M
		UNIT – III	
5.	(a)	Explain Binary Adder - Subtractor with neat block diagram	7M
	(b)	Design a combinational circuit which leads 3 bit input data and outputs square of the input	7M
		(OR)	
6.	(a)	Design and draw logic diagram of Full Subtractor using two half subtractors	7M
	(b)	Using 8 to 1 Multiplexer, realize the Boolean function $T = f(w, x, y, z) = \sum(0, 1, 2, 4, 5, 7, 8, 9, 12, 13)$	7M
		UNIT – IV	
7.		Design a mod-10 synchronous counter using JK flip flops. Write the excitation table and state table	14M
		(OR)	
8.	(a)	Draw and explain the operation of RS flip-flop	7M
	(b)	Design and draw the 3-bit up-down synchronous counter	7M
		UNIT-V	
9.	(a)	Design a BCD to Excess-3 code converter using ROM	6M
	(b)	Explain about the Semiconductor Memories	8M
		(OR)	
10.	(a)	Explain about PLA and PAL	7M
	(b)	Distinguish SRAM and DRAM	7M

Q.P. Code: 1814404 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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)	Explain forward bias and reverse bias operations in PN junction diode.	7M
	(b)	Explain V-I Characteristics of a P-N Junction diode.	7M
		(OR)	
2.	(a)	Find out the Efficiency, Ripple factor, Peak Inverse voltage of Full wave rectifier and Bridge wave Rectifier?	8M
	(b)	Explain the working principles of photo diode along with applications.	6M

UNIT – II

3.	(a)	Explain the operation of PNP transistor.	6M
	(b)	Explain the input and output characteristics of common Emitter configuration.	8M
		(OR)	
4.	(a)	Discuss the relationship between I_B, I_E and I_C in CB characteristics.	8M
	(b)	How transistors act as switch? Discuss with neat diagram.	6M

UNIT – III

5.	(a)	Discuss output characteristics of JFET.	8M
	(b)	Explain the operation of JFET with neat diagram.	6M
		(OR)	
6.	(a)	Explain the operation of JFET in CG configuration with neat diagram.	8M
	(b)	How JFET act as Amplifier?	6M

UNIT – IV

7.	(a)	What is an oscillator? Explain the principle of feedback oscillator.	6M
	(b)	Draw th circuit diagram of RC phase shift oscillator and explain its working.	8M
		(OR)	
8.	(a)	Explain how a quartz crystal behaves as a waveform network.	4M
	(b)	Draw th circuit diagram of Colpitts oscillator and explain its working.	10M

UNIT-V

9.	(a)	Explain the major parts of CRT with a block diagram.	8M
	(b)	Define voltmeter sensitivity. What is the loading effect of a DC voltmeter?	6M
		(OR)	
10.	(a)	Discuss briefly Deflection sensitivity, Electrostatic deflection and Magnetic deflection.	6M
	(b)	Discuss how voltage and frequency can be measured using CRO.	8M

Q.P. Code: 1821401 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) Show that (i) $Cos\,(x\,sin\theta) = J_0 + 2(J_2 cos2\theta + J_4 cos4\theta + \cdots)$. 7M

   (ii) $Sin\,(x\,sin\theta) = 2(J_1 sin\theta + J_3 sin3\theta + J_5 sin5\theta \ldots)$.

   (b) Express $x^3 + 2x^2 - x - 3$ in terms of Legendre polynomials. 7M

(OR)

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

   (b) Show that $\frac{d}{dx}[x^n J_n(x)] = x^n J_{n-1}(x)$. 7M

UNIT – II

3. (a) Find all the values of *k* such that $f(z) = e^x(cosky + i\,sinky)$ is analytic. 7M

   (b) Show that $f(z) = \dfrac{x^3(1+i) - y^3(1-i)}{x^2+y^2}\,(z \neq 0)$ and $f(0) = 0$, is continuous and satisfies C-R equation at origin but not differentiable at origin. 7M

(OR)

4. (a) Show that the function $f(z) = e^{2x}(x\,cos2y - y\,sin2y)$ is harmonic and find its conjugate. 7M

   (b) If $f(z)$ is an analytic function of z, then prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|Ref(z)|^2 = 2|f'(z)|^2$. 7M

UNIT – III

5. (a) Discuss about the transformations $w = z + \frac{1}{z}$. 7M

   (b) Find the bilinear transformation which maps the points $1-2i, 2+i, 2+3i$ into the points $2+i, 1+3i, 4$. 7M

(OR)

6. (a) Show that the image of the hyperbola $x^2 - y^2 = 1$ under the transformation $w = \frac{1}{z}$ is the lemniscate $\rho^2 = cos2\varphi$. 7M

   (b) Find the region in W-plane in which the rectangle bounded by the lines $x = 0, y = 0, x = 2\ and\ y = 1$ is mapped under the transformation $w = z + 2 + 3i$. 7M

UNIT – IV

7. (a) Evaluate $\oint_C \frac{e^{2z}}{(z+1)^3}\,dz$, where $C: |z| = 2$, using Cauchy's Residue theorem. 7M

   (b) Evaluate $\int_{(1,1)}^{(2,8)}(x^2 + ixy)dz$ along the straight line from $(1,1)\ to\ (2,8)$. 7M

(OR)

8. (a) Evaluate $\int_{(0,0)}^{(1,3)} 3x^2y\,dx + (x^3 - 3y^2)\,dy$ along the line $y = 3x$. 7M

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

UNIT-V

9. (a) Show that $\int_0^\infty \frac{Cosmx}{x^2+1}\,dx = \frac{\pi}{2}e^{-m}(a > 0)$. 7M

(b) Evaluate $\oint_c \frac{12z-7}{(z-1)^2(z+2)}\,dz$, where $C: |z| = \frac{3}{2}$, using Cauchy's Residue theorem. 7M

(OR)

10. (a) Show that $\int_0^{2\pi} \frac{1}{2-Cos\theta}\,d\theta = \frac{2\pi}{\sqrt{3}}$. 7M

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

Q.P. Code: 1821402 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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) A die is tossed thrice. A success is 'getting 1 or 6' on a toss. Find the mean and variance of the number of successes. 7M

   (b) A variate X has the probability distribution 7M

x :	-3	6	9
$P(X=x)$:	1/6	1/2	1/3

   Find $E(X)$ and $E(X^2)$. Hence evaluate $E(2X+1)^2$.

(OR)

2. The probability density $p(x)$ of a continuous random variable is given by 14M

   $p(x) = y_0 e^{-|x|}, -\infty < x < \infty$. Prove that $y_0 = \frac{1}{2}$. Find the mean and variance of the distribution.

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) In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10, use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets. 7M

(OR)

4. In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find (i) how many students score between 12 & 15? (ii) how many score above 18? (iii) how many score below 8? (iv) how many score 16? 14M

UNIT – III

5. (a) The means of two samples of sizes 1000 and 2000 are 67.5 and 68.0 cm respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 cm. 7M

   (b) In a city A 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant ? 7M

(OR)

6. (a) Explain two tailed test. 7M

   (b) Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After the increase in duty, 800 people were consumers of tea in a sample of 1200 persons. Find whether there is a significant decrease in the consumption of tea after the increase in duty. 7M

UNIT – IV

7. (a) A sample of 20 items has mean 42 units and standard deviation 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units. 7M

(b) Two samples of sizes 9 and 8 gave the sums of squares of deviations from their respective means equal to 160 and 91 respectively. Can they be regarded as drawn from the same normal population? 7M

(OR)

8. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees. 14M

Employees / Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

UNIT-V

9. (a) Define SQC and write its advantages. 7M

(b) The following data provides the number of defective bolts which were found in an inspection of 10 samples of 100 bolts each. Construct the fraction defective chart by obtaining the UCL and LCL and state the nature of the process. 7M

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	5	12	5	6	3	4	8	3	5	6

(OR)

10. 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

Q.P. Code: 1823401 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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 differences of prokaryotic and eukaryotic cell structure	7M
	(b)	Write a detailed note on cell cycle	7M
		(OR)	
2.	(a)	Illustrate the different types of animal tissues	7M
	(b)	What is the basis of five kingdom classification? Explain its advantages over two kingdom classification.	7M
		UNIT – II	
3.	(a)	What are carbohydrates? State functions and sources	7M
	(b)	What are the building blocks of the protein? List their names	7M
		(OR)	
4.	(a)	Explain different types of protein structures and their importance	7M
	(b)	Discuss the enzyme classification and their use in industry	7M
		UNIT – III	
5.	(a)	What is nutritional deficiency and explain its symptoms and preventive measures.	7M
	(b)	Describe the step wise process of digestion of the food substances	7M
		(OR)	
6.	(a)	Write a detailed note on anaerobic respiration system	7M
	(b)	Explain the human excretory organs with important functions	7M
		UNIT – IV	
7.	(a)	Explain the differences in structure of prokaryotic and eukaryotic genes	7M
	(b)	Describe prokaryotic DNA replication	7M
		(OR)	
8.	(a)	Define cloning and write its benefits for human welfare	7M
	(b)	Explain the steps involved in protein synthesis	7M
		UNIT-V	
9.	(a)	Define vaccine and how one can prevent diseases by vaccination	7M
	(b)	Illustrate the applications of enzymes in food and pharmaceutical industry	7M
		(OR)	
10.	(a)	What is tissue engineering and its application in medical	7M
	(b)	What are the biofuels and their advantages over fossil fuels	7M

Q.P. Code: 1824402 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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.		What the different kinds of communication barriers? Discuss the methods to overcome these barriers	14M
		(OR)	
2.	(a)	What are the objectives of communication?	7M
	(b)	Discuss the essentials of good communication	7M
		UNIT – II	
3.		Define technical writing. Discuss the style and language of technical writing.	14M
		(OR)	
4.	(a)	Do you agree that grammar helps in effective technical writing	7M
	(b)	What is revising? How it helps to improve drafts?	7M
		UNIT – III	
5.		What is self-assessment. Discuss personal goal setting and self-esteem.	14M
		(OR)	
6.	(a)	What is time management?	7M
	(b)	Discuss career planning	7M
		UNIT – IV	
7.		What is Group Discussion? Discuss the dos and don'ts in a Group discussion	14M
		(OR)	
8.	(a)	Write the strategies to prepare for an interview?	7M
	(b)	Do you agree that confidence plays an important role in oral presentation?	7M
		UNIT-V	
9.		Discuss the various types of etiquettes in social and office settings.	14M
		(OR)	
10.	(a)	What are the important points to remember while talking over phone?	7M
	(b)	Draft an email to all the employees assuming you self as the General Manager of Wipro Limited about the dress code at work place.	7M

Q.P. Code: 1825401 | **SET - 1**

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

B. Tech. IV Sem. (R18) Regular & Supple. Examinations of August – 2021

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)	Define Managerial economics	4M
	(b)	Explain the nature and scope of managerial economics	10M
		(OR)	
2.		Explain the factors governing the demand forecasting	14M
		UNIT – II	
3.	(a)	What do you mean cost?	4M
	(b)	Explain the break even analysis with suitable examples?	10M
		(OR)	
4.		Explain the meaning, definition and importance of law of variable proportion?	14M
		UNIT – III	
5.	(a)	What is Oligopoly competition?	4M
	(b)	Explain its features and characteristics of oligopoly competition?	10M
		(OR)	
6.		Explain the different methods of pricing.	14M
		UNIT – IV	
7.	(a)	What is joint stock company	4M
	(b)	Explain the advantages and disadvantages of joint stock company	10M
		(OR)	
8.	(a)	What is a capital	4M
	(b)	Explain the methods and sources for raising the capital?	10M
		UNIT-V	
9.		Explain the Trading Account, Profit and Loss Account and Balance Sheet	14M
		(OR)	
10.	(a)	What is ratio analysis	4M
	(b)	Explain the uses and categories of financial ratios?	10M