AR20

CODE: 20CET207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech. II Semester Regular/Supplementary Examinations, May, 2023

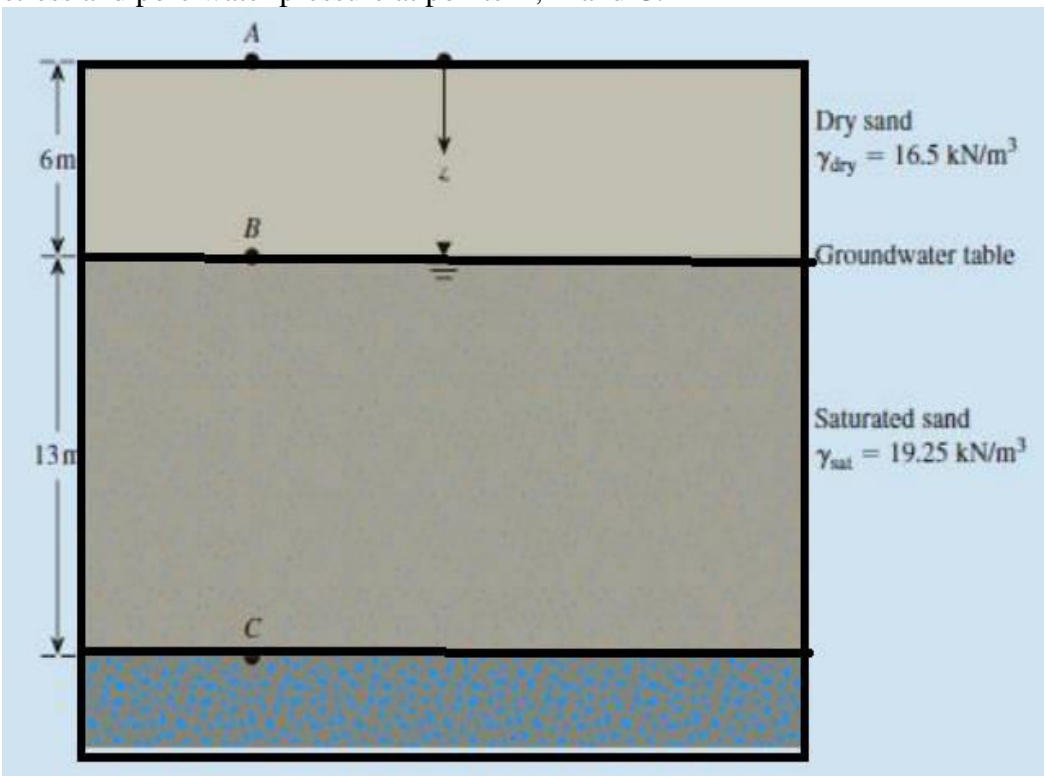
GEOTECHNICAL ENGINEERING

(CIVIL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

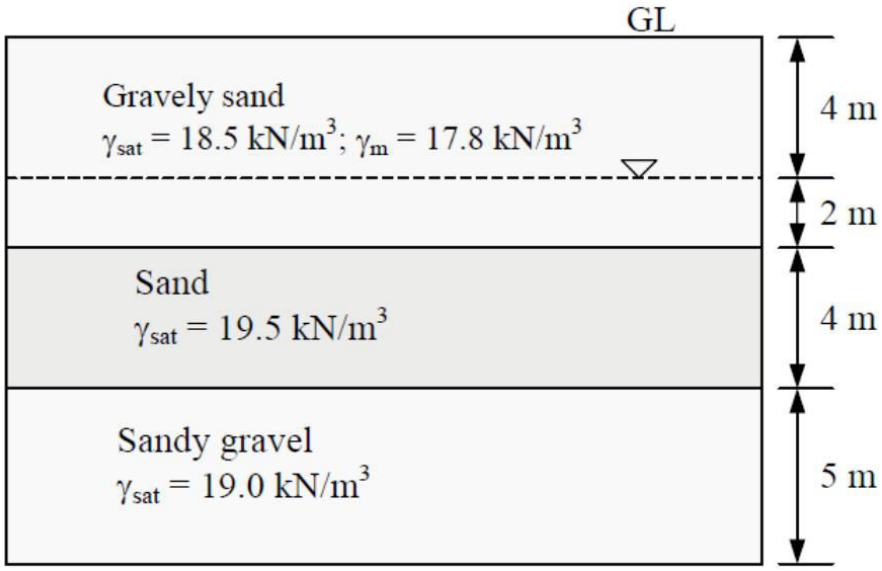
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Classify Soils.	4M	1	L2
	b)	A soil sample has a diameter of 38mm and a height of 76mm, Its wet weight is 1.15N. Upon drying its weight reduced to 0.5 N. In the wet state what was the degree of saturation and the water content of soil sample. Comment on the values obtained.	6M	1	L3
		(OR)			
2.	a)	What is the difference between porosity and voids ration? Derive the relation between them.	5M	1	L2
	b)	Describe briefly about Atterberg Limits.	5M	1	L2
		UNIT-II			
3.	a)	Describe the significance of Darcy's law in estimating the coefficient of permeability.	5M	2	L2
	b)	Describe the phenomena of quicksand condition with a neat sketch and derive an equation for critical hydraulic gradient.	5M	2	L2
		(OR)			
4.	a)	Derive the equation for finding the coefficient of permeability by variable head test.	5M	2	L2
	b)	Describe the properties of flow net.	5M	2	L2
		UNIT-III			
5		A soil profile is shown in figure below. Calculate the total stress, effective stress and pore water pressure at points A, B and C.	10M	3	L3



(OR)

6.		Plot the variation of total, effective vertical stresses, and pore water pressure with depth for the soil profile shown below.	10M	3	L3



UNIT-IV

7.	a)	Describe various factors affecting compaction of soil.	5M	4	L2
	b)	State the process of consolidation by Terzaghi's spring analogy.	5M	4	L2
		(OR)			
8.	a)	Describe the procedure of light weight compaction test to determine the optimum water content and maximum dry density.	5M	4	L2
	b)	List the steps to be followed to conduct consolidation test on a soil sample.	5M	4	L2

UNIT-V

9.	a)	Explain causes of stresses inn soils.	4M	5	L2
	b)	Describe Boussinesque's analysis of stresses in soils.	6M	5	L2
		(OR)			
10.	a)	What is meant by Pressure Bulb? Explain	4M	5	L2
	b)	Describe Westergard's analysis of stresses in soils.	6M	5	L2

UNIT-VI

11.	a)	Calculate the shear strength of soil on a plane within a saturated soil mass at a point where the total normal stress is 295 kPa and pore water pressure is 120 kPa when c^1 = 12 kPa and angle of internal friction is 30^0.	5M	6	L3
	b)	State the significance of shearing resistance of soil.	5M	6	L2
		(OR)			
12.	a)	Explain the procedure of direct shear test. Write its advantages and disadvantages.	5M	6	L2
	b)	In an in-situ vane shear test on saturated clay, a torque of 35 Nm was required to shear the soil. The diameter of the vane was 50 mm and length 100 mm. Calculate the undrained shear strength of clay. The vane was then rotated rapidly to cause remoulding of the soil.The torque required to shear the soil in the remoulded state was 5 Nm. Determine the sensitivity.	5M	6	L2

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CODE: 20CST207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech. II Semester Regular/Supplementary Examinations, May, 2023

OPERATING SYSTEMS

(COMMON TO CSE, CSM & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a	Define Operating System. List down services or functionalities provided by an operating system.	5	CO1	K2
	b	Define System Call? Explain the types of system calls.	5	CO1	K2
		(OR)			
2.		Explain pre-emptive vs non pre-emptive SJF scheduling algorithms with example.	10	CO1	K3

Process	Arrival time	Burst time
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	5.0	4

		UNIT-II			
3.		Explain in detail Synchronization problem with a suitable example	10	CO2	K3
		(OR)			
4.		Explain the usage and implementation of semaphores with example	10	CO2	K3
		UNIT-III			
5.	a	Explain in detail about deadlock detection techniques	5	CO3	K1
	b	What are the necessary conditions for the occurrence of deadlock?	5	CO3	K2
		(OR)			
6.	a	Explain briefly about deadlock prevention techniques	5	CO3	K2
	b	Discuss various techniques to recover from the deadlock.	5	CO3	K2
		UNIT-IV			
7.		What is Segmentation? Explain with example	10	CO4	K2
		(OR)			
8.		Consider the page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, with 4 page frame. Find number of page faults for any two of the algorithms - FIFO, Least Recently Used (LRU), Optimal page replacement algorithm	10	CO4	K3
		UNIT-V			
9.		Explain various file access methods with suitable examples.	10	CO5	K2
		(OR)			
10.		Explain briefly about file allocation methods.	10	CO5	K2
		UNIT-VI			
11.		Explain any two disk scheduling algorithms with example.	10	CO6	K2
		(OR)			
12.		Write notes on storage structure, disk structure.	10	CO6	K2

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CODE: 20ECT207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Regular/Supplementary Examinations, May,2023

TRANSMISSION LINES & ELECTRO MAGNETIC WAVES

(ELECTRONICS AND COMMUNIATION ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a	Explain different types of transmission lines.	5	1	Understanding
	b	An open wire transmission line has primary constants R=6Ω/km, L=2mH/km, G=0.5μ mhos/km and C=0.05μF/km at 1kHz. Calculate characteristic impedance and propagation constant.	5	1	Applying
		(OR)			
2.	a	Derive the transmission line equations in terms of source parameters and distance of point of interest from the source.	5	1	Analyzing
	b	Find the characteristic impedance and propagation constant at 100kHz for a lossless transmission line having L=33μH/m and C=10nF/m.	5	1	Applying
		UNIT-II			
3.	a	Derive the expressions for input impedance of a transmission line in terms of reflection coefficient open circuited and short circuited lines.	5	2	Analyzing
	b	A lossless transmission line of 100Ω characteristics impedance is connected to a load of 300Ω. Calculate the reflection coefficient and VSWR.	5	2	Applying
		(OR)			
4.	a	Describe the characteristics of λ/8, λ/4 and λ/2 radio frequency transmission line elements.	6	2	Analyzing
	b	Discuss about group velocity and phase velocity	4	2	Understanding
		UNIT-III			
5.	a.	Derive the expression for Electric field intensity (E) due to infinite line conductor.	7	3	Analyzing
	b.	Explain about DELL operator.	3	3	Understanding
		(OR)			
6.	a	Using Gauss' law, find the expression for flux density for a coaxial cable with a, b as inner and outer radius respectively.	5	3	Applying
	b	Explain laplace Equation and Poisson 's Equation.	5	3	Understanding
		UNIT-IV			
7.	a	State and explain Biot-Savart law relating the magnetic field produced at a point due to the current in a small elemental wire.	5	4	Understanding
	b	Find the force between two straight, infinitely long parallel current carrying conductors (with currents I_1 and I_2)separated by distance d.	5	4	Applying
		(OR)			
8.		Using Ampere's circuital law, derive the expression for magnetic field intensity for a solid conductor of radius a. What is the relation between magnetic field intensity and flux density?	10	4	Applying

UNIT-V

9.	a	What is the inconsistency of Ampere's law? How displacement current density overcome this inconsistency?	5	5	Analyzing
	b	What is the Faraday's law of induction? Explain the significance of the terms transformer E.M.F and generator E.M.F.	5	5	Understanding
		(OR)			
10.	a	State Maxwell's equations in differential form and write down their word statements.	5	5	Analyzing
	b	State the boundary conditions for electric fields between two media.	5	5	Understanding

UNIT-VI

11.	a	Derive the wave equations for a perfect dielectric medium.	5	6	Analyzing
	b	Explain the relation between E and H in a lossless medium.	5	6	Analyzing
		(OR)			
12.	a	Explain about different types of polarisation.	5	6	Analyzing
	b	What is pointing vector? Explain Poynting theorem.	5	6	Understanding

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CODE: 20EET207 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Regular/Supplementary Examinations, May,2023

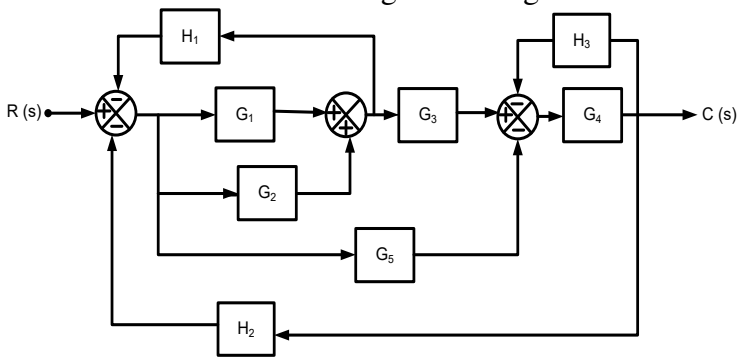
CONTROL SYSTEMS

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max Marks: 60**

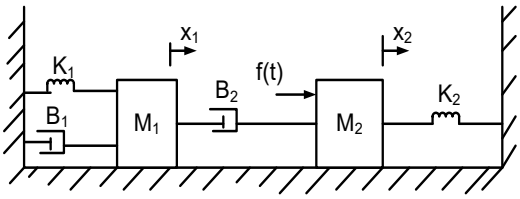
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		UNIT-I	Marks	CO	Blooms Level
1.		Using block diagram reduction technique, find the closed loop transfer function of the following block diagram.	10	1	Applying

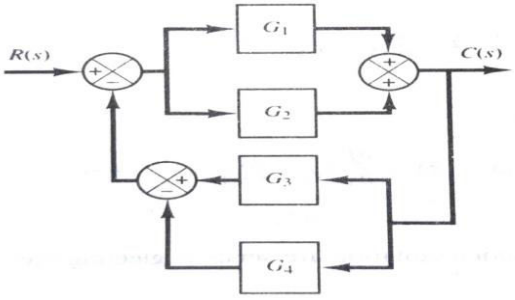


(OR)

2.	a	Obtain mathematical model of the following mechanical system.	5	1	Understanding



	b	Simplify the block diagram shown in figure below and obtain the closed loop transfer function C(S)/ R(S).	5	1	Understanding



UNIT-II

3.	a	What is the need for controllers? Differentiate among PD, PI, and PID controllers.	5	2	Remembering
	b	The open loop transfer function of a unity feedback system is $G(s)H(s) = \frac{K}{s(1+sT)}$. By what factor the gain K should be multiplied so that damping ration is increase from 0.3 to 0.8. By what factor time constant should be multiplied so that damping ratio is reduced from 0.6 to 0.4.	5	2	Applying

(OR)

4.	a	Derive the expression of a unit step response of a second-order under-damped system. Also, find the expressions of peak time and peak overshoot of the system.	6	2	Remembering
	b	Calculate the parameters (i) delay time, (ii) rise time, and (iii) settling time for a control system whose natural frequency of oscillation is 9 rad./sec. and damping ratio is 0.65.	4	2	Applying

UNIT-III

5.		Plot the root locus of a unity feedback system whose open-loop transfer function is $G(s) = \frac{k}{s(s+1)(s+4)}$	10	3	Understanding

(OR)

6.		How many roots of a system with the following characteristic equation are in the right half of s-plane? Determine Stability using RH criteria. $s^6 + 2s^5 + 3s^4 + 5s^3 + 4s^2 + s + 6 = 0$	10	3	Applying

UNIT-IV

7.		Using polar plot comment on the stability of the control system with $G(s)H(s) = \frac{10}{s(s+1)(s+4)}$	10	4	Applying

(OR)

8.		A unity feedback control system has a forward path gain as under: $G(s) = \frac{100}{s(s+2)(5s+1)}$ Draw the bode plot and determine the values of gain margin, phase margin, gain crossover frequency, and phase crossover frequency.	10	4	Applying

UNIT-V

9.		Derive the transfer function of Lag and Lead compensator	10	5	Remembering

(OR)

10.		For the feedforward system given as $G(s) = \frac{4}{S(S+2)}$ Design a lead compensator to modify the closed loop poles such that undamped natural frequency is 4 rad/sec obtained without changing the damping ratio of 0.5.	10	5	Applying

UNIT-VI

11.	a	A LTI system is characterized by the following state variable model. Determine state transition matrix. $\dot{X} = \begin{bmatrix} -2 & 1 \\ 0 & -3 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u \qquad Y = [2 \quad 1]X$	7	6	Understanding
	b	What is state transition matrix? What is its significance? What are its properties?	3	6	Remembering

(OR)

12.	a	A LTI System is characterized by the equation $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}1 & 0\\ 1 & 2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}1\\ 2\end{bmatrix}u$ Where u is a unit step function. Compute the solution of these equations assuming initial condition $X_0=\begin{bmatrix}1\\ 0\end{bmatrix}$ using the STM method.	6	6	Understanding
	b	Find state equation and output equation of the following system. $G(s)=\frac{2}{s^3+8s^2+12s+5}$	4	6	Understanding

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CODE: 20MET207 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Regular/Supplementary Examinations, May,2023

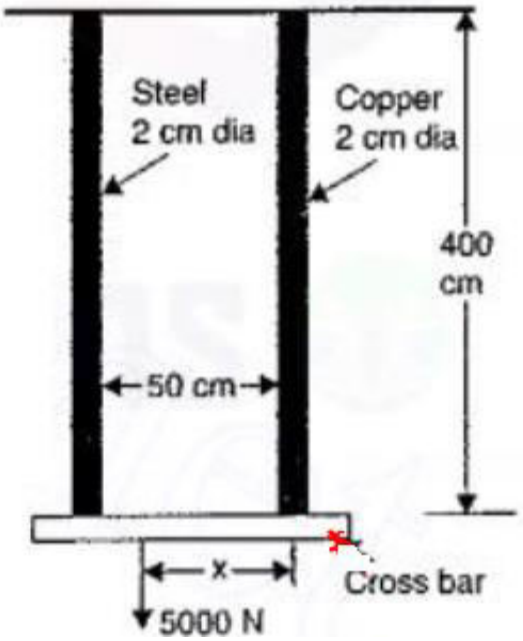
STRENGTH OF MATAERIALS

(MECHANICAL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

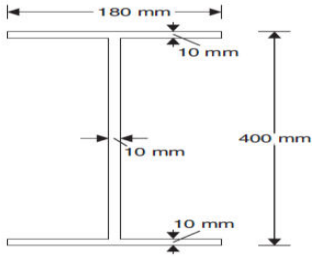
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
	UNIT-I			
1.	A tensile test was conducted on a mild steel bar. The following data was obtained from the test: i) Diameter of the steel bar = 30 mm ii) Gauge length of the bar = 200 mm iii) Load at elastic limit = 250 KN iv) Extension at a load of 150 KN = 0.21mm v) Maximum load = 380 KN vi) Total extension = 60 mm vii) Diameter of the rod at the failure = 25 mm Determine: (a) the Young's modulus (b) the stress at elastic limit (c) the percentage elongation (d) the percentage decrease in area	10M	1	Apply
	(OR)			
2.	Two vertical rods one of steel and the other of copper are each rigidly fixed at the top and 50cm apart. Diameters and lengths of each rod are2cm and 4m respectively. A cross bar fixed to the rods at the lower ends carries a load of 5000 N such that the cross bar remains horizontal even after loading. Find the stress in each rod and the position of the load on the bar. Take E for steel = $2X10^5$ N/mm^2 and E for copper = $1X10^5$ N/mm^2.	10M	1	Apply



	UNIT-II			
3.	A cantilever beam of length 2m carries a uniformly distributed load of 4kN/m over the whole length and a point load of 5kN at the free end. Draw the shear force and bending moment diagrams for the cantilever.	10M	2	Apply
	(OR)			
4.	A simply supported beam of length 6m carries a point load of 3kN and 6kN at a distance of 2m and 4m from the left end. Draw the shear force and bending moment diagram for the beam	10M	2	Apply

UNIT-III

5.		A I section of a beam has the following dimensions as shown in Fig. Determine the maximum bending stress in the beam, when a bending moment of 200 N-m is acting on the section. 	10M	3	understand

(OR)

6.		The shear force acting on a section of a beam is 50 kN. The section of the beam is of T – Shaped of dimensions 100 mm × 100 mm × 20 mm. The moment of inertia about the horizontal neutral axis is 314.221 × 10^4 mm^4. Calculate the shear stress at the neutral axis and at the junction of the web and the flange.	10M	3	Apply

UNIT-IV

7.	a	Determine the diameter of a solid steel shaft which will transmit 90 kW at 160 r.p.m. also determine the length of the shaft if the twist must not exceed 1 degree over the entire length. Maximum shear stress is limited to 60 N/mm^2. Take the modulus of rigidity as $8x10^4$ N/mm^2.	5M	4	Apply
	b	Derive the Torsion equation and state any five assumptions in the derivation of this equation.	5M	4	understand

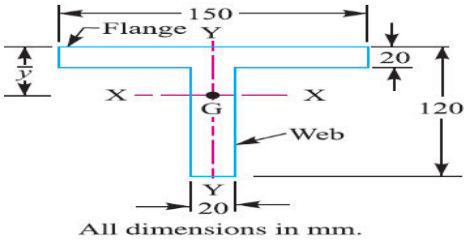
(OR)

8		A thin cylindrical shell 3 m long which is closed at the ends has an internal diameter of 1 m and a wall thickness of 15 mm. Calculate the hoop and longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected to an internal pressure of 1.5 N/mm^2. Take E = 200 GPa and μ = 0.3.	10M	4	Apply

UNIT-V

9.		Derive a relation for the Euler's crippling load for a column when i) it has both ends hinged and ii) both ends fixed.	10M	5	understand

(OR)

10.		A T-section 150 mm × 120 mm × 20 mm is used as a strut of 4 m long hinged at both ends. Calculate the crippling load, if Young's modulus for the material of the section is 200 kN/mm^2. 	10M	5	Apply

UNIT-VI

11	a	Derive the expression for slope and deflection of a simply supported beam of length L and carrying a uniformly distributed load over the whole length?	5M	6	understand
	b	A simply supported beam of uniform rectangular section 100 mm wide and 200 mm deep is simply supported at its ends. It carries a udl of 5kN/m over the entire span of 5m. If the value of E is $1X10^4$ N/mm^2; Find (i) Slope at the supports and (ii) maximum deflection.	5M	6	Apply

(OR)

12.	a	State Mohrs theorms I and II and find the equations for slope and deflection of a simply supported beam subjected to udl over its entire span using moment area method	5M	6	Apply
	b	A cantilever of 100mm wide and 200mm deep is 3m long. What uniformly distributed load which the beam can carry in order to produce a deflection of 6 mm at the free end. Take E = $2X10^5$ N/mm^2.	5M	6	Apply

AR18

CODE: 18CST206 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, May,2023

Operating Systems

(Common to CSE AND IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the following types of Operating Systems (1) Time sharing OS (2) Distributed OS	6M
	b)	What is System Call? Explain the different types of System calls with examples.	6M
		(OR)	
2.	a)	What is a process? Explain about Process states.	6M
	b)	Explain about **Round Robin** scheduling with suitable example	6M
		UNIT-II	
3.	a)	Discuss in detail about deadlock avoidance using banker's algorithm with suitable examples.	6M
	b)	Describe a dining-philosopher problem? Write an algorithm to solve the problem using semaphores?	6M
		(OR)	
4.	a)	Explain the basic concepts of process synchronization. How is the message passing mechanism working inwards communication of processes?	6M
	b)	What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy	6M
		UNIT-III	
5.	a)	Define Segmentation. Discuss in detail about segmentation hardware with example	6M
	b)	Explain about memory allocation of contiguous memory allocation	6M
		(OR)	
6.	a)	What is Thrashing? Explain the Causes of Thrashing.	6M
	b)	Consider the page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3 with 4 page frames. Find number of page faults using **LRU**.	6M
		UNIT-IV	
7.	a)	Explain in detail about various types of directory structures with a neat diagram.	6M
	b)	Explain the following wrt file a) Concept of file b) Access methods	6M
		(OR)	
8.	a)	Explain the following File allocation methods [1] Contiguous allocation [2] Linked allocation	6M
	b)	Discuss in detail about Free Space Management	6M
		UNIT-V	
9.	a)	Explain in detail about the FCFS disk scheduling algorithms with examples	6M
	b)	Explain the different I/O Buffering Techniques.	6M
		(OR)	
10.	a)	Distinguish between Storage Area Network and Network attached storage with a neat diagram.	6M
	b)	Explain in detail about the following: i) Magnetic disks ii) Solid-State disks	6M

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CODE: 18CET207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, May,2023

Fluid Mechanics-II

(CIVIL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.		Discuss the following in detail a) Types of flows b) Hydraulic jump	12 M
		(OR)	
2.	a)	List and explain the energy and momentum correction factors.	6 M
	b)	Distinguish between the sub-critical and super critical flows.	6 M

UNIT-II

3.	a)	A jet 200 mm diameter moving at a velocity of 20 metres per second impinges normally on a series of flat vanes mounted over a wheel. If the velocity of the vanes is 8 metres per second, find (i) the force exerted by the jet on the wheel, (ii) the work done by the jet on the wheel per second, and (iii) the hydraulic efficiency	6 M
	b)	Derive an expression for the force exerted by a jet striking the curved plate at one end tangentially when the plate is symmetrical.	6 M
		(OR)	
4.	a)	An experiment was conducted in Hydraulic Machinery Laboratory and the following values were observed. Diameter of Pipe is 40 cm Diameter of Jet is 7.5 cm Velocity of Jet is 20 m/sec. Conditions: (i) Plate is at rest. (ii) Plate is moving in the same direction of flow with velocity 5m/sec. Based on the observations find out the thrust and work done/sec for condition (i) & (ii) And also calculate the efficiency of the jet for condition (ii)	6 M
	b)	Find an expression for Force exerted by a fluid jet on stationary flat plate.	6 M

UNIT-III

5.		Differentiate between i) Impulse and Reaction turbine ii) ii) Radial and Axial flow Turbines iii) iii) Inward and Outward Radial flow turbines	6 M 6 M
		(OR)	
6.	a)	What is a draft-tube? Why is it used in a reaction turbine? Describe with neat sketch two different types of draft tubes.	6 M
	b)	Illustrate hydraulic intensifier with a neat sketch.	6 M

UNIT-IV

7. a) What are the different efficiencies of a centrifugal pump? 6 M

   b) A centrifugal pump discharge 560 liters of water per second has to develop a head of 10 meters, the speed of rotation of the impeller being 700rpm. The manometric efficiency is 85% and the loss of head in the pump due to friction is 0.025 $V1^2$ meters of water, where V1 is the velocity with which the water leaves the impeller. Assume that the velocity of flow through the impeller is constant at 2.50 meters per second and that there is no velocity of whirl at inlet. Determine (i) The diameter of the impeller (ii) the outlet area (iii) The vane angle at the outlet edge of the impeller. 6 M

(OR)

8. a) What are the methods adopted to increase the efficiency of a centrifugal pump? 6 M

   b) A centrifugal pump has vanes which are radial at the outer periphery. The impeller has an outer diameter of 20 cm and a width of 3 cm at that diameter. If the discharge is 1800 L/min and the net head produced is 3.5 m, calculate the (i) rotational speed of the impeller and (ii) magnitude and direction of absolute velocity at exit. Manometric efficiency can be assumed as 0.85. 6 M

UNIT-V

9. Explain the following in detail 12 M
   a) Rayleigh's method
   b) Kinematic and dynamic similarities

(OR)

10. a) What are the dimensionless numbers in dimensional analysis? Discuss any three of them. 6 M

    b) Explain with suitable example the concept of Dimensional Homogeneity. 6 M

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AR18

CODE: 18ECT209 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, May, 2023

DIGITAL ELECTRONICS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Convert the following (i) $(4057.06)_8 = (\ )_{10}$ (ii) $(2598.675)_{10} = (\ )_{16}$	6M
	b)	Encode the data bits 1101 into the 7 bit even parity Hamming Code	6M
		(OR)	
2.	a)	Subtract 14 from 46 using 8 bit 2's comp arithmetic	6M
	b)	Perform decimal additions in 8421 code (i) 679.6 + 536.8	6M

UNIT-II

3.	a)	Express the Boolean function F = xy + x'z as a product of maxterms	6M
	b)	Perform the realization of all basic logic gates using universal NAND gate	6M
		(OR)	
4.	a)	Reduce the expression f=Σm(0,2,3,4,5,6) using K- map and implement it in NAND logic.	6M
	b)	(i) Prove x'y'z' + x'yz' + xyz' = x'z' + yz' (ii) Simplify F = x'yz + x'yz' + xz.	6M

UNIT-III

5.	a)	Design a full adder by using two half adders	6M
	b)	Design a 4-bit carry ahead adder circuit	6M
		(OR)	
6.	a)	Design a 4-bit Binary parallel adder?	6M
	b)	Design a 4-bit BCD adder?	6M

UNIT-IV

7.	a)	Design a 1:8 demultiplexer using two 1:4 demultiplexer	6M
	b)	What is encoder? Design octal to binary encoder	6M
		(OR)	
8.	a)	What is decoder? Construct 3*8 decoder using logic gates and truth table	6M
	b)	Design a 4-bit magnitude comparator?	6M

UNIT-V

9.	a)	Convert S-R Flip flop to D flip flop?	6M
	b)	Design Bidirectional shift register	6M
		(OR)	
10.	a)	Design a Mod-6 synchronous counter using J-K flip flops.	6M
	b)	Draw and explain the working of shift right register	6M

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AR18

CODE: 18EET209 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, May, 2023

CONTROL SYSTEMS

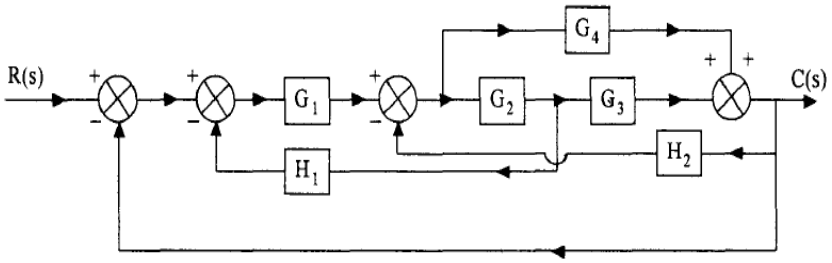
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

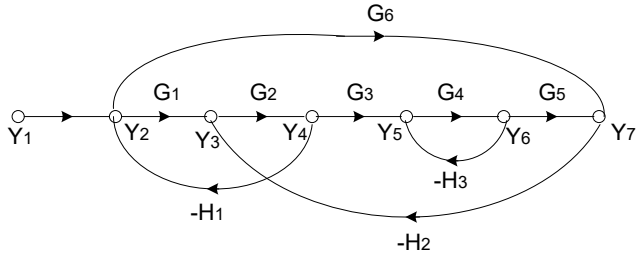
UNIT-I

1. a) Obtain the transfer function C(s)/R(s) by using Block diagram algebra. 12M



(OR)

2. a) Differentiate open loop and closed loop control systems with an example. 5M
   b) Obtain the transfer function Y_7/Y_1 using Mason's gain formula. 7M



UNIT-II

3. a) Derive the expression for rise time of a standard second order under damped system. 6M
   b) For a unity feedback control system whose open loop transfer function is given by 6M

$$G(s) = \frac{25}{S(S+6)}$$

Find (i) Rise time (ii) Peak time (iii) Peak overshoot (iv) Settling time

(OR)

4. a) The overall transfer function is a unity feedback control system is given by, 12M

$$\frac{C(s)}{R(s)} = \frac{10}{S^2 + 6S + 10}$$

(i) Find K_p, K_v and K_a.
(ii) Determine the steady state error if the input is $r(t)=1+t+t^2$.

UNIT-III

5. a) Check the system stability of the characteristic equation 6M

$$s^5+s^4+6s^3+12s^2+18s+6=0$$

b) For a unity feedback system with open loop transfer function 6M

$$G(S)H(S)=\frac{K}{S(S+4)(S+6)}$$

Find the range of K for which the system will be stable.

(OR)

6. Sketch the Root Locus of the system whose open loop transfer function is 12M

$$G(s)=\frac{k}{s(s+1)(s+3)}.$$

UNIT-IV

7. Draw the Nyquist plot of $G(s)H(s)=\frac{1}{s(1+2s)(1+s)}$. Assess the stability of closed loop system from Nyquist plot. 12M

(OR)

8. The open loop transfer function of a unity feedback system is 12M

$$G(S)=\frac{K}{S(S+1)(S+10)}$$

Draw the Bode plot and determine gain margin and phase margin where k=100

UNIT-V

9. a) Explain about lead compensator with necessary circuits. 5M

b) A system is characterized by the following state space equations. 7M

$$\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}-3 & 1\\ -2 & 0\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u;\ \ t>0$$

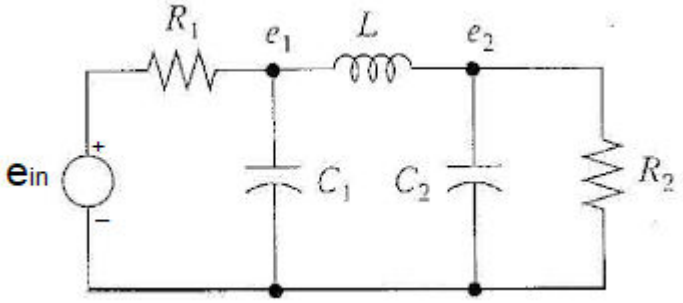
$$y=[1\ \ 0]\begin{bmatrix}X_1\\ X_2\end{bmatrix}$$

Compute the state transition matrix.

(OR)

10. a) List the advantages of State Space Analysis. 5M

b) Obtain the state model of the following electrical system. 7M



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AR16

CODE: 16EC2010 **SET-I**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(An Autonomous Institution)

II B.Tech II SEMESTER SUPPLEMENARY EXAMINATIONS, MAY,2023

DIGITAL ELECTRONICS

(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 hours **Max. Marks: 70M**

Answer one question from each unit

All questions carry equal marks

All parts of the question must be answered at one place

UNIT - I

1.a Convert the following (i) 11011.101_2 to decimal (ii) 378.93_{10} to octal. 8M

b Convert the gray number 10110010 into (i) Hexa decimal (ii) octal (iii) decimal. 6M

(OR)

2.a Encode the data bits 1101 into the 7-bit even parity hamming code 6M

b Subtract the following numbers using 9's complement method (i) 745.81-436.62 (ii) 436.62-745.81 8M

UNIT-II

3.a Draw the logic symbols , construct the truth tables, and with the help of circuit diagrams explain the working of following gates (i) NAND (ii) NOR (iii) EX-OR (iV) EX-NOR 8M

b Reduce the following functions using K-map (i) F= $\sum m(0, 1, 2, 3, 6, 7, 13, 15)$ (ii) F=$\sum m(2, 3, 6, 7, 10, 11, 12)$ 6M

(OR)

4.a What are the steps followed in the reduction of Boolean expressions? 4M

b Simplify the given expression using tabular procedure 10M

F(V, W, X, Y, Z) = $\sum m(0, 4, 12, 16, 19, 24, 27, 28, 29, 31)$

UNIT-III

5.a Realize a full subtractor using (i) only NAND gates (ii) Only NOR gates. 8M

b Design a logic circuit with 4-inputs A, B, C, D that will produce output "1" only whenever two adjacent input variables are 1's. A and D are also to be treated as adjacent. Implement it using universal logic. 6M

(OR)

6.a	Compare Half adder, Half subtractor, Full adder, Full subtractor.	8M
b.	Explain the logic diagram of Excess-3 adder with an example.	6M

UNIT-IV

7.a	Design a 4-bit gray to binary code converter and explain its conversion table with an example.	8M
b	Implement the following logic function using an 8:1 multiplexer F(A, B, C, D)= $\sum m(1, 3, 4, 11, 12, 13, 14, 15)$.	6M

(OR)

8.a	With the help of logic diagram and function table explain (i) 4-input multiplexer (ii) 1-line to 8-line demultiplexer.	8M
b	Design a 8-line to 3-line encoder and explain its operation.	6M

UNIT-V

9.a	Define the following terms with relation to flip flop (i) Set-up time (ii) Hold time (iii) Propagation delay time.	6M
b	Draw the circuit diagram of a i) JK flip flop, ii) RS flip flop and explain its operation with the help of a truth table.	8M

(OR)

10.	a.Convert JK flip flop into (i) T flip flop (ii) D flip flop.	8M
b	Draw and explain the logic diagram of 4-bit bidirectional shift register.	6M

AR16

CODE: 16ME2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II SEMESTER SUPPLEMENARY EXAMINATIONS, MAY,2023

MACHINE DRAWING

(MECHANICAL ENGINEERING)

TIME: 3 HOURS **MAX. MARKS: 70**

NOTE: ANSWER ANY TWO QUESTIONS FROM PART A
ANSWER QESTION FROM PART B

PART A **2X15=30M**

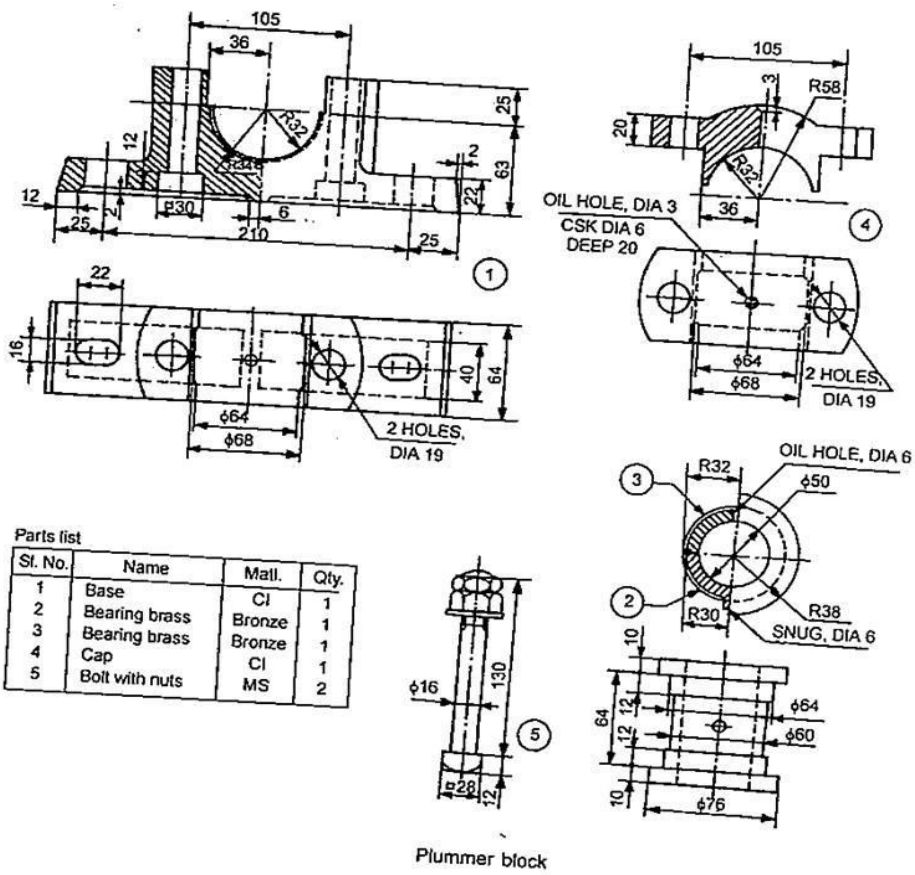
1. Draw the sectional front view and top view of knuckle joint with sleeves to connect shafts of 35 mm

2. Draw the sectional front view and top view of double riveted butt joint with single strap Zigzag type to join two plates of 20 mm thickness each.

3. Draw two views of a foot step bearing for a shaft 100 mm diameter

PART B **1X40=40M**

1. Figure 1 gives the part drawings of Plummer block. Assemble all the parts and draw the following assembled views. a) Sectional front view b) Top view.



Parts list

Sl. No.	Name	Matl.	Qty.
1	Base	CI	1
2	Bearing brass	Bronze	1
3	Bearing brass	Bronze	1
4	Cap	CI	1
5	Bolt with nuts	MS	2

Plummer block

AR16

CODE: 16EE2013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II SEMESTER SUPPLEMENARY EXAMINATIONS, MAY, 2023

CONTROL SYSTEMS

(ELECTRICAL & ELECTRONICS ENGINEERING)

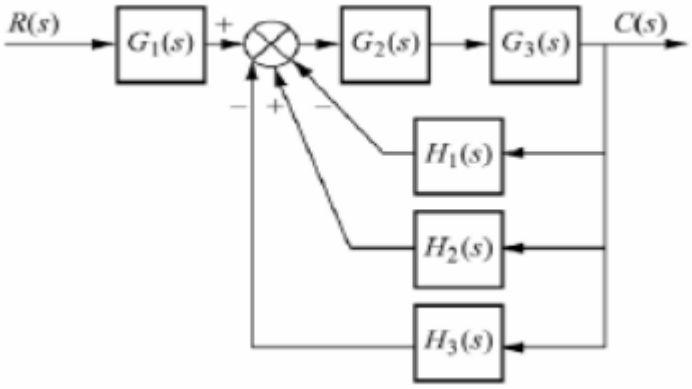
Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) What is a signal flow graph? Explain about basic elements in signal flow graphs **6**

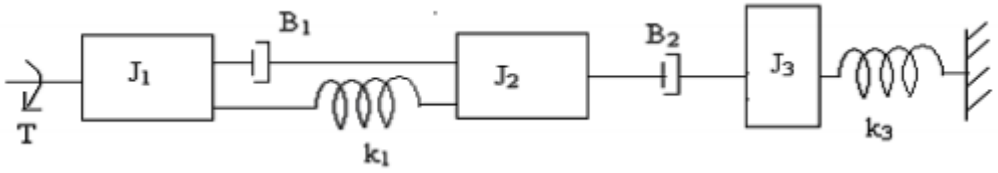
   b) Obtain the transfer function for the system shown in the fig **8**



(OR)

2. a) State and explain the Mason's gain formula **6**

   b) Write the differential equations governing the Mechanical rotational system shown in fig. Draw the Torque-voltage and Torque-current electrical analogous circuits. **8**



UNIT-II

3. a) Derive the transfer function and develop the block diagram of Armature controlled DC servo motor **14**

(OR)

4. a) For a unity feedback control system the open loop transfer function G(S) = 10(S+2)/ S2 (S+1). Find Position, velocity and acceleration error constants. **8**

   b) Give the relation between generalized and static error coefficients. Mention advantages of generalized error constants over static error constants. **6**

UNIT-III

5. Sketch the root locus for the open loop transfer function of unity feedback control system given below: G(S) H(S) =K/S(S+1) (S+2).Also find K of breakaway point **14**

(OR)

6. Using Routh criterion determine the stability of the system whose characteristics equation is S4+8S3+18S2+16S+5 =0 **14**

UNIT-IV

7. Sketch the Bode plot and hence find Gain margin and Phase margin. **14**

$$G(s) = \frac{100}{s(s+1)(s+4)}$$

(OR)

8. Construct the polar plot for the function GH(S) =2(S+1)/ S2. Find Gain cross over frequency, Phase cross over frequency, Gain margin and Phase margin. **14**

UNIT-V

9. What is compensation? Why it is needed for control system? Explain the types of compensation **14**

(OR)

10. Explain state space representation for continuous time system **14**

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AR13

CODE: 13EE2013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.TECH II SEM SUPPLEMENTARY EXAMINATIONS, MAY, 2023

LINEAR CONTROL SYSTEMS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

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

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

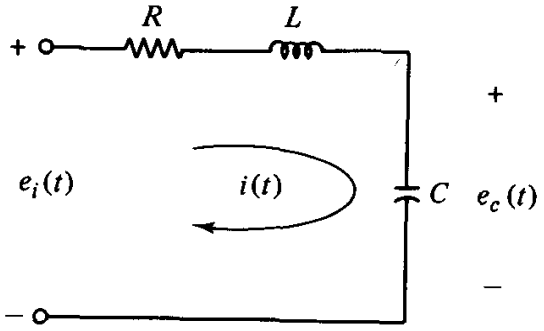
1. a) Draw the block diagram of an open-loop control system.
   b) Write the effect of feedback on overall gain.
   c) What are the time domain specifications?
   d) How do you reverse the direction of rotation in AC servomotor?
   e) What is the necessary and sufficient condition for stability?
   f) What are the advantages of Routh Criterion?
   g) What is the effect on polar plot if a non-zero pole is added to the transfer function?
   h) What are the specifications in frequency domain design?
   i) Explain about lead-lag compensator.
   j) Explain the concept of state and state variable.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Derive the transfer function of a linear system given in the Fig. 6M



   b) Draw and explain the block diagram of a turbine driven hydraulic power system. 6M

(OR)

3. a) Explain various block diagram elements of typical sensing devices of control system. 6M
   b) Explain the step by step construction of the signal flow graph for the following set of algebraic equations. 6M

$$y_2 = a_{12}y_1 + a_{32}y_3$$
$$y_3 = a_{23}y_2 + a_{43}y_4$$
$$y_4 = a_{24}y_2 + a_{34}y_3 + a_{44}y_4$$
$$y_5 = a_{25}y_2 + a_{45}y_4$$

UNIT-II

4. Derive the transfer function and develop the block diagram of Armature controlled DC servo motor 12M

(OR)

5. a) Obtain the time response of a first order system for a unit step input and plot its response. 6M

   b) Determine the step, ramp and parabolic error constants of the following unity feedback control system whose open loop transfer function is given by 6M

$$G(s) = \frac{1000}{(1+2S)(1+0.5S)}$$

UNIT-III

6. A unity feedback system has an open loop function $G(s) = \frac{K}{S(S^2+3S+10)}$ make a rough sketch of root locus plot by determining the following 12M

   (i) Centroid, number and angle of asymptotes
   (ii) angle of departure of root loci from the poles
   (iii) Breakaway points if any
   (iv) points of intersection with jw axis and
   (v) maximum value of k for stability.

(OR)

7. Sketch the root locus plot of unity feedback system with an open loop transfer function 12M

$G(s) = \frac{K}{S(S+1)(S+5)}$. Find the range of K for the system to have damped oscillatory response. Determine the value of K so that the dominant pair of complex poles of the system has a damping ratio of 0.6. Corresponding to this value of K. Determine the closed loop transfer function in the factored form.

UNIT-IV

8. a) Find the Gain margin and phase margin of the system if the open loop transfer function 6M

   is : $G(s) = \frac{10}{S(S+1)}$

   b) Draw the polar plot of $G(s)H(S) = \frac{K}{S(S+3)(S+5)}$ and there from determine range of K for stability using Nyquist Criterion. 6M

(OR)

9. Consider a unity feedback system having an open loop transfer function $G(s) = \frac{K}{S(1+0.5S)(1+4S)}$ sketch the Bode plot and determine the value of 'K' so that gain margin is 20 db and phase margin is 30^0. 12M

UNIT-V

10. a) Explain the concept of state, state model, state variable, state space. 6M

    b) Obtain the transfer function for linear time invariant system. And also draw the state model. 6M

(OR)

11. Explain the design procedure of lead compensator 12M