O.P.Code: 20EE0214	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023

CONTROL SYSTEMS

(Electronics & Communication Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Compare open loop and closed loop control systems based on different aspects.	CO1	L2	6M
	b	Distinguish between Block diagram Reduction Technique and Signal Flow Graph.	CO1	L4	6M

OR

2		Find the overall transfer function of the system whose signal flow graph is shown in fig 1.	CO2	L4	12M

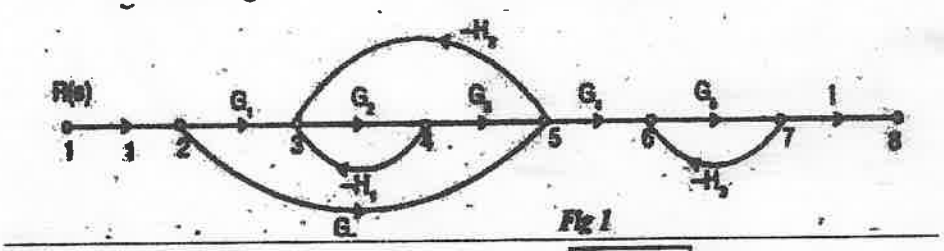

Fig 1

UNIT-II

3	a	Measurements conducted on a servo mechanism, show the system response to be c(t) = 1+0.2e-60t - 1.2e-10t When subject to a unit step input. Obtain an expression for closed loop transfer function, determine the undamped natural frequency, damping ratio?	CO3	L4	8M
	b	What is the characteristic equation? List the significance of characteristic equation.	CO3	L1	4M

OR

4		Define steady state error. Derive the static error components for Type 0, Type 1 &Type 2 systems.	CO3	L2	12M

UNIT-III

5		With the help of Routh's stability criterion determine the stability of the following systems represented by the characteristic equations: $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$ $9s^5 - 20s^4 + 10s^3 - s^2 - 9s - 10 = 0$	CO5	L2	12M

OR

6		Explain the procedure for constructing root locus.	CO5	L2	12M

UNIT-IV

7		List out the frequency domain specifications and derive the expressions for resonant peak.	CO4	L2	12M

OR

8	a	Define and derive the expression for resonant frequency	CO4	L1	6M
	b	Given $\xi = 0.7$ and $\omega n = 10$ rad/sec. Find resonant peak, resonant frequency and bandwidth.	CO4	L3	6M

UNIT-V

9	a	Explain the properties of STM.	CO6	L2	6M
	b	Derive the expression for the transfer function and poles of the system from the state model. $\dot{X} = Ax + Bu$ and $y = Cx + Du$	CO6	L3	6M

OR

10		Find state variable representation of an armature controlled D.C.motor.	Co6	L2	12M

***** END *****