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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Regular & Supplementary Examinations February-2024
CONTROL SYSTEMS
(Electrical & Electronics Engineering)

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

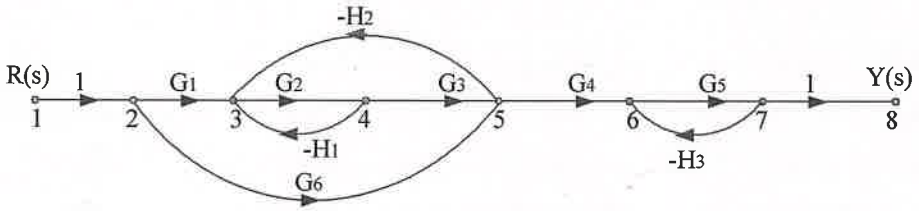
(Answer all Five Units **5 x 12** = **60** Marks)

UNIT-I

1	a	Compare open loop and closed loop control systems based on different aspects.	CO1	L1	6M
	b	For the electrical system shown in below figure, find the transfer function.	CO2	L3	6M

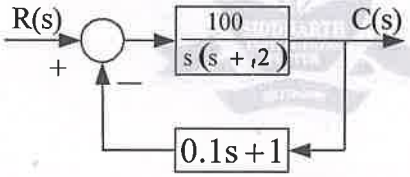
OR

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



UNIT-II

3	a	Define steady state error. Derive the static error components for Type 0, Type 1 and Type 2 systems.	CO3	L2	6M
	b	A positional control system with velocity feedback shown in below figure. What is the response c(t) of the system for unit step input.	CO3	L5	6M



OR

4		What is the significance of controller? Explain the effect of P, I, and D controllers with block diagrams.	CO4	L1	12M

UNIT-III

5	a	What is the stability the of the system. Explain the procedure for Routh Hurwitz stability criterion.	CO3	L1	6M
	b	With the help of Routh's stability criterion find the stability of the following systems represented by the characteristic equations:	CO5	L3	6M

$$s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$$

OR

6		Develop the root locus of the system whose open loop transfer function is $G(s) = \frac{K}{s(s^2 + s + 13)}$	CO5	L4	12M

UNIT-IV

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

OR

8		Develop the Bode plot for the following transfer function and determine the system phase and gain cross over frequencies. $$G(s)=\frac{10}{s\,(0.4s+1)\,(0.1s+1)}$$	CO4	L4	12M

UNIT-V

9	a	Define state, state variable, state equation.	CO2	L1	6M
	b	For the state equation: $\dot{X}=\begin{pmatrix}0 & 1\\ -2 & -3\end{pmatrix}X+\begin{pmatrix}0\\1\end{pmatrix}U$ with unit step input with initial conditions as $X(0)=\begin{pmatrix}1\\1\end{pmatrix}$. Obtain the State transsion matrix.	CO6	L3	6M

OR

10	a	Explain the properties of State Transition Matrix.	CO6	L1	6M
	b	Find state variable representation of an armature controlled D.C. motor .	CO6	L2	6M

***** END *****