U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

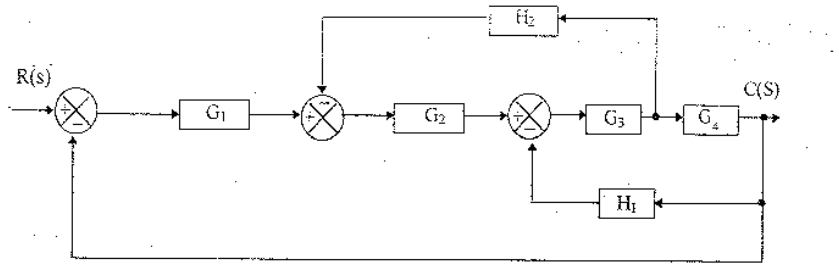
Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 23MD4ESPCS **Max Marks: 100**
Course: Physiological Control Systems

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			MODULE - I	CO	PO	Marks
1	a)		Determine the overall transfer function C(s)/R(s) of the following 	CO1	PO2	10
	b)		Enumerate the difference between Engineering and Physiological control systems with a suitable example.	CO1	PO2	10
			OR			
2	a)		With a neat block diagram explain the linear mathematical model of muscle mechanism.	CO2	PO2	10
	b)		Enumerate the difference between open loop systems and closed loop systems with a suitable example.	CO2	PO2	10
			MODULE - II			
3	a)		Illustrate the working of muscle stretch relax with a neat block diagram.	CO3	PO2	10
	b)		Derive the response of second order system for over damped case when input is unit step.	CO3	PO2	10
			MODULE - III			
4	a)		Explain the following 1. BIBO stability 2. Root locus construction rules.	CO3	PO2	10
	b)		Describe the stability analysis of the pupillary light reflex.	CO3	PO2	10
			MODULE - IV			
5	a)		Explain the process of starling heart lung preparation.	CO3	PO2	10

		b)	Justify the regulation of blood glucose with minimum number of parameter.	*CO3*	*PO2*	**10**
			MODULE - V			
	6	a)	The open lop transfer function of a unity feedback system is given as follows. Sketch the polar plot and determine the phase margin. $G(s) = \frac{(1+0.2s)\ (1+0.025s)}{s^3(1+0.005s)\ (1+0.001s)}$.	*CO4*	*PO2*	**10**
		b)	A open loop transfer function of a unity feedback system is given by $G(s)=1/s(1+s)^2$. Sketch the polar plot and determine the gain and phase margin.	*CO4*	*PO2*	**10**
			OR			
	7	a)	Define the following 1.Gain margin 2.Phase margin 3.Corner frequency 4.Gain cross over frequency	*CO4*	*PO2*	**10**
		b)	Sketch the bode plot for the following transfer function. Determine the phase margin and gain margin $G(s) = \frac{75\ (1+0.2s)}{s\left(s^2+16s+100\right)}$	*CO4*	*PO2*	**10**

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