U.S.N.										

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

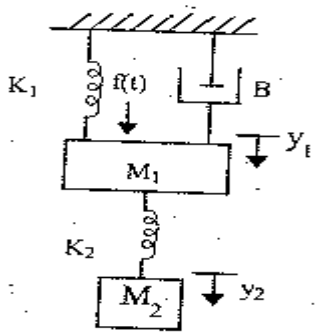
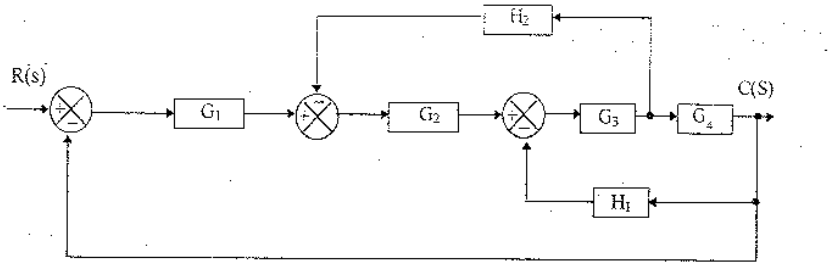
Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 22MD4PCPCS **Max Marks: 100**
Course: PHYSIOLOGICAL CONTROL SYSTEM

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.

		UNIT - I	CO	PO	Marks
1	a)	Determine the transfer function $Y_2(s)/F(s)$ of the system shown below. 	*CO1*	*PO1*	**10**
	b)	With a neat block diagram explain the linear mathematical model of muscle mechanism.	*CO1*	*PO1*	**10**
		OR			
2	a)	Determine the overall transfer function C(s)/R(s) of the following 	*CO1*	*PO1*	**10**
	b)	Enumerate the difference between Engineering and Physiological control systems with a suitable example.	*CO1*	*PO1*	**10**
		UNIT - II			
3	a)	A unity feedback control system is characterized by the following open loop transfer function G(s)=(0.4s+1)/s(s+0.6). Determine its transient response for unit step input and sketch the response. Evaluate the maximum overshoot and corresponding peak time	*CO2*	*PO2*	**10**

		b)	Illustrate the working of regulation of cardiac output with a neat block diagram	*CO2*	*PO2*	**10**
			UNIT - III			
	4	a)	Explain the following 1. BIBO stability 2. Root locus construction rules.	*CO3*	*PO3*	**10**
		b)	Elaborate on stability analysis of the pupillary light reflex.	*CO3*	*PO3*	**10**
			UNIT - IV			
	5	a)	Explain the process of Starling heart lung preparation.	*CO4*	*PO3*	**08**
		b)	Justify the regulation of blood glucose with minimum number of parameter.	*CO4*	*PO3*	**12**
			UNIT - V			
	6	a)	Define the following 1.Gain margin 2.Phase margin 3.Corner frequency 4.Gain cross over frequency	*CO3*	*PO3*	**08**
		b)	Examine the Bode plot of the linearized lung mechanics model in open and closed loop modes.	*CO3*	*PO3*	**12**
			OR			
	7	a)	Elucidate the frequency responses of the circulatory control model.	*CO3*	*PO3*	**10**
		b)	Sketch the bode plot for the following transfer function. Determine the phase margin and gain margin $G(s) = \frac{75\,(1+0.2s)}{s\left(s^2+16s+100\right)}$	*CO3*	*PO3*	**10**

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