Reg. No. :

Question Paper Code: 1216105

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024
Sixth Semester
Biomedical Engineering
U20BM601 - BIOCONTROL SYSTEMS
(Regulation 2020)

Time: Three Hours   Maximum: 100 Marks

Answer ALL questions

PART – A   (10 x 2 = 20 Marks)

1.   Define open loop and closed loop system.

2.   Difference between Engineering and Physiological control system.

3.   Name the test signals used in control system.

4.   What is centroid? How the centroid is calculated?

5.   Compare distributed parameter versus lumped-parameter models.

6.   Infer the viscoelasticity property of lung tissue.

7.   Draw the basic mechanism of the muscle stretch reflex action.

8.   Illustrate the concept of frequency response in a circulatory control model.

9.   What is excretion and give its significance?

10.   List the characteristics of biological receptors.
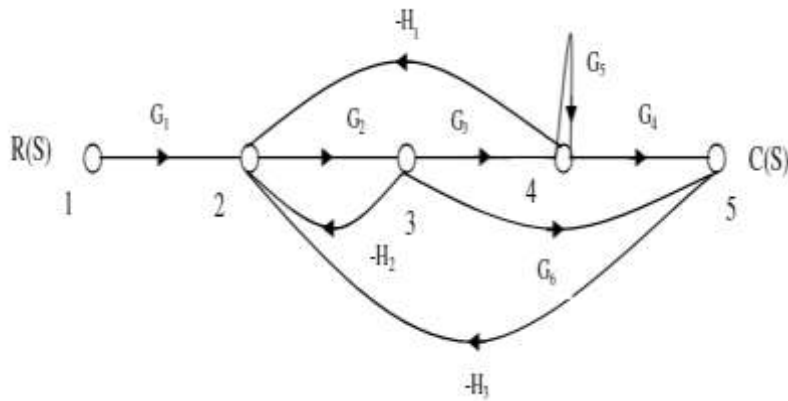
PART – B   (5 x 16 = 80 Marks)

11. (a)   Determine the overall transfer function C(S)/R(S) for the system.   (16)
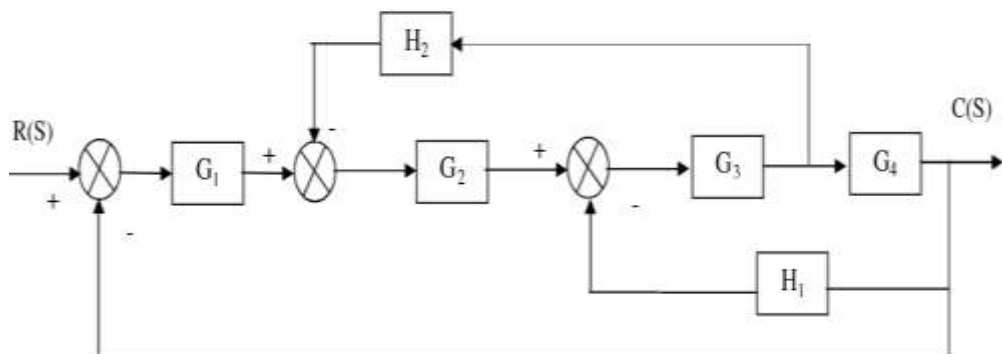
(OR)

(b) Simplify the overall gain C(s)/R(s) for the signal flow graph. (16)

12. (a) For a unity feedback control system the open loop transfer function $G(S) = \frac{10(S+2)}{s^2(S+1)}$ find

(i) The position ,Veocity and Acceleration error constants

(ii) The steady state error when the input is $R(S) = \frac{3}{s} - \frac{2}{s^2} + \frac{1}{3s^3}$ (16)

(OR)

(b) Solve an open loop Transfer Function of a unity feedback control system has an open loop transfer function G(S)=$\frac{K(S+9)}{S(S^2+4S+11)}$ Sketch the root locus of the system. (16)

13. (a) Discuss on the modeling of cardiovascular system with single feedback loop and two interacting feedback loops. (16)

(OR)

(b) Prove the mathematical model regulation of cardiac mechanics to regulate the cardiac output. (16)

14. (a) Analyze the steady state of muscle stretch reflex action with block diagram. (16)

(OR)

(b) Explain with neat block diagram model of transient response analysis of neuromuscular reflex model. (16)

15. (a) Elaborate in detail about endocrine control system modeling. (16)

(OR)

(b) Explain in detail about biological receptors and its characteristics. (16)

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