

(Extra)

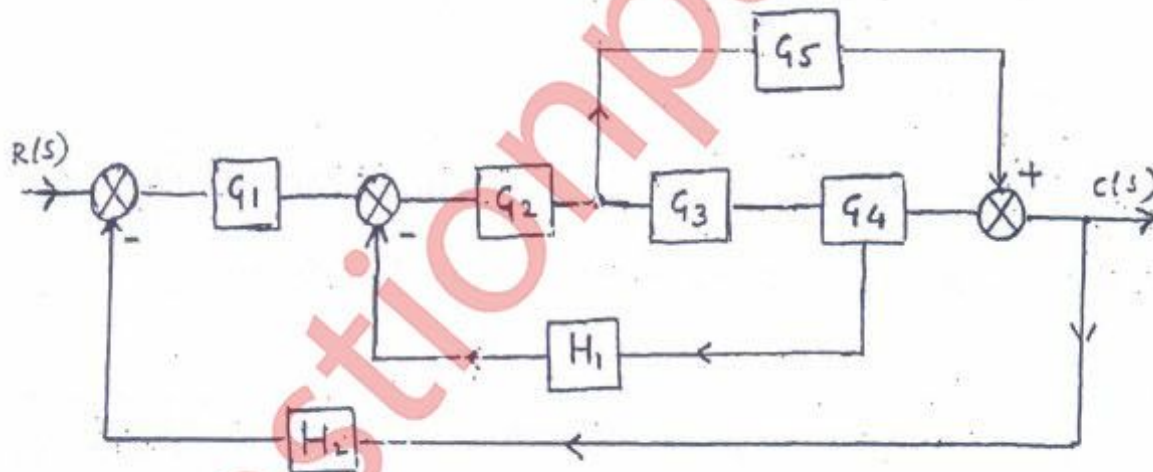
QP Code : 64275

(3 Hours)

[Total Marks : 30

- N.B. :** (1) Attempt any Four questions
(2) Justify the data which is assumed

1. Write short note 20
- Servomotors
 - Modeling of control system
 - Low cost automation
 - Derivative controller
2. (a) Obtain the transfer function for the given block diagram. 10



- (b) Explain the following terminology in SFG with suitable example. 10
- Source node
 - Forward path
 - Self loop
 - Loop gain
 - Non-touching loop

3. (a) Derive the transfer function for R-L-C network. 8

- (b) Sketch the root locus for system with $G(S) = \frac{k(S+4)}{S(S^2+2S+2)}$ 12

[TURN OVER]

4. (a) Examine the stability for following C.E. by Routh's criterion 8
 $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$
- (b) A second order system is given by $\frac{C(S)}{R(S)} = \frac{25}{S^2 + 6S + 25}$. Find its rise 8
time, peak time, peak overshoot and settling time if subjected to unit
step input. Also calculate expression for its out put response.
- (c) Explain the advantages of A. C. servo motor over D.C. servo motor. 4
5. (a) For a unity feedback system having OLTF, $G(S) = \frac{K(S+2)}{S(S^3 + 7S^2 + 12S)}$ 12
find following
(i) Type of the system
(ii) Error coefficients
(iii) Steady state error when input to the system is $\frac{R}{2}t^2$
- (b) Discuss in detail D.C tachometer and A.C tachometer 8
6. (a) For the unity feedback system having $G(S) = \frac{242(S+5)}{S(S+1)(S^2 + 5S + 12)}$ 12
sketch the bode plot and comment on stability.
- (b) Derive the state-space representation for the system having. 8

$$\frac{Y(S)}{U(S)} = \frac{S^2 + 2S + 1}{S^2 + 7S + 14S + 8}$$
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