



B.E. Sem. VI (Mechanical) (Regular)
 June - 2009
Control Engineering

10 JUN 2009

Time : 3 Hours]

[Max. Marks : 100

- Instructions :**
- (1) Attempt all questions.
 - (2) Figures to the right indicate full marks.
 - (3) Assume suitable data if necessary.

1. (a) Explain the term Standard Test Signals. Explain Step, Ramp and Sinusoidal input. (8)
- (b) What is Control System ? Which of the following are close loop control system ? State the reason also: Automatic Washing Machine, Automatic electric Iron and Missile Launcher. (8)

OR

- (a) A unity feedback system has $G(s) = k(s+1)/s^2(s+2)(s+5)$. Using Routh's Stability criterion find the range of k for the close loop system to be stable. (8)
- (b) For the System shown in Fig. 1 find system equation. (8)

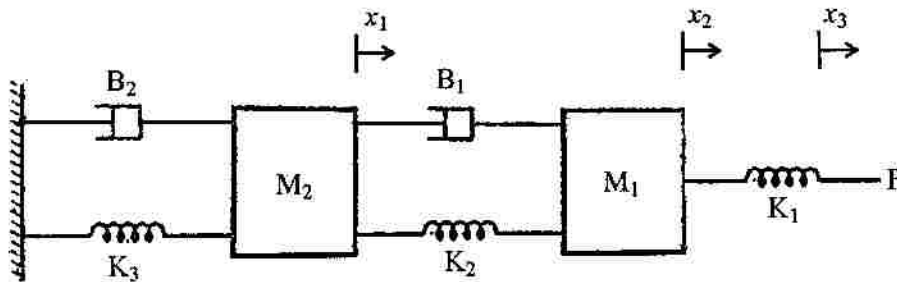


Fig. 1

2. (a) For the block diagram of Fig. 2 derive the open loop and close loop transfer function by Block Diagram reduction technique, (8)

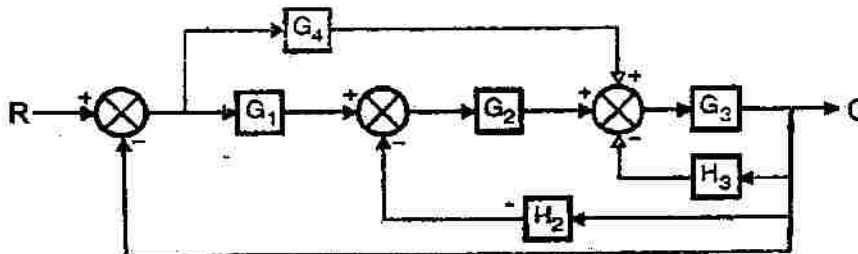


Fig. 2

- (b) What is Steady State Error ? For the given control system $G(s) = 20/s(i+4s)(1+s)$ having unity feedback determine the Static error coefficients. (8)

OR

- (a) Obtain the Time Domain Specification of given second order system for unit step input $F(s) = s^2+2.4s + 9$. (8)
- (b) Refer Fig. 3 and obtain transfer function. (8)

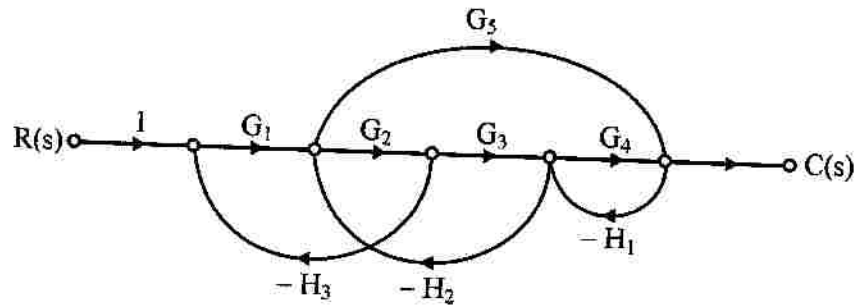


Fig. 3

3. Attempt any **three** : (18)
- (a) Draw the root locus of the system $G(s).H(s) = k / s(s+3)(s+6)$.
- (b) What is F-V and F-I analogy ?
- (c) Explain classification of control system in detail.
- (d) Define the term Delay Time, Rise Time and Peak Overshoot.
4. (a) Describe the classification of Industrial Controller according to their control action. Write down the effort of Integral and Derivative control action on system performance. (8)
- (b) Draw a schematic diagram of a remote controlled servo mechanism. Explain its working. Also determine the Transfer Function. (8)

OR

Compare Hydraulic and Pneumatic Control System. What are the elements of Hydraulic Circuit Design ? (8)

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5. (a) How will you do the maintenance of Hydraulic Control System ? (8)
- (b) Define Programmable Logic Controller. What are the components of P.L.C. ?
State the advantages of P.L.C. also. (8)

OR

- (a) Explain the concept of Fuzzy Logic with basic notion. Provide suitable examples also. (8)
- (b) Describe the Hydraulic Accumulator and Unloading valve. (8)
6. Write short note on following (any **three**) : (18)
- (a) Control system for Thermal Power Plant.
- (b) Hydraulic control of Machine Tool.
- (c) Pneumatic valves and cylinder.
- (d) Ladder Logic Diagram.
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