Question Bank

of

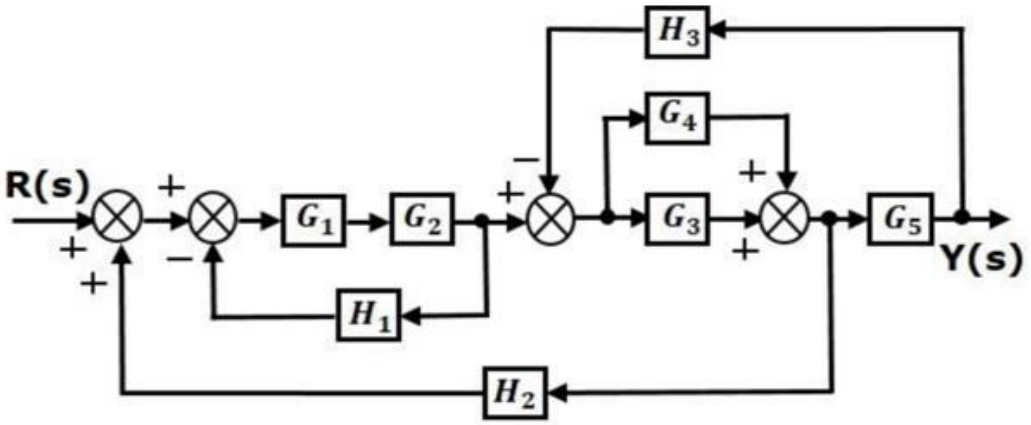
CONTROL SYSTEM ENGINEERING

2 marks questions

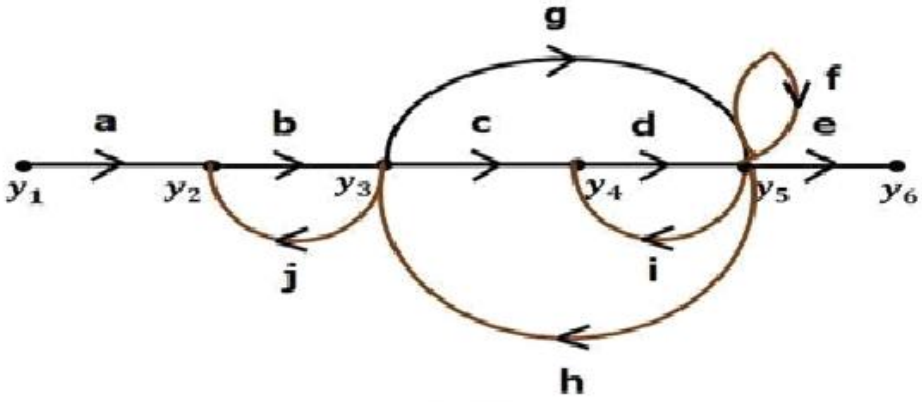
1. Define control system with an example.
2. Define feedback. What are the types of feedback?
3. What is stability?
4. Define transfer function.
5. What are node and branch?
6. Write Mason's gain formula.
7. What is time response?
8. Define test signal.
9. What is Order?
10. Define Type of a transfer function.
11. What is damped natural frequency?
12. Define steady state error.
13. Write two advantages of PI controller.
14. What is routh hurwitz criteria?
15. What is root locus?
16. Define pole and zero.
17. What is frequency response?
18. Define break away & break in point?
19. Define bandwidth
20. Define gain margin.
21. Define phase margin.
22. Define resonant frequency.
23. What is polar plot?
24. What is Nyquist stability criteria?
25. Define gain crossover frequency.
26. Define phase crossover frequency.
27. What are M & N circles?

5 marks question

1. Differentiate between open loop and closed loop feedback.
2. What are the effects of negative feedback on gain, sensitivity, bandwidth, and disturbance?
3. Find the transfer function of figure below using block diagram reduction technique



4. Write down the properties of SFG.
5. Explain time response in details with diagram.
6. Explain the types of test signal and write their mathematical & graphical representation.
7. Find Y_6/Y_1 in the figure below



8. Explain time domain specification with suitable diagram.
9. Define and explain types of controller.
10. Find the stability of the control system having characteristic equation, using RH criteria.

$$s^4 + 3s^3 + 3s^2 + 2s + 1 = 0$$

11. Draw the root locus of the control system having open loop transfer function, $G(s)H(s) = \frac{K}{s(s+1)(s+5)}$

12. What are the effects of addition of poles and zeroes in the root locus?

13. Write down the rules for construction of root locus.

14. Write down the rules for drawing polar plot.

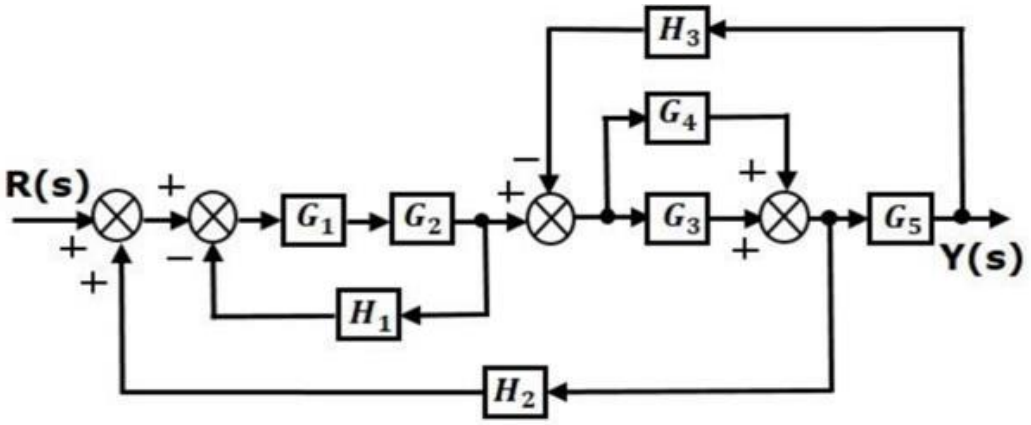
15. Draw the polar plot of the open loop system

$$G(s)H(s) = \frac{6}{s(s+2)(s+4)}$$

16. Write down the rules for construction of Nyquist plot.
17. Derivation of expression for rise time, peak time, peak overshoot.
18. What is principle of argument?

10 marks question

1. Draw the signal flow graph from the figure below. Find the transfer function using Mason's gain formula.



2. Find the steady state error for an input signal $r(t) = (5 + 2t)u(t)$ of unity negative feedback control with $(s) = \frac{5(s+4)}{s(s+2)(s+15)}$.

3. Find the stability of the control system having characteristic equation, using RH criteria.

$$s^5 + 3s^4 + s^3 + 3s^2 + s + 3 = 0$$

4. Draw the root locus of the control system having open loop transfer function G(s)H(s), and find the range of K for stability.

$$G(s)H(s) = \frac{(s+4)}{s^2(s+3)(s+9)}$$

5. Draw the Bode plot of the open loop transfer function

$$G(s)H(s) = \frac{10s}{(s+2)(s+7)}$$

6. Draw Nyquist plot of the following open loop transfer function and comment about the stability of the closed loop system.

$$G(s)H(s) = \frac{3}{s(s+1)(s+4)}$$