SHRI SANT GADGE BABA COLLEGE OF ENGINEERING & TECHNOLOGY,BHUSAWAL.

Pre University Test

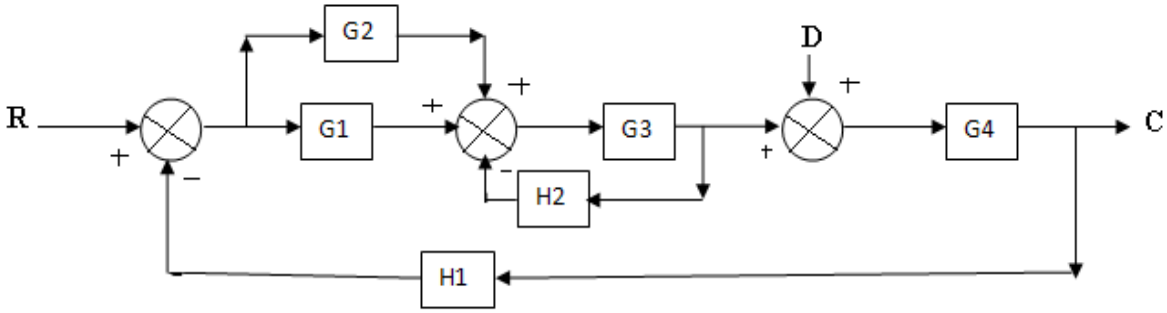
Class: - T.E **Subject: - Feedback Control System** **Session-2015-16**

QUESTION BANK

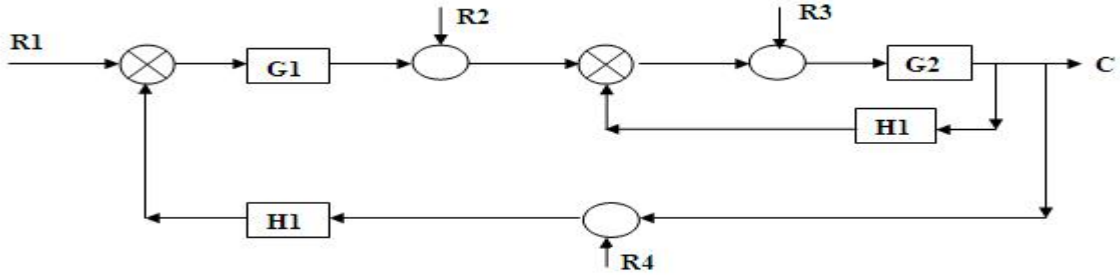
UNIT-I

1. Discuss in detail the difference between open loop & closed loop control systems with example of each. Also explain the importance of transfer function **08**

2. Find C from block diagram shown below **08**



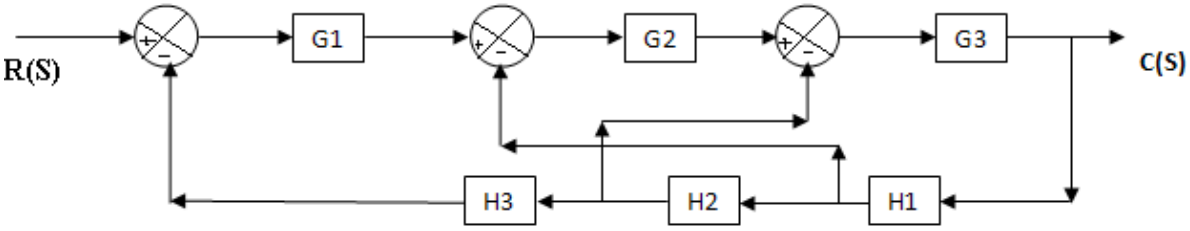
3. **08**



Find the gain using BDR

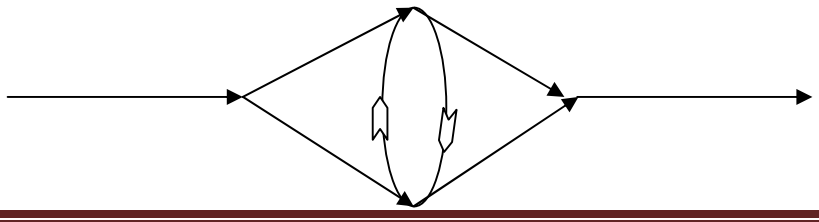
4. Explain the effect of disturbance of signals and reduction of parameters variations by use of feedback. **08**

5. **08**

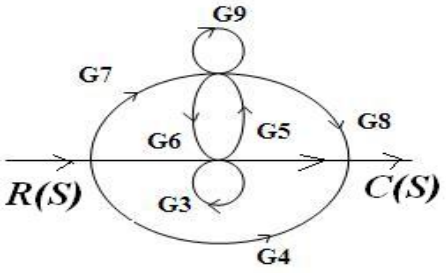


Find the transfer function of the above system using block diagram reduction technique

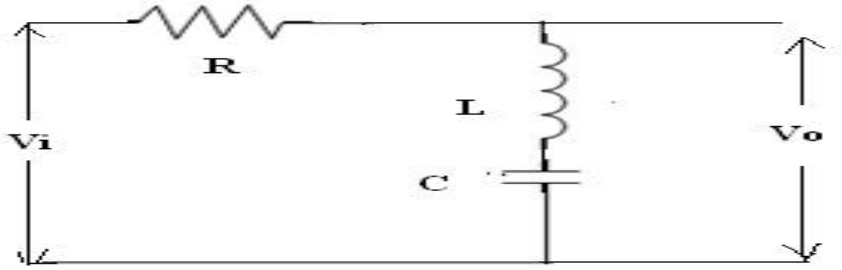
6. Find SFG **08**



7. Find T.F. by SFG **08**



8. i) Find SFG of below network **04**

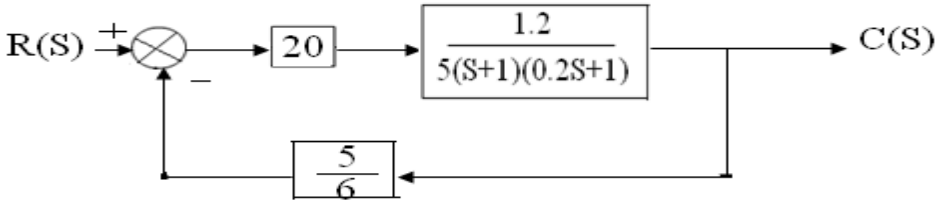


ii) Enlist the different types of systems? Explain any one of it in detail **04**

UNIT-II

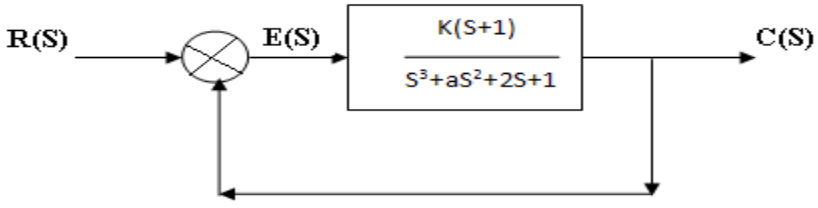
1. State and explain Routh Criterian. Write in detail as special cases of Routh's Criterian. **08**

2. The block diagram of a simple servo system is shown in the figure. Calculate all time domain specifications and hence obtain the equation for time response for a unit step i/p. **08**



3. Explain in detail role of ζ (zeta) in Second order System. **08**

4. A system oscillates with frequency ω, if it has poles at S=+ jω and no poles in the right half s-plane. Determine values of K and a, so that the system shown below oscillates at a frequency 2 rad/sec **08**

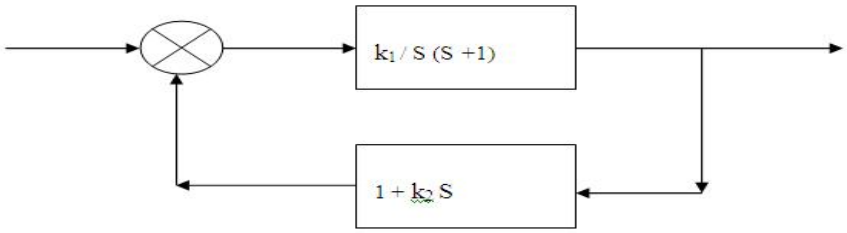


5. Derive the equation for unit step response of a second order system for which damping factor is less that 1.

6. Find the restriction on K so that the system having T.F. given below is absolutely stable

$$G(s) = K/ S (1+0.5 S)(1+0.1 S) \quad \text{and } H(s)= \text{Unity}$$

7. For the system shown in figure determine values of k_1 and velocity feedback constant k_2 **08**
So that the maximum overshoot in the unit step response is 0.2 and peak time is 1 Sec. Also obtain time and settling time with these values of k_1 and k_2



8. A second order system is given by $C(s)/R(s) = 25/S^2+6S+25$ find its rise time, peak time, peak overshoot and settling time if subjected to unit step input. Also calculate expression for its response. **08**

UNIT-III

1. Draw the Root locus for **08**

$$GH(s)= K (S+5) / S (S+2)$$

2. Draw the complete root locus of a system having **08**

$$G(s) H(s) = [K/S(S+1)(S+2)(S+3)]$$

And find the range of K for stability

3. i) Give different steps to design a lag compensator using root locus. **08**
ii) Discuss the effect of addition of poles and zeros on the stability in root locus

4. Draw the complete root locus of a system having **08**

$$G(s) H(s) = [K/S(S+1)(S+2)(S+3)]$$

And find the range of K for stability

5. Draw the Root locus for **08**

$$GH(s)= K / S (S+3) (S + 6)$$

Obtain the value of K when ζ (zeta)=0.6 from the locus

6. i) Find angle of departure for **04**

$$GH(s)= K / S (S+5) (S^2 + 6S+64)$$

ii) Write steps to solve Root locus **04**

7. Explain the effect of addition of open loop poles and zeros on the root locus. State the advantages of root locus and define root counter. **08**

UNIT-IV

1. For a certain control system **08**

$$G(S) H(S) = [K/S(S+2) (S+10)]$$

Sketch the Nyquist plot and hence calculate the range of K for stability

2. $$GH(s)= K / S (S+1) (S+10)$$ **08**

Determine value of K so that i) GM=12 db and ii) PM = 30

3. Sketch the asymptotic Bode plot for the system having open loop transfer function given as $[2(S+0.25)/S^2(S+1)(S+0.5)]$ **08**
Find the value of GM and PM. Hence decide about stability

4. Sketch Nyquist Plot for the system **08**

$$GH(S)= K(S+10)^2 / S^3$$

Show that the feedback system is stable for $K > 5$
Determine the gain margin when $K=7$

5. Explain the concept of Nyquist plot. Also discuss which steps are adopted to sketch the Nyquist plot. **08**

6. A system has a open loop transfer function with poles located at 0,-4 and -10 and zero located at -2 with gain K. Draw the bode plot and find the value of K such a that phase margin is 30° **08**

7. Construct the asymptotic plot for the open loop T.F. **08**

$$G(S)\,H(S) = [30/S\,(1+0.5S)\,(0.08S)]$$

Determine gain margin, phase margin and closed loop stability

8. i) Sketch roughly polar plot for 1/S, 1/(S+6)(S+2) **04**
ii) Give conditions for stability for Bode plot, Nyquist Plot and Polar plot **04**

UNIT-V

1. Explain PID type of controller and discuss its effect in the system. **08**

2. For a single input single output control system overall transfer function is given by **08**

$$T(S) = [S^2+4S+4/S^3+5S^2+4S]$$

Represent the state model in canonical form, draw the state diagram and find matrices A, B, and C

3. Explain Controllability and observability **08**

4. i) Discuss in brief properties of state transition matrix **08**
ii) Write a short notes on PI type of controller and discuss its effect in the system

5. Write Short Note on **08**
i) Stepper Motor
ii) Servo

6. Give difference between PI & PD controller **08**