**B.E/ B.Tech Electronics and Communication Engineering**
**Semester: 4- R-2004 NOV/DEC 2011**
**EC 285 Control Systems**

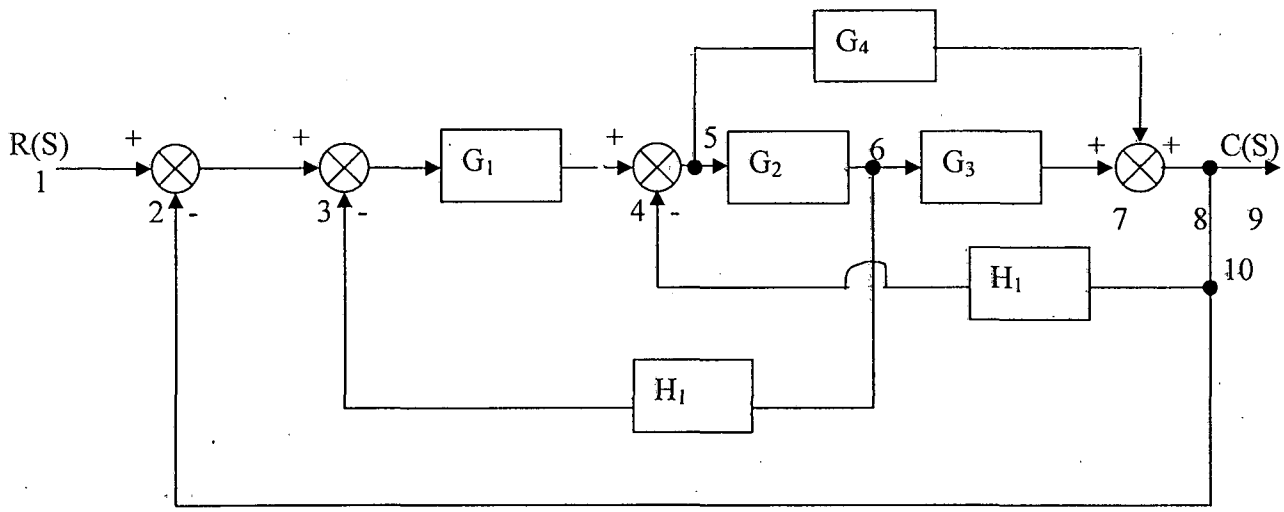
Time: 3 Hours Max.Mark: 100

Answer all Question
**Part-A** (10x2=20 Marks)

1. Define open loop control system.
2. Define transfer function.
3. What is the drawback in P-controller?
4. Define Ramp signal:
5. What are advantages of frequency response analysis ?
6. Define corner frequency ?
7. What is routh stability condition?
8. What is a Nichols plot?
9. Write the properties of state transition matrix.
10. What is resolvant matrix?

**PART B**

11. Convert the block diagram to signal flow graph and determine the transfer function using mason's gain formula.




12.

a. The unity feedback system is characterized by an open loop transfer function G(s) = K/s(s+10). Determine the gain K, so that the system will have a damping ratio of 0.5 for this value of K. Determine settling time, peak overshoot and time to peak overshoot for a unit step input.

**(OR)**

b. Explain PD and PID controllers.

13.

a. Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies. $G(s) = 10/s(1+0.4s)(1+0.1s)$

**(OR)**

b. The open loop transfer function of a unity feedback system is given by $G(s) = 1/s(1+s)(1+2s)$. Sketch the polar plot and determine the gain margin and phase margin.

14.

a. Write the rules and procedure for construction of root locus.

**(OR)**

b. Construct Routh array and determine the stability of the system whose characteristics equation, $s^6+2s^5+8s^4+12s^3+20s^2+16s+16 = 0$. Also determine the number of roots lying on the half of s-plane and on imaginary axis.

15.

a. Explain the concept of state variable and state model.

**(OR)**

b. Consider the mechanical system shown ,consisting of two platforms coupled to each other and to ground via springs and dashpot dampers.choosing suitable state variables,construct a state model of the system.