

ANNA UNIVERSITY COIMBATORE

B.E/B.TECH. DEGREE EXAMINATIONS: MAY/JUNE 2010

REGULATIONS: 2008

FOURTH SEMESTER

080280033-CONTROL SYSTEMS

(COMMON TO EEE/EIE/ICE)

TIME: 3 Hours

Max.Marks:100

PART-A

(20*2=40 MARKS)

ANSWER ALL QUESTIONS

1. Distinguish between open loop and closed loop system.
2. What is the effect of positive feedback on stability?
3. What is synchro pair?
4. Write the transfer function of PI, PD and PID controllers.
5. Define damping ratio.
6. The closed loop transfer function of a second order system is given by $200/s^2+20s+200$.
Determine the damping ratio and natural frequency of oscillation.
7. Define settling time.
8. The damping ratio of a system is 0.75 and the natural frequency of oscillation is 12 rad/sec. determine the peak overshoot and the peak time.
9. Define gain margin.
10. Define corner frequency.
11. Give the significance of polar plot in finding frequency response.
12. Define minimum and non minimum phase system.
13. What will be the nature of impulse response if the roots of characteristic equation are lying on right half s-plane?
14. What is breakaway and break in point? How to determine them?
15. How will you find root locus on real axis?

16. What are asymptotes? How will you find the angle of asymptotes?
17. The damping ratio of system is 0.6 and natural frequency of oscillation is 8 rad/sec.
Determine the rise time.
18. Write transfer function of lag-lead compensator.
19. Compare series compensator and feedback compensator
20. Draw electrical lag-lead compensator network.

PART-B

(5*12=60 marks)

ANSWER ANY FIVE QUESTIONS

21. Using block diagram reduction technique find the closed loop transfer function of the system whose block diagram is shown below. (12)
22. Derive the expressions for rise time, peak time and peak overshoot.
23. Sketch the bode plot and hence find gain cross over frequency, phase cross over frequency, gain margin and phase margin(s) $=0.75(1+0.2s)/s(1+0.5s)(1+0.1s)$ (12)
24. The characteristic polynomial system is $S^7 + 9S^6 + 24S^5 + 24S^4 + 24S^3 + 24S^2 + 23S + 15=0$. Determine the location of roots on s-plane and hence the stability of the system. (12)
25. Explain the procedure for finding the transfer function of lead compensation and lag Compensation. (12)
26. Find the overall gain of the system whose signal flow graph is shown in figure below. (12)
27. The open loop transfer function of a servo system with unity feedback system is $G(s) = 10/s(0.1s+1)$. Evaluate the static error constants of the system. Obtain the steady State error of the system when subjected to an input given by the polynomial $r(t)=a_0 + a_1t + a_2/2t^2$. (12)
- 28 (a). Derive the expressions and draw the response of first order system for unit step input. (6)
- (b). Draw and explain the response of second order system for critically damped case and When the input is unit step. (6)

*****THE END*****