AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Sessional Test-2

Course: B.Tech | **Semester: V**
Session:2017-18 | **Branch: EN**
Subject: Control System | **Sub.Code: NEE-503**
Max Marks:50 | **Time: 2 hours**

Note: Answer all the sections.

Section-A (2*5=10)

A. Attempt all parts:

1. Define absolute stability and Relative stability of a system.
2. Enlist the limitations of Routh-Hurwitz criteria.
3. What is the effect of adding poles and zeros to the closed loop transfer function.
4. Draw time domain step response curve of a second order system and indicate important specifications.
5. A unity feedback system has forward path transfer function $G(s)= \frac{5(s^2+2s+100)}{s^2(s+5)(s^2+3s+10)}$, find K_P, K_V, and K_a for the system.

Section-B (5*5=25)

B. Attempt all parts:

6. What is the effect of P-I controller on steady state error of the second order system with a unit ramp input. Prove your answer mathematically.
7. Explain Construction and working of A.C servomotor. Also discuss its torque speed characteristics.
8. Examine stability of a system with following characteristic equation:
   $F(s)= s^6 + 3s^5 +4s^4 +6s^3 +5s^2 +3s+2=0$
9. What is steady state error? Discuss positional, Velocity and acceleration error constants for type- 0 , type-1 and type-2 systems.
10. Consider the system shown in Fig.1. Determine the value of k such that the damping ratio is 0.5. Also, obtain the rise time(t_r), peak time(t_p), maximum overshoot (M_p), settling time (t_s) and time response of the system to a unit step input.

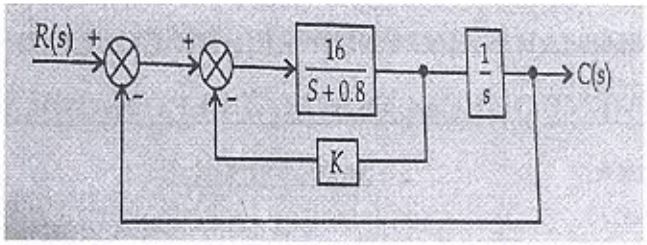

Fig.1

Section-C **(2*7.5=15)**

C. Attempt all parts:

11. Sketch the complete root locus for the system having

$$G(s)H(s) = \frac{K}{s(s+3)(s^2+3s+11.25)}$$

12. Derive the expressions for rise time and maximum peak overshoot of the second order system in time domain. Also define the settling time and rise time for second order system.