



PAPER ID : 2066

TEE-405

Printed Pages : 3

Paper ID and Roll No. to be filled in your Answer Book

Roll No.

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B. Tech.

(SEM. IV) (EVEN SEM.) EXAMINATION, 2013

CONTROL SYSTEM

Time : 2 Hours]

[Total Marks : 50

Note : Attempt all questions, the marks assigned to each question is indicated at question itself.

- 1 Attempt any **four** : 20
- (a) Describe the effect of addition of poles and zeroes to the close loop transfer function.
 - (b) How the dynamics are affected by the feedback system ?
 - (c) How gain and phase margin are determined, explain these with the help of one example?
 - (d) Solve by Laplace transform's method the initial value problem $Y'' = 10$, $Y(0) = Y'(0)$.
 - (e) How gain and phase margin is determined, explain these with the help of one example.
 - (f) How relative stability assesment is done explain it in detail ?

2 Attempt any four :

10

- (a) A 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.
- (b) What are different error coefficients of the control system ? Explain.
- (c) Explain the stability concept in control system and explain how it determined.
- (d) Plot the frequency response of the first order system to a unit step and unit ramp input.
- (e) For a feedback control system
 $G(s) = K / (s+1)(s+3)(s+4)$
Calculate the value of K at which the system would become oscillatory in the closed loop [H(s) = 1], and obtain the frequency of such oscillations.
- (f) What are standard test signal ?

3 Attempt any two :

10

- (a) A unity feedback control system is characterized by the open loop transfer function
 $G(S) = K(S+13)/S(S+3)(S+7)$
Using the Routh criterion, calculate the range of K for the system to be stable.
- (b) Draw the root locus of the system whose open loop transfer function
 $G(S)H(S) = K/ S(S+3)(S^2+2S+2)$
- (c) Show that the transfer function of $dy/dt = u$, is $G(s) = 1/s$ and that of $y(t) = u(t-T)$ is $G(s) = e^{-sT}$.

4 Attempt any two :

10

- (a) Sketch the Bode plot for the transfer function
 $G(S)H(S) = 2(S+0.25)/ S^2(S+1)(S+0.5)$
Determine the Gain cross over frequency and phase cross over frequency.
- (b) Sketch the Nyquist plot for the system
 $G(S)H(S) = 60/ (S+1)(S+2)(S+5)$
Determine the stability of close loop system.
- (c) Explain in detail polar and inverse polar plots.