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Paper Code & Roll No. to be filled in your Answer Book

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B. Tech. EEE

UTU (SEM.-VI) Examination-2015

Control System

Time : 3 Hrs.   Max. Marks :100

Instructions:

All questions are Compulsory.

1. Attempt any **Four**   (5×4=20)

a) Discuss the effect of feedback on sensitivity.

b) Explain the Routh Hurwitz Criteria for determining the stability of a system.

c) What is the significance of time constant in first order systems.

d) Write down the salient feature of root locus plot.

e) What are M,N Circles?

f.) Why is closed loop control system is preferred over open loop?

2. Attempt any **Four.**   (5×4=20)

a) Differentiate between open loop and closed loop systems.

b) Explain the root locus technique for determining the stability of a system.

c) What are the merits and demerits of frequency domain analysis?

d) How steady state error of a control system is determined? How it can be reduced?

e) Define ramp-error constant for a control system.

f.) Explain basic rules of block diagram reduction.

3. Attempt any **Two.** (10×2=20)

a) Find the range of K for stability of

$S^4+2S^3+25^2+(3+K)S+K=0$, for K>0.

b) The open loop transfer function of a control system is given by

$G(s)H(s)=K/s(s+6)(s2+4s+13)$

Sketch the root locus

c) Give the procedure of designing of a cascaded lag-lead compensator for a linear control system.

4. Attempt any **Two.** (10×2=20)

a) Represent the following set of equations by a signal flow graph and determine the overall gain relating X_5 and X_1

$X_2=ax_1+fx_2$

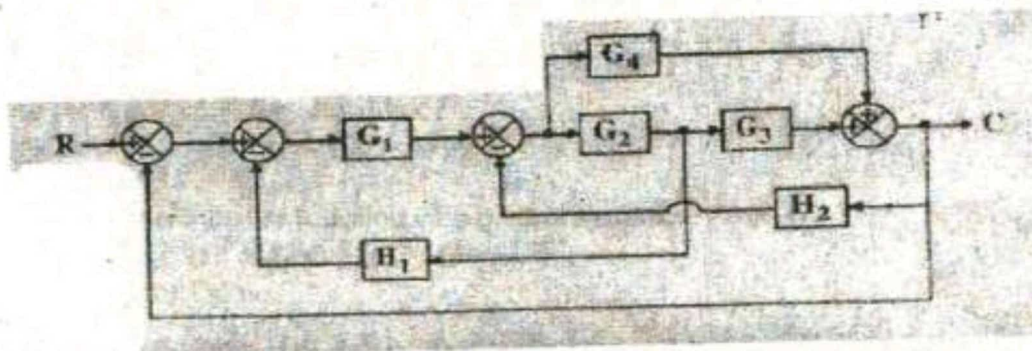$X_3=bx_2+ex_4$

$X_4=cx_3+hx_5$

$X_5=dx_4+gx_2$

(2)

b. Draw a phase lead Compensation network. How the effect of zero is dominated in it?

c. The Open loop transfer function of a system is given as follow. And Comment on the stability of the system using Nquist Plot.

$G(s)=k/(s+1)$

5. Attempt any **Two**. (10×2=20)

a. Explain the PI, PD, PID controllers.

b With respect to transient response of a second order system for step input, define the following:

i) Time delay

ii) Rise time

iii) Settling time

iv) Peak time

v) Maximum overshoot

c. Determine C/R of the following system:

—X—

(3)