

C 6118

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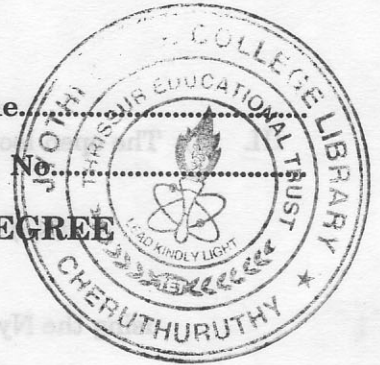
Name.....

Reg. No.....

**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, JUNE 2010**

EC 04 603—CONTROL SYSTEMS

(2004 Admissions)



Time : Three Hours

Maximum : 100 Marks

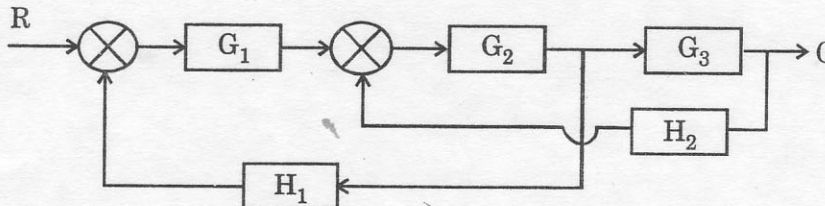
- I. (a) Explain the role of computers in automatic control.
(b) Explain the advantages and applications of block diagram reduction technique.
(c) Explain the concept of stability with an example.
(d) Explain the procedure for constructing Root locus with an example.
(e) List the properties of Z-transform. Prove any *two* properties.
(f) State and explain Jury's stability criterion.
(g) Define and explain :
1 State variables.
2 State vector.
3 State space.
(h) Obtain the relation between transfer function and transfer matrix.

(8 × 5 = 40 marks)

II. (a) Derive Mason's gain formula. Explain the steps in detail.

Or

(b) Find C/R for the block diagram shown in Figure.



Turn over

III. (a) The open loop transfer function of control system is :

$$G(s) = \frac{(1 + 4s)}{s^2 (1 + s)(1 + 2s)}$$

using the Nyquist criterion, determine whether the closed loop is stable or not.

Or

(b) For the function

$$GH(s) = \frac{20 (HST_z)}{s(s+1)(s+4)}$$

plot the root contour with Tz as the varying parameter.

IV. (a) Prove all the properties of Z-transform.

Or

(b) Write technical notes on :

(i) Bilinear transformation. (7 marks)

(ii) Cyclic and multi-rate sampling. (8 marks)

V. (a) Using Jury's test, check the stability of the system described by :

$$y(nT) = 0.5y(nT - T) - 0.12y(nT - 2T) + x(nT - T) + x(nT - 2T).$$

Or

(b) Write short notes on :

(i) SISO system. (7 marks)

(ii) State space representation of Discrete time systems. (8 marks)

[4 × 15 = 60 marks]

