C 14723 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION DECEMBER 2010

EE 04 603—CONTROL SYSTEMS—I

(2004 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

I. (a) Define state variables, state space and state vector.

(b) Explain the properties of state transition matrix.

(c) State Shannon's sampling theorem.

(d) Explain the Routh's stability criterion for discrete data systems.

(e) Explain the applications of Nichol's chart.

(f) Explain the specifications of logarithmic plots.

(g) Give an introduction to CS tool box in MAT LAB.

(h) Explain PI control.

(8 × 5 = 40 marks)

II. (a) Consider a system described by

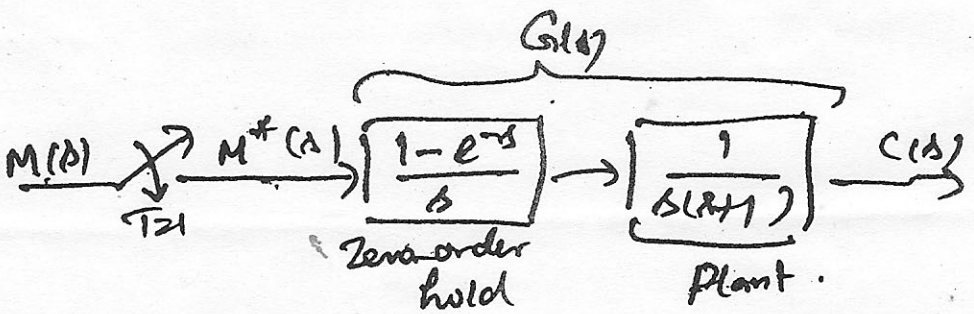
$$\dddot{y} + 3\ddot{y} + 2\dot{y} = u\,.$$

Derive a state space representation of the system. Choose the state variables such that the coefficient matrix of the state vector is diagnosed.

Or

(b) Explain bounded input and bounded output stability in detail. (15 marks)

III. (a) Obtain the pulse transfer function of the system shown in figure below.



Or

(b) Explain the sampling process and give the mathematical analysis. (15 marks)

Turn over

IV. (a) Discuss the construction of root locus and effect of poles and zeros on the root locus.

Or

(b) Explain the stability from polar and Bode plots. (15 marks)

V. (a) Explain lead-lag and lead-lag compensation using RC networks.

Or

(b) Explain the design of discrete data systems using frequency response and root locus materials. (15 marks)

[4 × 15 = 60 marks]