Roll No. ..... Total Pages : 3

BT-8/M-20 **38014**

ADVANCED CONTROL SYSTEMS

Paper–ECE-422E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

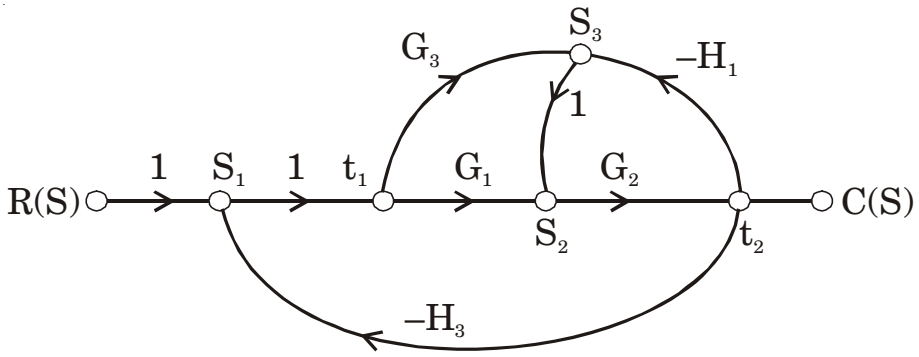
UNIT–I

1. Transfer function of a system is given by : 20

$$\frac{Y(s)}{U(s)} = \frac{2}{s^3+6s^2+11s+6}$$

Find the Controllability and Observability of the system.

2. For the signal flow graph shown in fig., calculate the following : 20



(a) Transfer function of the above system.

(b) Explain ON/OFF control action.

UNIT–II

3. Discuss in detail the phase portrait of second order system with non-linearities. 20

4. Discuss the following : 20

(a) Method of isoclines.

(b) Limit cycle.

UNIT–III

5. (a) Derive an expression for state description of systems with dead time.

(b) Write a note on saturation/columb friction and backlash. 20

6. (a) Discuss linear approximation of non-linear systems.

(b) What do you understand by state description functions? Discuss in detail. 20

UNIT–IV

7. Explain in detail : 20

(a) Sampling and impulse modulation.

(b) Mathematical analysis of sampling process.

8. Discuss any two of the following : 20

(a) Shanon's theorem.

(b) Jury's test of stability.

(c) Schur-Cohn stability criterion.