

MASTER OF VOCATION
Robotics and Automation
Subject: Automatic Control System
Subject Code: EE-901
Semester: Third
July 2021
Theory (External): 70 Marks
Time: 03 Hours

6. Explain the following terms:
 (a) PID modes of feedback control
 (b) Time Response of First order signal
7. Define Polar Plot explain each step sequentially.
8. For a given transfer function. Obtain State model.

$$G(s) = \frac{y(s)}{u(s)} = \frac{k(C_2s + C_1)}{s^3 + a_3s^2 + a_2s + a_1}$$

==END OF PAPER==

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 2 marks.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number

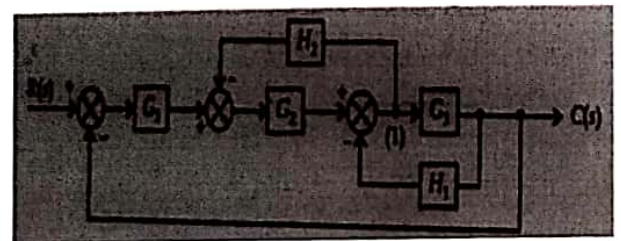
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SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x2=20 Marks)

- A. Define Break away point.
- B. How will you obtain angle of arrival and angle of departure of root locii.
- C. State the advantages of R-H criteria.
- D. State advantages of state space techniques.
- E. Explain Stepper Motor.
- F. What are the types of system?
- G. What is state vector and state model
- H. Define unit step response.
- I. Define transfer function for a linear system.
- J. Give classifications of feedback on control system.

SECTION -B (ESSAY TYPE QUESTIONS)
(5x10=50 Marks)

1. Find the C(s)/R(s) ratio of the given system using Block Reduction.



2. Difference between :
 - (a) Open Loop and Closed Loop system
 - (b) Mechanical and Electrical network
3. Investigate the stability using R-H criteria.

$$S^5+2S^4+2S^3+4S^2+11S+10$$
4. The forward path transfer function of a unity feedback system is given by

$$G(s) = \frac{k}{s(s+3)(s+4)}$$

Sketch the root locus varies from zero to infinity.

5. Sketch the Nyquist plot and determine the stability of a unity feedback control system.

$$G(s) = \frac{k}{(1+sT_1)(1+sT_2)}$$