

2207E088

**DIPLOMA OF VOCATION**

**Industrial Electronics**

**Subject: Control System**

**Subject Code: EDCS-206**

**Semester: Fourth**

**July 2022**

**Theory (External): 35 Marks**

**Time: 03 Hours**

6. For the given transfer function of the closed loop system construct the root locus and predict the stability.

$$G(s)H(s) = \frac{K}{s(s+5)(s+10)}$$

7. Determine the stability of the system whose characteristic equation is given by

$$2s^4 + 5s^3 + 5s^2 + 2s + 1 = 0$$

8. Draw the signal flow graph for the following set of equation and find the transfer function using Mason's gain formula.

$$x_2 = x_1 + ax_5$$

$$x_3 = bx_2 + cx_4$$

$$x_4 = dx_2 + ex_3$$

$$x_5 = fx_4 + gx_3$$

$$x_6 = x_5$$

===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 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 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)**  
(10x1=10 Marks)

- A. Benefits of feedback:
- Performance of system is greater.
  - Need for system much larger path gain and system instability.
  - Controlled variable accurately follows the desired value
  - Affected by parameter variations
- B. Feedback always increases the gain?
- True
  - False
- C. While increasing the value of gain K, the system becomes
- Less stable
  - More stable
  - Unstable
  - Absolute stable
- D. The main objective of drawing root locus plot is :
- To obtain a clear picture about the open loop poles and zeroes of the system
  - To obtain a clear picture about the transient response of feedback system for various values of open loop gain K
  - To determine sufficient condition for the value of 'K' that will make the feedback system unstable
  - Both b and c
- E. What is servomechanism where it is used?
- F. What do you understand by pole and zeros of a system?
- G. What is gain margin and phase margin.

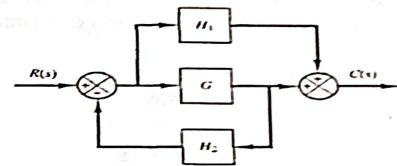
H. What is signal flow graph?

I. What is control system?

J. Define open loop system.

**SECTION -B (ESSAY TYPE QUESTIONS)**  
(5x5=25 Marks)

1. Simplify the block diagram and obtain the transfer function  $C(s)/R(s)$ .



2. Write short notes on:
- linear and non-linear systems
  - chemical and electrical systems
3. Explain the elements of a closed loop control system with the help of block diagram.
4. Define steady state error. Derive the values of static error coefficients and steady state error for a type 0 system with unit step input.
5. Write short note on:
- test signal for transient analysis
  - time response specifications.