



## Term Evaluation (Even) Semester Examination March 2025

Roll no.....

Name of the Course: B.Tech. ECE

Semester: IVth

Name of the Paper: Control System

Paper Code: TEC 401

Time: 1.5 hour

Maximum Marks: 50

**Note:**

- (i) Answer all the questions by choosing any one of the sub-questions
- (ii) Each question carries 10 marks.

Q1.

(10 Marks)

Co 1

- a. Derive closed loop transfer function of a feedback control system whose forward path transfer function is  $G(s)$  and feedback path transfer function is  $H(s)$

OR

- b. Draw signal flow graph for the following set of simultaneous equations and determine its transfer function using Mason's Gain Formula

$$X_2 = 3 X_1 + 2 X_2$$

$$X_3 = 4 X_1 + 5 X_2 + 7 X_3$$

$$X_4 = 6 X_2 + 8 X_3$$

Q2.

(10 Marks)

Co 2

- a. Check the following system for its linearity and time variance

$$Y(t) = 3 x(t) + 6$$

OR

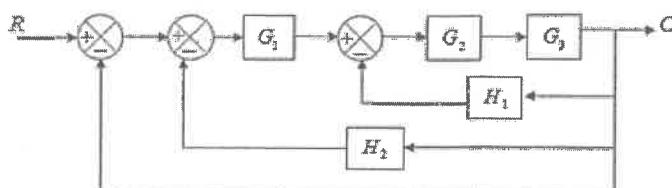
- b. Differentiate between open loop and closed loop control system.

Q3.

(10 Marks)

Co 1, Co 2

- a. Derive overall transfer function for the following block diagram -



OR

- b. Write short notes on (i) LVDT (ii) Potentiometer (iii) Performance Indices

Q4.

Co 2

a.

Indicate rise time, peak time, steady-state error and settling time in an under damped unit step response of a second order system. Mention formulae for rise time and settling time.



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(10 Marks)

OR

- a. Determine unity feedback control system response, whose transfer function is given as  
 $C(s)/R(s) = 1/(1+5s)$

Q5.

(10 Marks)

CO3

- a. Derive the expression for Maximum overshoot percentage for under damped system in a feedback second order control system

OR

- b. Derive the unit step response for a second order system in the case of underdamped response and represent it graphically.