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Test-1(Sept.18)

(Research Scholar ECE)

COURSE CODE: 16M1WEC231

MAX. MARKS:15

COURSE TITLE: ADVANCED CONTROL SYSTEMS

MAX. TIME: 1 Hr

Note: Carrying and use of mobile phone is not permitted in examination hall.

Q.1: A unity feedback system is characterised by the open-loop transfer function

$$G(s) = \frac{1}{s(0.5s+1)(0.2s+1)}$$

Determine the steady-state error, rise time, peak time, peak overshoot and settling time to the unit step input. [5]

Q.2 Find and plot the solution of state equation and output :

$$\dot{x}(t) = Ax(t) + bu(t)$$

$$y(t) = cx(t)$$

$$\text{Where, } A = \begin{bmatrix} 0 & 1 \\ 1 & -5 \end{bmatrix}; \quad b = \begin{bmatrix} 0 \\ 1 \end{bmatrix}; \quad c = [1 \quad 0]$$

[5]

Q-3: a) Derive the describing function for the on-off relay having unity magnitude? [2.5]

b) Explain the networked control system (NCS) with the help of one example? Also, give its block diagram. [2.5]