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School of Engineering

B.TECH Mechanical Engineering

Mid Term Examination - May 2024

Duration : 90 Minutes

Max Marks : 50

Sem VI - G3UB605T - Automatic Control SystemsGeneral Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) What is an error detector in a control system? K2 (2)
- 2) Name three reasons for using feedback control systems and at least one reason for not using them. K1 (3)
- 3) What is the laplace tranform of the following function $f(t)=Ae^{-at}\dagger u(t)$. K2 (4)
- 4) List five specifications for a second-order underdamped system. K2 (6)
- 5) Given the transfer function of Equation shown, find ζ and ω_n . K3 (6)

$$G(s) = \frac{36}{s^2 + 4.2s + 36}$$

- 6) Given the following differential equation, solve for $y(t)$ if all initial conditions are zero. Use the Laplace transform. K3 (9)

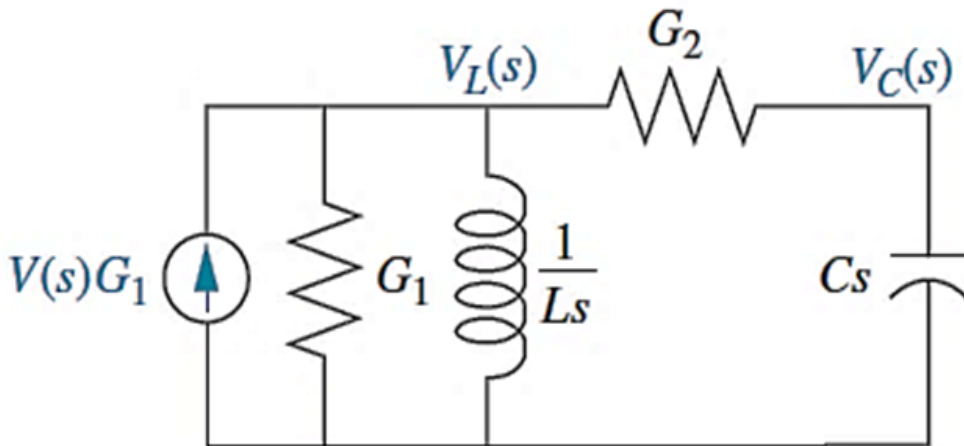
$$\frac{d^2y}{dt^2} + 12\frac{dy}{dt} + 32y = 32u(t)$$

- 7) Find the inverse Laplace transform of K4 (8)

$$F(s) = 10/[s(s + 2)(s + 3)^2].$$

- 8) For the network of Figure shown here, find the transfer function, $V_C(s)/V(s)$, using nodal analysis and a transformed circuit with current sources.

K4 (12)



OR

Write, the mesh equations for the network shown in Figure

K4 (12)

