Roll No. .....

24357

B. Tech. (ME) 6th Semester (Re-appear) Examination – October, 2020

AUTOMATIC CONTROL

Paper : ME-308-F

Time : 1.45 Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any ***three*** questions. All questions carry equal marks.

1. Explain the following terms :

(a) Active Vibration Control

(b) Error Constants

(c) Equivalent Unity Feedback System

(d) Gain and Phase Margins

(e) Pulse Transfer Function

2. What is control system ? Explain types of control system along with their applications.

3. What are controllers ? Explain hydraulic and pneumatic controllers.

4. Solve the following differential equation and find current '*i*', if unit step input voltage is applied to the system :

$$i(0+) = 1,\ \frac{di}{dt}(0+) = 2$$

$$\frac{d^2i}{dt^2} + 4\frac{di}{dt} + 5i = 5\mu(t)$$

5. Explain open and closed loop transfer function in detail.

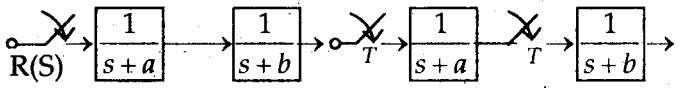
6. Comment on the stability of the system whose characteristic equation is

$$s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0\,.$$

7. Find the points of intersection of root loci with imaginary axis for the system

$$G(s)H(s) = \frac{K}{s(s+4)(s^2+4s+13)}\,.$$

8. Find the pulse transfer function for the following arrangements :



G_1 G_2 G_1 G_2

9. Consider the system defined by following differential equation :

$$\frac{d^3c(t)}{dt^3} + \frac{5d^2c(t)}{dt^2} + \frac{8dc(t)}{dt} + \frac{12c(t)}{dt} = 5r(t)$$