Fourth Semester B.Tech Degree Examination April 2015

(2013 Scheme)

Branch: Electronics and Communication Engineering

13.405 CONTROL SYSTEM THEORY (A)

(*Model Question Paper*)

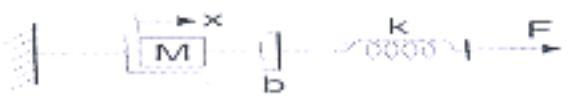
Time: 3Hrs Max Marks: 100

PART-A

Answer ***all*** *questions*

1. Find the transfer function of a system described by differential equation $\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + 4y = \frac{d^2y}{dt^2} + 5x$

2. Draw the force –current analogy of the system shown.



3. A unity feedback control system has the following open loop transfer function $G(s) = \frac{25}{s(s+10)}$. Find its natural frequency of oscillation.

4. Determine the poles and discuss the stability of the system with respect their position $T(s)=(s-2)/(s+4)(s^2+2)$

5. The characteristic equation of a feedback control system is given by $5S^4-2S^3+3S^2+2S+16=0$. Comment on its stability.

6. The characteristic equation of a feedback control system is given by $S^4+20S^3+15S^2+2S+K=0$ Determine the range of values of K for the system to be stable using Routh stability criterion.

7. Obtain the magnitude and phase plot for a system with open loop transfer function $G(s)H(s) = \frac{1}{(s+10)}$

8. Draw the root locus plot for a system with open loop transfer function $G(s)H(s) = \frac{1}{s^3}$

9. Write the transfer function of a lead compensator and draw its pole zero plot.

10. A system is represented by the state vector differential equation $x'=Ax+Bu$ where $A=\begin{bmatrix} 0 & 1 \\ -1 & -1 \end{bmatrix}$. Find the roots of the system. (10 x 2 = 20 marks)

Latha. V