

2063
B.E. (Mechanical Engineering)
Seventh Semester
MEC-702: Automatic Controls

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. Attempt the following
- Draw block diagram for mechanical rotating system.
 - Write working principal of Potentiometer-type error detector.
 - Define settling time w.r.t transient response.
 - What will be nature of time response for the system $C(s) / R(s) = 16 / (s^2 + 8s + 16)$? 5*2
 - What do you mean by lag-compensator?

Part-A

- What is feedback? What type of feedback is preferred for control system? 5
 - Differentiate between Regulators and servo mechanism. Write its application. 5
- Draw the mechanical circuit diagram for the system shown in Fig.1 and write system equations. 5

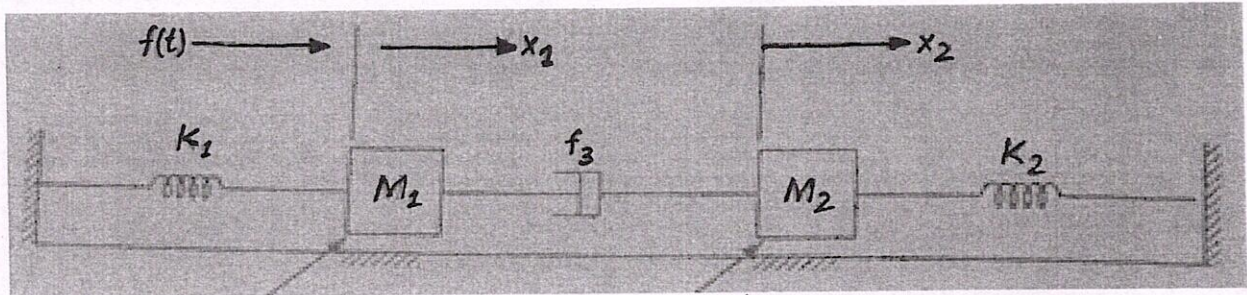


Fig.1

- Give the comparison between open loop and closed loop System. 5
- The forward path transfer function of a unity feedback control system is given by $G(s) = 2 / [s(s + 3)]$, Obtain an expression for unit step response of the system. 5
 - Explain in brief PID controller. 5

P.T.O.

(2)

Part-B

5. a) A close-loop control system is described by the block diagram given in Fig. 2 Determine the stability using Nyquist criterion. 5

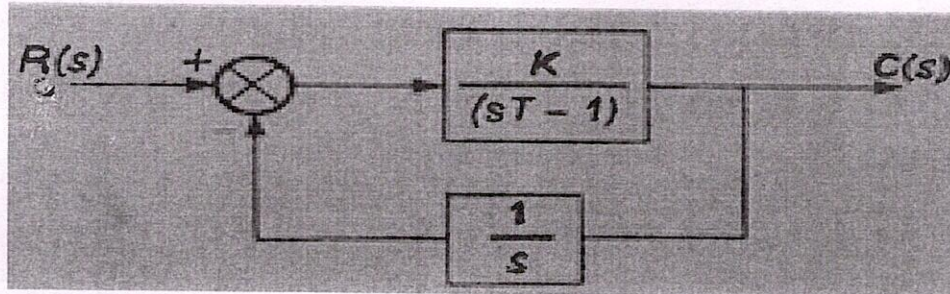


Fig. 2

- b) What is electrical zero position of synchro detector? Write stability characteristic equation of a control system. 5
6. a) For the system with transfer function, $Y(s) / U(s) = (s^2 + 2s + 1) / (s^3 + 7s^2 + 14s + 8)$; drive state space representation by using partial fraction method. 5
- b) What is an array indexing in LabVIEW? 5
7. a) What are techniques used for driving state-space equations? 5
- b) Explain hydraulic actuation system with double acting cylinder. 5