

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, May 2022

B. Tech. in Electrical and Electronics Engineering, Semester IV, 2021-22

EE1105: SIGNALS AND CONTROL SYSTEMS

Roll No.....

Time: 3 hours

Max. Marks: 80

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Mention all the assumptions for your answers clearly.

Q.1. Determine the transfer function C/R from the block diagram, shown in Fig. 1.

10
(LO6)

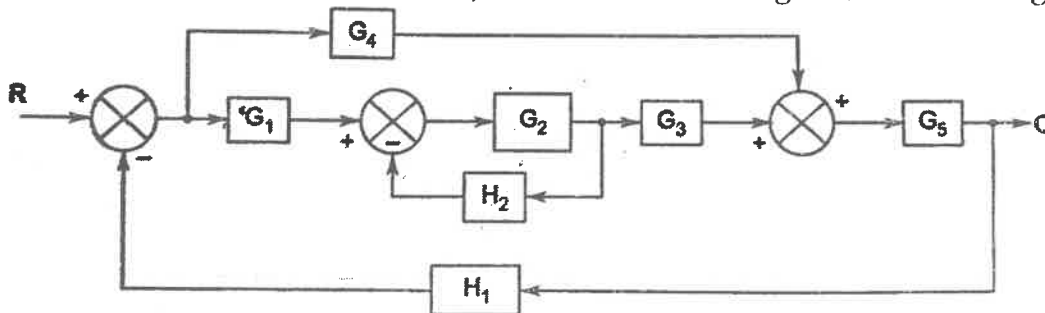


Fig. 1

Q.2. Calculate M , D and K for the system shown in Fig. 2. Assume the system was initially at rest.

10
(LO6)

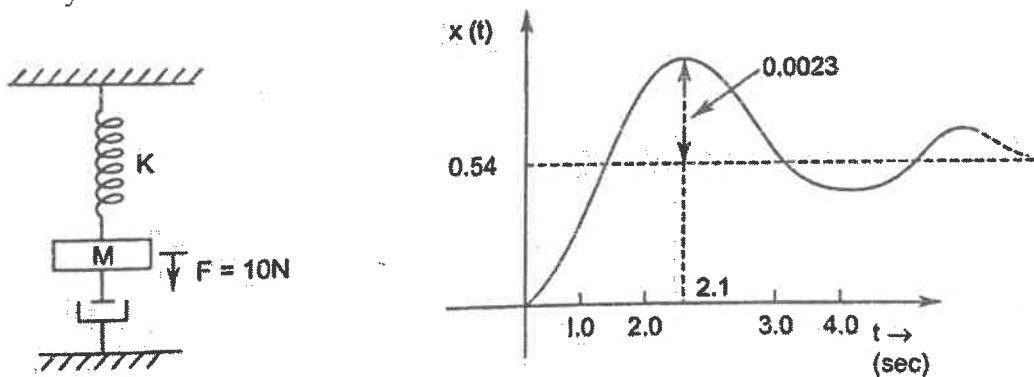


Fig. 2

Q.3. For a unity feedback system having

$$G(s) = \frac{35(s+6)}{s(s+1)(s+7)}$$

10
(LO7)

Determine:

- a) the type of the system
- b) all error coefficients
- c) error for ramp input with magnitude 10.

Q.4. The open-loop transfer function of a feedback control system is given by

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

10
(LO8)

Find the range of values of K for stability. Also determine the stability of the system when $K = 12$.

Q.5. Draw the root locus plot for the open loop transfer function given below: 10

$$G(s)H(s) = \frac{K(s^2 + 9)}{s(s + 4)}.$$

(LO8)

Also calculate the values of K at breakaway points.

Q.6. Draw the polar plot of 10

$$G(s) = \frac{5(1 + 7s)}{(1 + 3s)}.$$

(LO9)

Q.7. Draw the Bode plot for the transfer function 10

$$G(s)H(s) = \frac{36(1 + 0.2s)}{s^2(1 + 0.05s)(1 + 0.01s)}.$$

(LO10)

Q.8. Sketch the Nyquist plot and decide the stability for 10

$$G(s)H(s) = \frac{20}{(s + 3)(s^2 + 2s + 2)}.$$

(LO10,11)
