

Total No. of Questions : 6]

SEAT No. :

P516

[Total No. of Pages : 2

APR - 18/TE/Insem. - 116

T.E. (Electrical)

CONTROL SYSTEM - I

(2015 Course) (Semester - II) (303147)

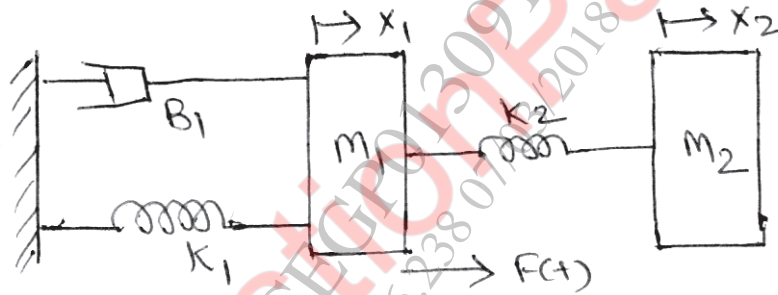
Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

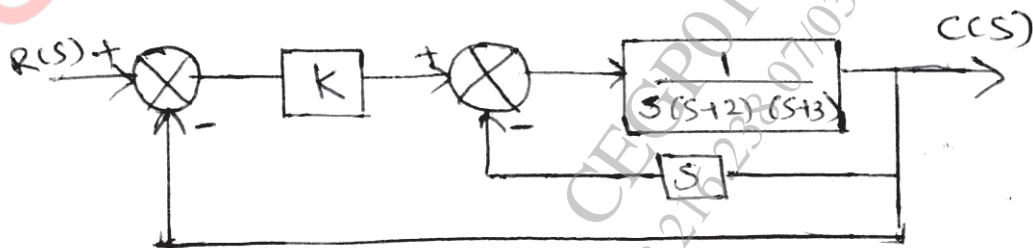
- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

- Q1) a) Compare Feedback and Feed forward control system. [4]
- b) Determine equilibrium equations for following system using Force - Current analogy. [6]



OR

- Q2) a) State and explain Mason's Gain formula for Signal flow graph. [4]
- b) Obtain transfer function of the system. [6]



P.T.O.

Q3) a) Derive an expression of steady state error for a simple closed loop system. [4]

b) A unity feedback system has $G(s) = \frac{K}{s(s+1)(1+0.4s)}$ [6]

i) For ramp input $r(t) = 4t$ and $K = 2$, find steady state error.

ii) If desired steady state error to be 0.2, Find corresponding value of K.

OR

Q4) a) Explain effect of ξ (damping factor) on locations of closed loop poles. [4]

b) For system having $\frac{C(s)}{R(s)} = \frac{20}{s^2 + 7s + 25}$ [6]

Determine all time domain specifications.

Q5) a) How two special cases of Routh's Criterion can be solved? [4]

b) Determine the range of k for stability of a system having characteristic equation $s^3 + 3ks^2 + (k+2)s + 4 = 0$. [6]

Find the value of k so that the system is marginally stable and find the frequency of sustained oscillations.

OR

Q6) a) Explain the terms : Centroid and Angle of asymptotes of Root locus. [4]

b) Determine Break away point and angle of departure for root locus of a system with open loop transfer function. [6]

$$G(s)H(s) = \frac{k(s+1)}{s^2 + 4s + 13}$$

