

Total No. of Questions :8]

SEAT No. :

P2880

[4958]-1069

[Total No. of Pages :2

T.E. (Electrical)

CONTROL SYSTEM - I

(2012 Course) (303147) (Semester - II)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer all questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

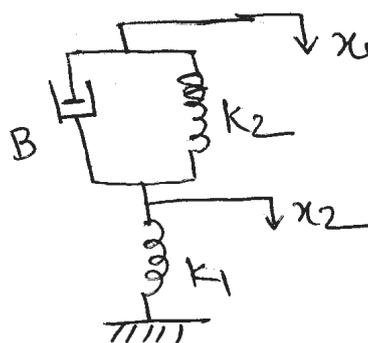
Q1) a) Compare open loop system with close loop system. Give one example of each. [6]

b) Derive transfer function of lead network. [7]

c) Explain different static error coefficients and steady state error in each case. [7]

OR

Q2) a) Explain Force - voltage analogy and find transfer function of [7]



b) Derive transfer function of DC servomotor. [6]

c) Find damping ratio, settling time and peak overshoot for system with close loop transfer function given by $T(S) = \frac{10}{s^2 + 7s + 20}$. [7]

P.T.O.

- Q3)** a) Explain Routh Hurwitz stability criterion. [6]
 b) Draw root locus for following system. Also find range of values of K for which system is stable. $G(S) = \frac{K}{s(s+2)(s^2+s+1)}$ [10]

OR

- Q4)** a) Using Routh Harvitz criterion determine whether the given close loop system is unstable. If unstable how many poles are on right halves plane or imaginary axis. [8]

$$G(S) = \frac{10}{s^5 + 7s^4 + 6s^3 + 42s^2 + 8s + 56}$$

- b) Explain rules for construction of root locus. [8]

- Q5)** a) Draw bode plot for following system $G(S) = \frac{1000}{s(1+0.1s)(1+0.001s)}$ Find gain margin and phase margin comment on stability. [12]

- b) Define Gain margin and phase margin. Explain how it is to be found using bode plot. [6]

OR

- Q6)** a) Draw polar plot for $G(S) = \frac{10}{s(s+1)(s+4)}$. [9]

- b) Explain Nyquist stability criterion. Explain procedure for drawing nyquist plot and how to determine stability. [9]

- Q7)** a) Explain P and PI controllers. Explain their effect on damping ratio and steady state error. [8]

- b) Design a PID controller for system with unity feedback and [8]

$$G(S) = \frac{K}{(s+3)(s^2+s+1)}$$

OR

- Q8)** a) Explain Ziegler Nichols method of tuning PID controller. [8]

- b) Explain procedure for designing PID controller using root locus. [8]

EEE