Total No. of Questions : 6]

SEAT No. :

P22

[Total No. of Pages : 2

TE/Insem./APR - 25

T.E. (Electrical)

303147 : CONTROL SYSTEM - I

(2015 Course) (Semester - II)

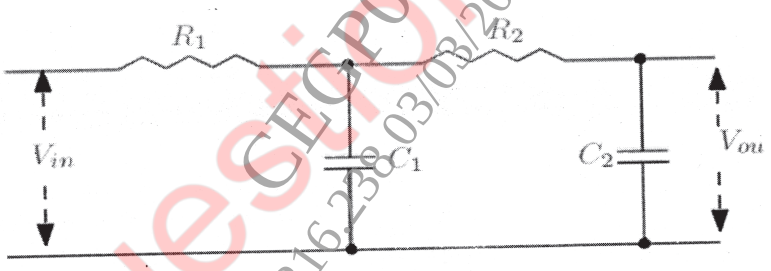
Time : 1 Hour] *[Max. Marks : 30*

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.***
5) ***Use of non programmable calculator is allowed.***

Q1) a) Explain open loop and closed loop system with suitable examples. **[4]**

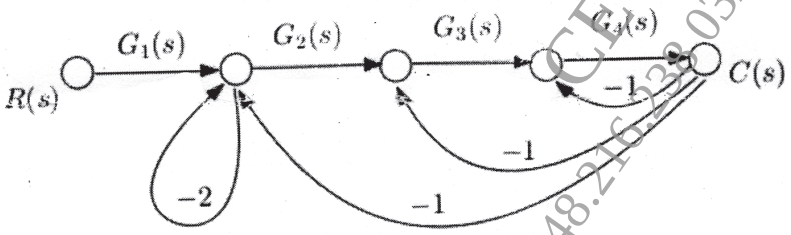
b) Find the transfer function of the electrical circuit as shown in Figure. **[6]**



OR

Q2) a) Compare electrical analogous system with mechanical translational system. **[4]**

b) Find the transfer function C(s)/R(s) for the system given below using Mason's gain formula? **[6]**



P.T.O.

Q3) a) Define rise time, peak time, peak overshoot and settling time for under damped second order system with unit step input. **[4]**

b) Consider the unit step response of a unity feedback control system with open loop transfer function is $G(s)=\frac{1}{s(s+1)}$ **[6]**

obtain the rise time, peak time, maximum overshoot and settling time (2% criterion).

OR

Q4) a) Derive the expression for rise time of the unit step response for a second order system. **[4]**

b) Define type and order of the system. Also explain various steady state error coefficients. **[6]**

Q5) a) Explain Routh's Hurtwithz criterion for stability analysis in LTI system. **[4]**

b) A system has open-loop transfer function **[6]**

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

What is the complete range of K for which the unity feedback closed-loop system is stable ?

OR

Q6) a) Explain angle and magnitude condition for stable system in case of root locus. **[4]**

a) Sketch the root locus for a unity feedback systems with open loop transfer function. **[6]**

$$G(s)H(s)=\frac{K}{S(S+6)(S+9)}$$