Total No. of Questions : 6]

SEAT No. :

P15

[Total No. of Pages : 3

APR - 18/TE/Insem. - 17

T.E. (Electrical)

CONTROL SYSTEM - I

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

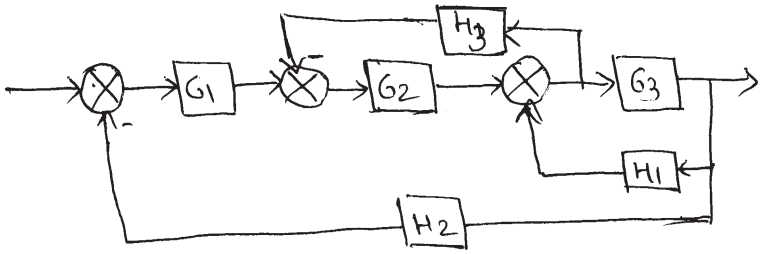
Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q.1 or 2, Q.3 or 4, Q.5 or 6.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

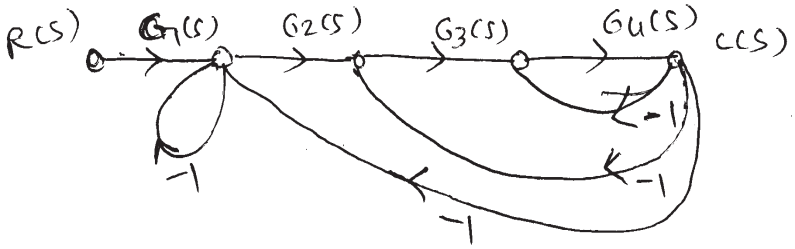
Q1) a) What is close loop system? What are its advantages? Give any one example of close loop system. **[5]**

b) Simplify following block diagram and find transfer function of it. **[5]**



OR

Q2)a) Using signal flow graph find transfer function of **[6]**

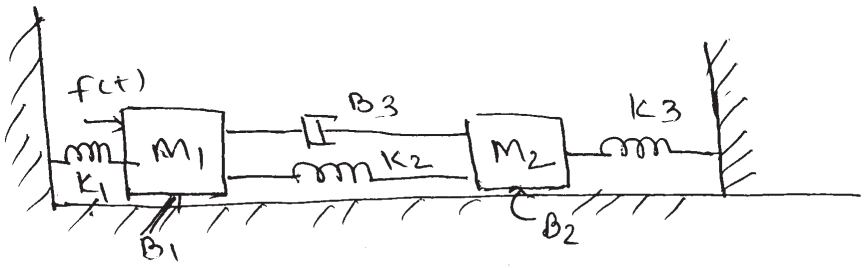


b) What is regulatory system and tracking system. Explain them. **[4]**

P.T.O.

Q3) a) Derive transfer function of lag network. Draw its pole zero plot. **[5]**

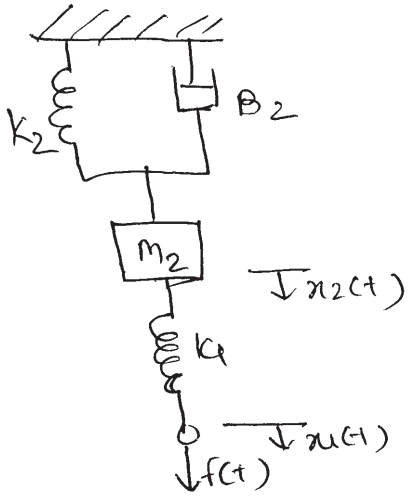
b) Write differential equations for following mechanical system. **[5]**



OR

Q4) a) Derive transfer function of AC servomotor. **[5]**

b) Explain Force voltage analogy and write differential equations using F-V analogy. **[5]**



Q5) a) For each of the following system find poles of system, plot them on s plane. Without solving for inverse Laplace transform plot the nature of time response to step i/p in each case. **[6]**

i) $G(s)=\dfrac{225}{s^2+30s+225}$

ii) $G(s)=\dfrac{400}{s^2+12s+400}$

iii) $G(s)=\dfrac{625}{s^2+625}$

b) Find the transfer function of second order system, if percentage overshoot is 12% and settling time is 0.6 sec. **[4]**

OR

Q6) a) For first order system with TF as $T(s)=\frac{1}{s+T}$, derive its time response for unit step input. Plot the response and comment on nature of response with change in time constant. **[4]**

b) For the given OLTF $G(s)=\frac{K(s+5)}{s(s+6)(s+7)(s+8)}$ with unity feedback. **[6]**

i) Find static error coefficients Kp, Kv, Ka for K = 42.

ii) Find the range of values of K so taht steady state error is < = 10%.

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