Total No. of Questions : 6]

SEAT No. :

**P528**

[Total No. of Pages : 2

# TE/Insem/APR-115
# T.E.(Electrical) (Semester - II)
# CONTROL SYSTEM - I
# (2015 Pattern)

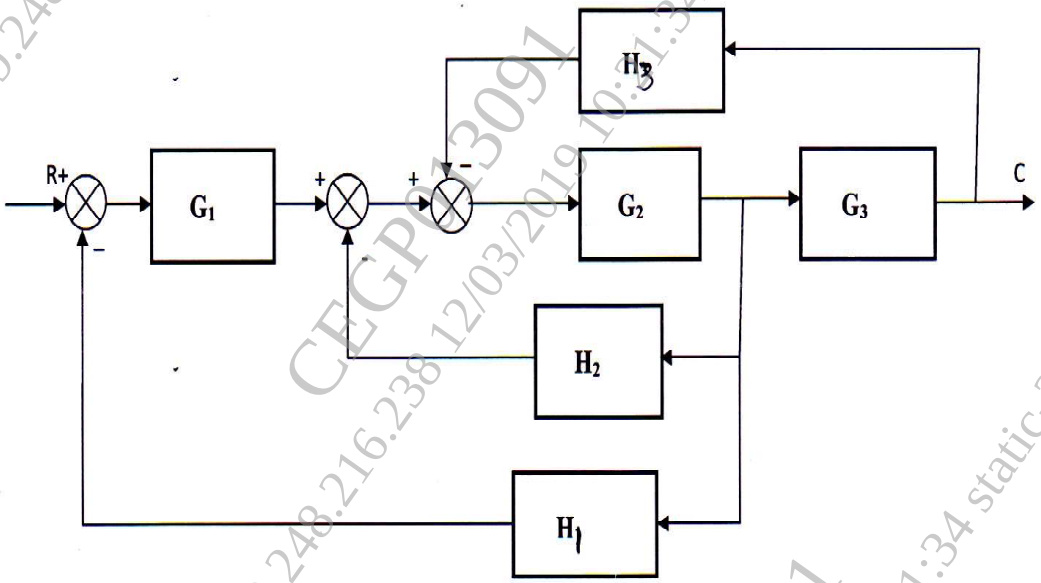
*Time :1 Hour]* *[Max. Marks : 30*

***Instructions to the candidates:***

1) ***Answer any one question from each pair of questions : Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Figures to the right indicate full marks.***

***Q1)*** a) Compare open loop system and close loop system. **[4]**

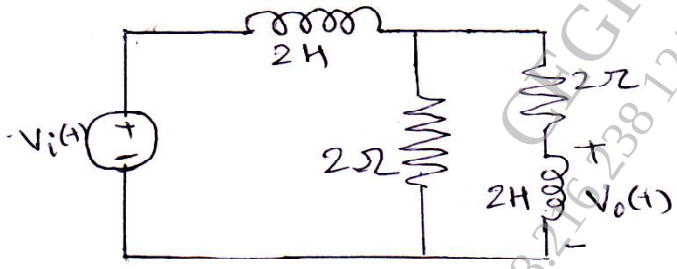
b) Find transfer function of given system using block diagram reduction. **[6]**




OR

***Q2)*** a) Explain masons gain formula. **[4]**

b) Find transfer function Vo(s)/Vi(s) for given electrical network. **[6]**




***P.T.O.***

***Q3)*** a) Define static error coefficients. **[4]**

b) A unity feedback system has the following forward transfer function: **[6]**

$$G(s)=\frac{1000(s+8)}{(s+7)(s+9)}$$

i) Evaluate system type, Kp, Kv, and Ka.

ii) Steady state error for step input and ramp input

OR

***Q4)*** a) For each of the following transfer functions, find its roots and draw, the general form of the step response. **[6]**

i) $G(s)=\frac{400}{s^2+12s+400}$

ii) $G(s)=\frac{900}{s^2+90s+900}$

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

b) For a second order system find ζ, ωn,ts, % overshoot. **[4]**

$$G(s)=\frac{16}{s^2+3s+16}$$

***Q5)*** a) Given the unity feedback system with $G(s)=\frac{K(s+4)}{s(s+1.2)(s+2)}$ find the following : **[6]**

i) The range of K that keeps the system stable

ii) The value of K that makes the system oscillate

iii) The frequency of oscillation when K is set to

b) Explain angle and magnitude criterion for Root Locus. **[4]**

OR

***Q6)*** a) Sketch the root locus for the system with open Loop Transfer function,

$$G(s)=\frac{K(s+3)}{s(s+1)(s+2)(s+4)}$$

Find break away point, intersection with imaginary axis, K marginal. **[8]**

b) What is root locus. **[2]**