Total No. of Questions : 4]

SEAT No. :

PA-10048

[Total No. of Pages : 2

[60091-331
T.E. (Electrical) (Insem)
CONTROL SYSTEM ENGINEERING
(2019 Pattern) (Semester - II) (303150)

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

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*

Q1) a) Clearly differentiate between open loop and closed loop control system. **[5]**

b) Using block diagram reduction technique, find the transfer function for the system as shown in Figure 1 below. **[5]**

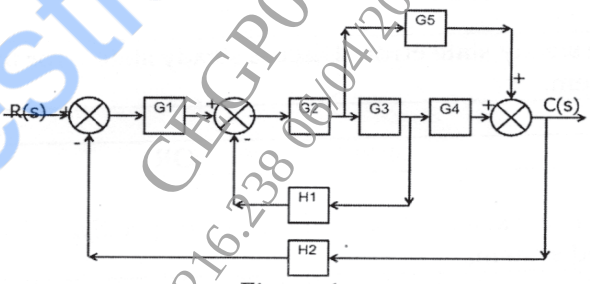

Figure 1

c) Determine the transfer function C/R for the signal flow graph given below in Figure 2 using Mason's gain formula. **[5]**

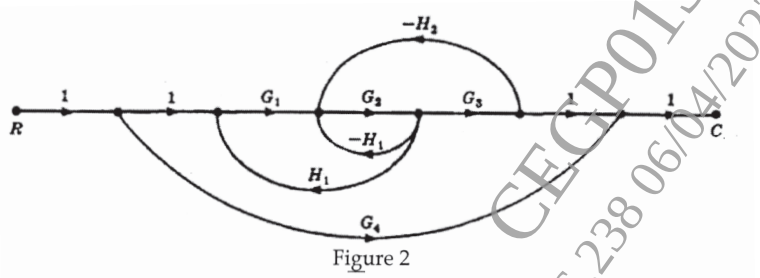

Figure 2

OR

P.T.O.

Q2) a) Give classification of control systems. **[5]**

b) Obtain the transfer function for RLC parallel circuit. **[5]**

c) Determine the transfer function C(s)/R(s) for the block diagram given below in Figure 4 using Mason's gain formula. **[5]**

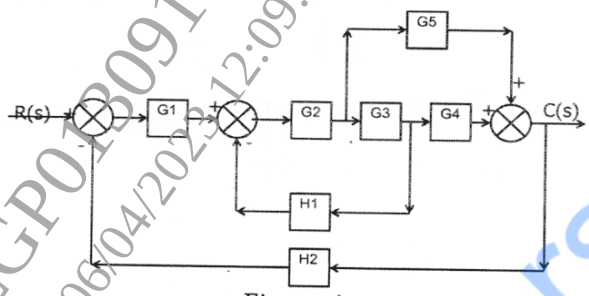

Figure 4

Q3) a) Define and explain standard test signals. **[4]**

b) A unity feedback system is characterized by an open loop transfer function. $G(S)=\frac{10}{s(s+4)}$ Determine delay time, rise time, settling time, peak overshoot and peak time for a unit step input. Also write expression for its response. **[6]**

c) Define steady state error. Discuss steady state error for type '0', type '1' and type '2' system. **[5]**

OR

Q4) a) With a neat sketch explain time domain specifications of second order under damped system. **[5]**

b) Find steady state error for an input signal r(t) = 1+2t+t^2/2 of unity feedback control system $G(s)=\frac{100}{s(0.1s+1)}$ **[5]**

c) For a unity feedback control system $G(s)=\frac{144}{s^2+12s+144}$ find out damping factor, damping frequency, delay time. maximum over shoot, rise time and settling time. **[5]**