

**Apr-26/TE/Insem-393**  
**T.E. (Electrical) (Insem.)**  
**CONTROL SYSTEM ENGINEERING**  
**(2019 Pattern) (Semester - VI) (303150)**

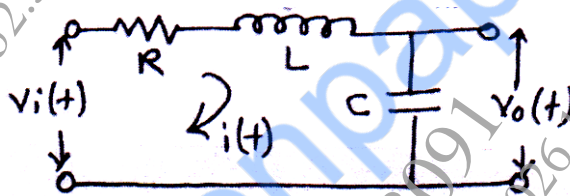
Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Solve Q.1 or Q.2, Q.3 or Q.4.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data, if necessary.

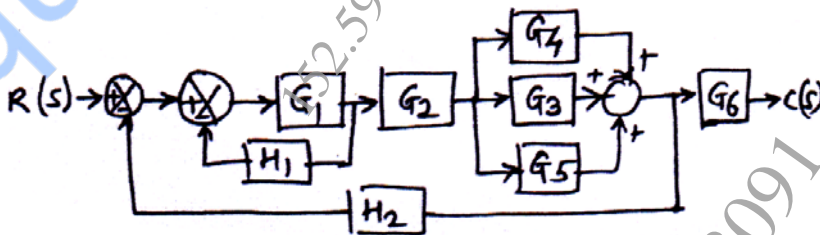
Q1) a) Compute the transfer function of given network. [7]



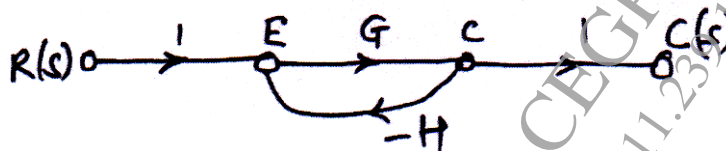
- b) Compare open-loop & closed-loop systems. [4]
- c) Compare linear time-variant & linear time-invariant control systems. [4]

OR

Q2) a) Find the single block equivalent by block diagram reduction for following example. [7]



b) Obtain the transfer function [4]



c) Explain Mason's gain equation & compare block diagram and signal Flow Graph (SFG) method. [4]

P.T.O.

**Q3) a)** Explain Standard test signals : Impulse, step, ramp, parabolic & sinusoidal with their formula. [7]

b) The control system having unity feedback has  $G(s)=20/[s(1+4s)(1+s)]$ . Determine : [8]

i) Type of system,

ii) Static error coefficients

iii) Steady state error if input  $r(t) = 2 + 4t$

OR

**Q4) a)** Explain specifications of the transient response : Delay time, rise time, peak time, overshoot, settling time with the formula. [7]

b) For the closed-loop transfer function  $C(s)/R(s) = 200/(s^2 + 5s + 206)$ . determine the time - domain specifications. [8]