

Total No. of Questions : 4]

SEAT No. :

PD110

[Total No. of Pages : 2

[6410]-431

T.E. (Electrical) (Insem)

CONTROL SYSTEM ENGINEERING

(2019 Pattern) (Semester-II) (303150)

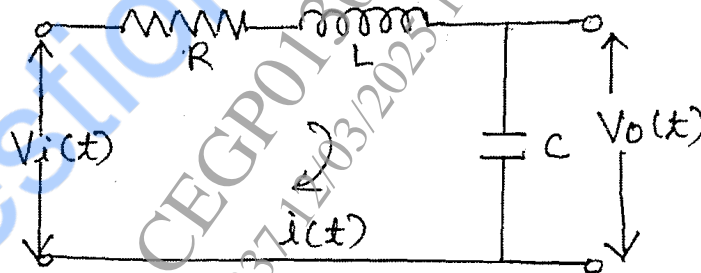
Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

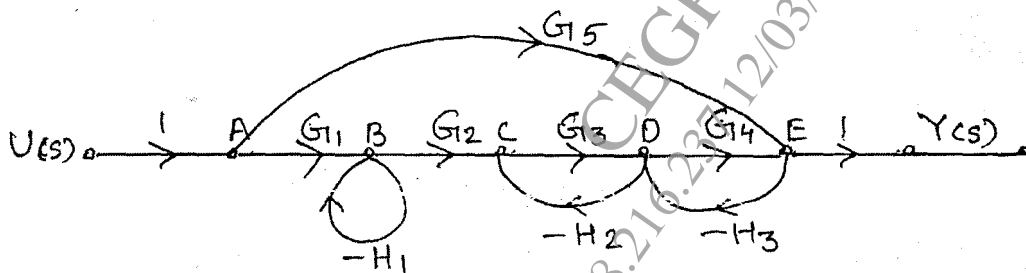
- 1) Attempt Q.1 or Q.2, Q.3 or Q.4.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable additional data, if necessary.
- 5) Use of non-programmable calculator is allowed.

- Q1) a) What are the types of control systems and Derive the Transfer function of close loop System. [7]
- b) Find the transfer function of following electrical network. [8]



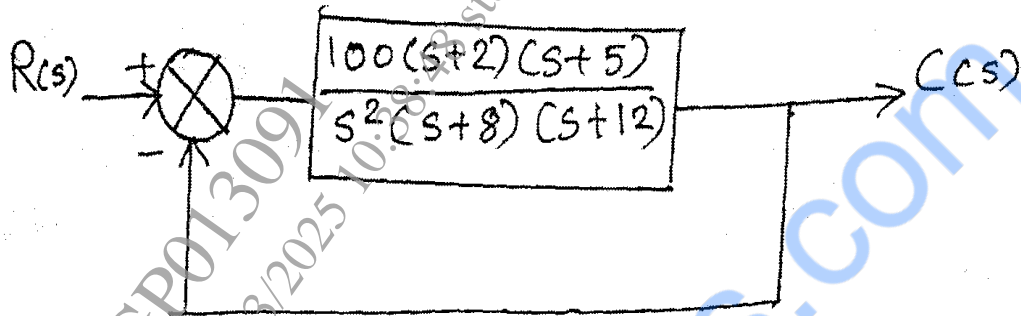
OR

- Q2) a) Derive force voltage (F-V) and force current (F-I) analogy between electrical and mechanical systems. [7]
- b) Determine ratio $Y(s)/U(s)$ using Mason's Gain formula for following signal flow graph. [8]



P.T.O.

- Q3) a) Explain standard test signals with their mathematical expressions. [7]
 b) For the system shown below evaluate the static error constants and find steady state error for step, ramp and parabolic inputs. [8]



OR

- Q4) a) Derive the time domain specifications (M_p , t_p) for second-order under-damped system for unit step input. [7]
 b) The closed-loop control system is shown as below with damping ratio = 0.7. Determine the value of k to satisfy the condition. Calculate settling time, peak time, delay time & maximum overshoot for the value of k thus determined. [8]

