Total No. of printed pages = 3

19/5th Sem/DECE513B

2021

CONTROL SYSTEMS AND PLC

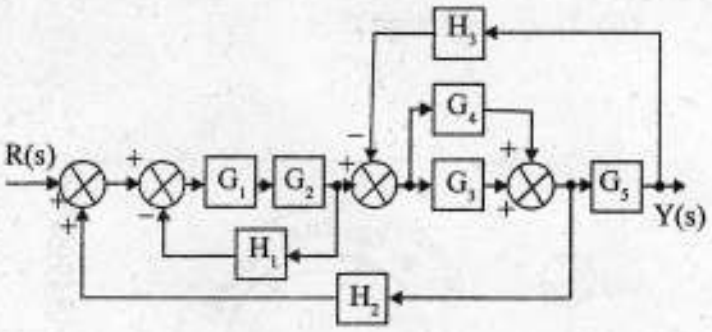
Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. Using the block diagram reduction find the C(s)/R(s) of the following signal flow graph : 20



2. Derive an expression for time response of a first order under damped system to step input. 20

[Turn over

3. Write short notes on the following : 5×4=20

(i) RAM and ROM

(ii) Open loop and Closed loop control system

(iii) Time varying and Time invariant system

(iv) Linear and Non-linear system.

4. The characteristic polynomial of a system is

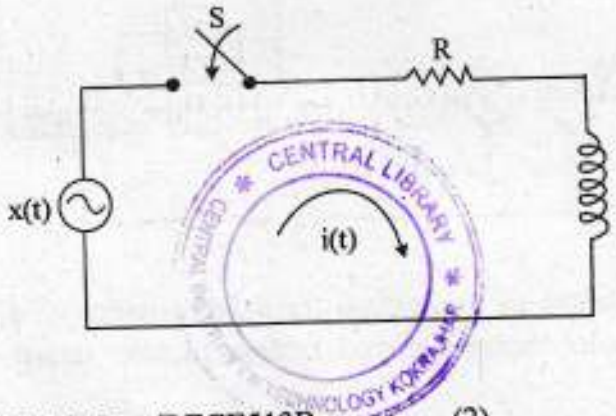
$$Q(s) = s^4+s^3+3s^2+2s+2$$

Determine the location of roots on s-plane and hence comment on the stability of the system using Routh-Hurwitz criterion. 20

5. Using the Laplace transform method derive the current in following RL circuit when the input x(t) is 10+10=20

(i) Impulse signal

(ii) Unit step signal.



6. State and explain Nyquist stability criteria. How the root location in the s plane defines the stability and unitability of a control system ? 20

7. Find the steady state error for the following system : 20