B. Tech. (ECE) 6th Semester (G Scheme)
Examination, July-2022

CONTROL SYSTEM

Paper-PCC-ECE-302-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each unit. **Question No. 1 is compulsory**. All questions carry equal marks.*

1. (a) Differentiate feedback and feedforward systems.

(b) Define controllability and observability.

(c) State advantages and applications of lag-lead compensators.

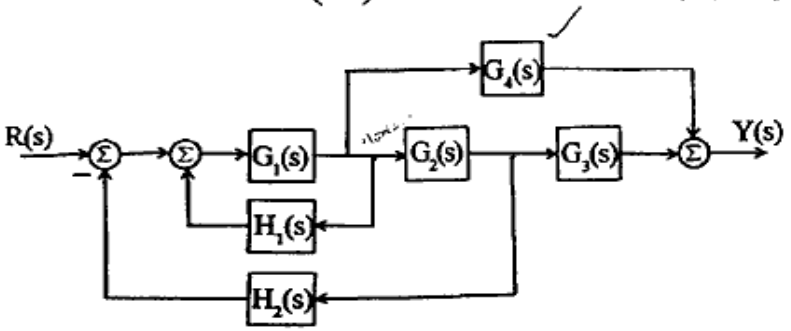
(d) Define non touching loop.

(e) List the time domain specifications.

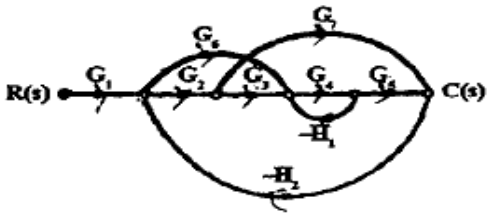
(f) Define Phase margin. 6×2.5

Unit-I

2. (a) Deduce the closed-loop transfer function of the following system through block-diagram simplification. 7.5



(b) Develop the transfer function from the given signal flow graph applying Masons gain formula 7.5.



3. (a) Explain multi variable control system in detail. 7.5

(b) Differentiate between DC servomotor and AC Servomotor. 7.5

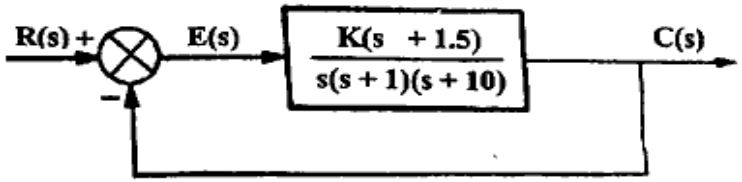
Unit–II

4. (a) Derive the expression and draw the response of first order system for unit step input(s). 7.5

(b) Determine the stability of the following system using Routh's criterion. 7.5

$$s^3 + 2s^2 + s + 2 = 0$$

5. Sketch the root locus of the following : 15



Unit-III

6. (a) Stability of the system. 7.5

(b) Derive the transfer function of a lead compensator network. 7.5

7. Draw Nyquist plot for :

$$G(s) = \frac{s^2 + s + 0.5}{s(s+1)(s+10)}$$

Unit-IV

8. (a) Compare classical Transfer function method and state variable method. 7.5

(b) Obtain the solution of homogeneous state equation. 7.5

9. Obtain the transer function of the system y(s)/u(s) for which the state model is :

$$x(t) = A\,x(t) + B\,u(t)$$

$$y(t) = C\,x(t) + D\,u(t)$$