UNIT – IV

8. Find the transfer function from the given state model : 15

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -3 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 2\end{bmatrix}4(t)\;;\; y=\begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

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

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

Roll No. .....

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B. Tech. 5th Semester (EE) Examination – March, 2021

CONTROL SYSTEM

Paper : PCC-EE-305-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

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

1. (a) Define the transfer function. $2.5 \times 6 = 15$

(b) State and explain the Mason's gain formula.

(c) Explain the term disturbance rejection with respect to the controller design.

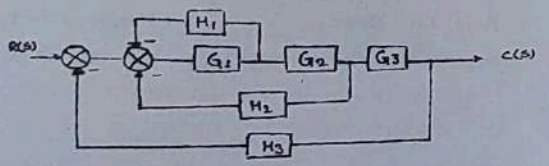
(d) Define controllability and observability.

(e) State advantages, disadvantages and applications of lag compensators.

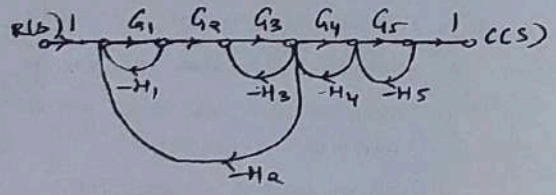
(f) State the rules of Block diagram reduction technique.

UNIT – I

2. (a) Deduce the overall transfer function of the following block diagram using block diagram reduction technique. 7.5



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



3. Consider a unity feedback control system with the following feedforward control system. 15

$$G(s) = \frac{K}{s(s^2 + 4s + 8)}$$

Plot the root loci of the system.

UNIT – II

4. For the given transfer function 15

$$G(s)\,H(s) = \frac{2}{s(1+0.5s)\,(1+0.05s)}$$

Determine phase crossover frequency, gain margin, gain crossover frequency, phase margin.

5. Sketch the polar plot for $\frac{20}{s(s+1)\,(s+2)}$. 15

UNIT – III

6. Explain the design specifications in frequency domain. 15

7. (a) Summarize the Integral and Derivative controller action on the output of the controller. Support with suitable diagrams. 7.5

(b) Write short note on analog implementation of controllers. 7.5