

325553(25)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2019

(New Scheme)

(EEE Branch)

LINEAR CONTROL SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28.

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d).

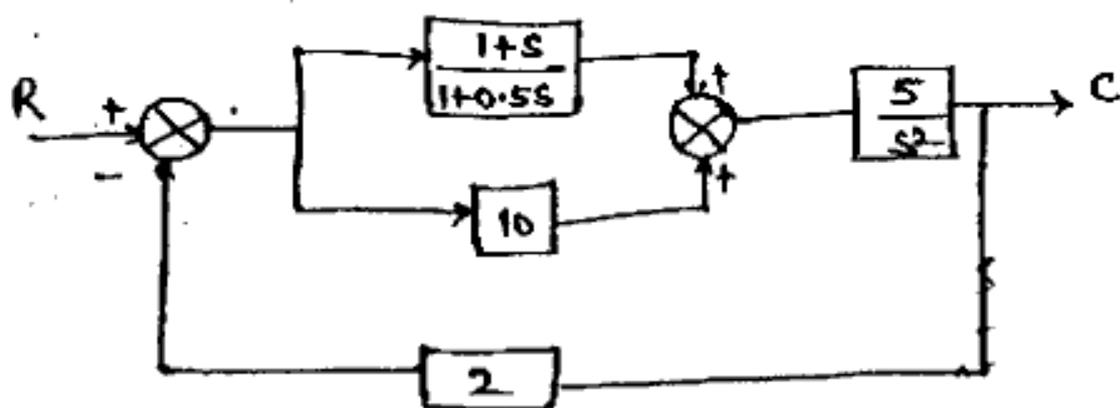
Unit-I

1. (a) Explain advantages of closed loop system. 2
- (b) Find the overall transfer function of the system shown in the below figure. 7

325553(25)

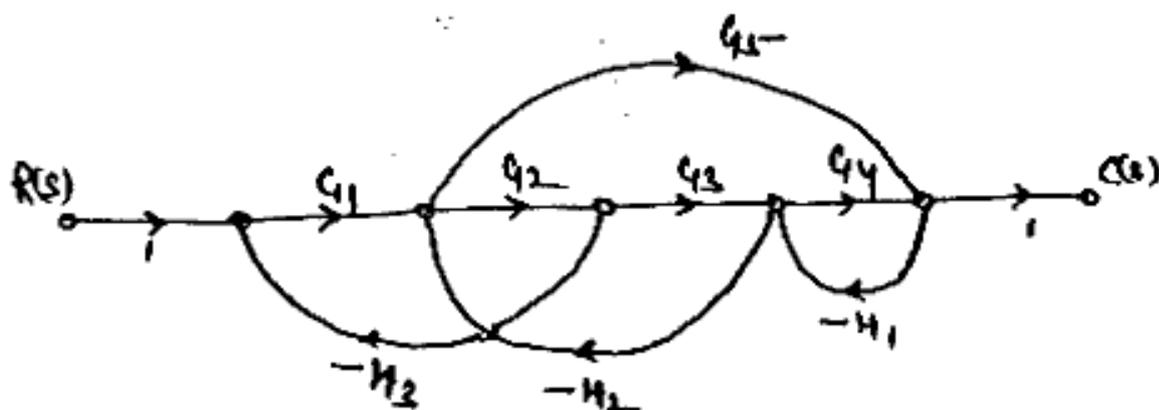
PTO

121



(c) Find $C(s)/R(s)$ signal flow graph shown in following figure.

7



(d) Explain force-voltage and force current analagous circuit.

7

Unit-II

2. (a) What are standard test signals?

2

(b) For a system

$$G(s)H(s) = \frac{k}{s^2 (s+2)(s+3)}$$

find the value of k to limit steady state error to 10,

when input to the system is $1 + 10t + \frac{40}{2}t^2$. 7

(c) Derive the expression for peak time, peak overshoot and settling time of second order system when input is unit step input. 7

(d) A feedback system has an open loop transfer function

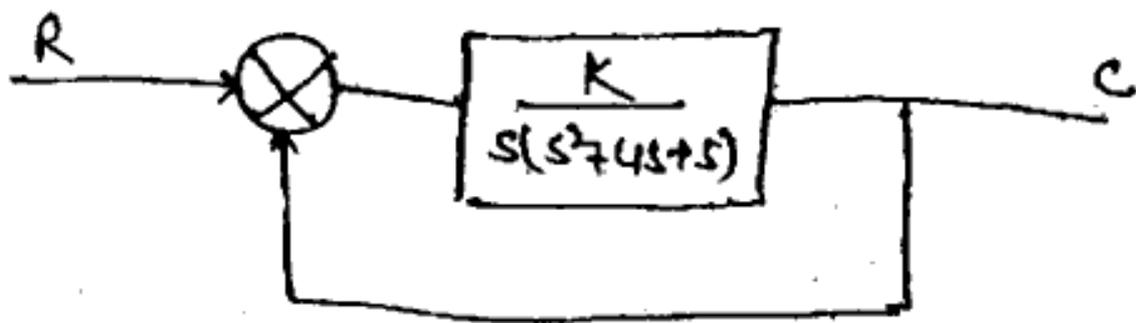
$$G(s)H(s) = \frac{K e^{-s}}{s(s^2 + 5s + 9)}$$

Determine using Routh-Hurwitz criterion, the maximum value of K for the closed loop system to be stable. 7

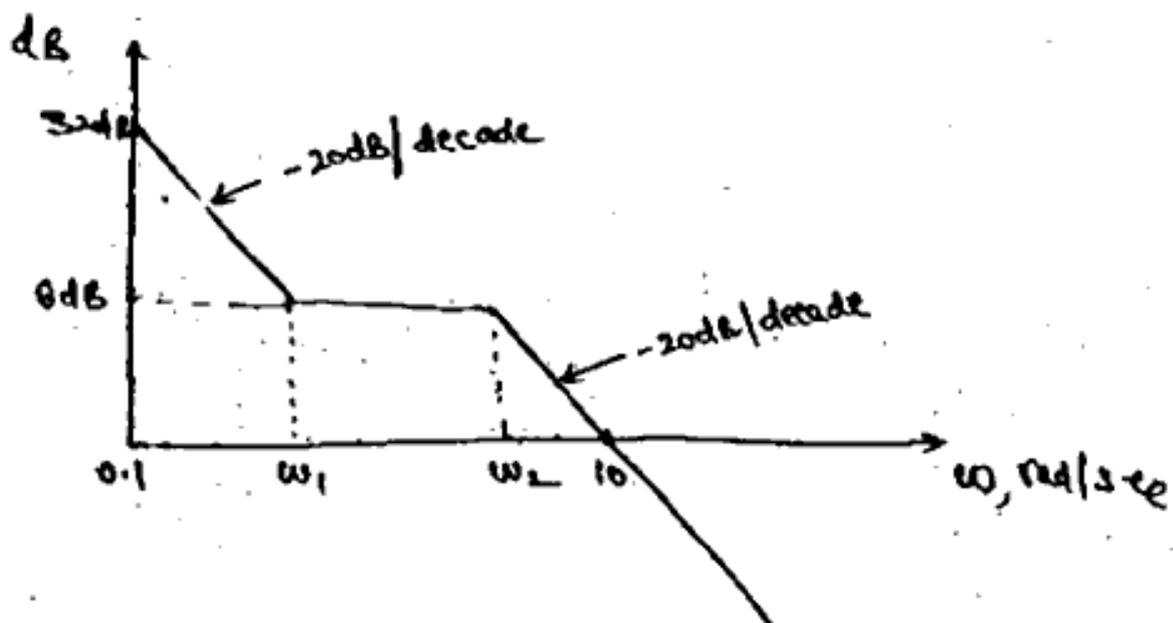
Unit-III

3. (a) What is root locus? 2

(b) Sketch the root Loci for the system as shown in below figure. 7



(c) Estimate the transfer function the Bode Plot of the system shown below. 7



(d) Explain why Nyquist path does not contain L.H.S. of plane and give advantages of Nyquist plot. 7

Unit-IV

4. (a) What is Compensation? 2

(b) What are the basic controller used in control system. Explain in brief. 7

- (c) Explain phase lead compensator. Write advantages and disadvantages at phase lead compensator.

7

- (d) Design a suitable lag compensator for

$$G(s) = \frac{K}{s(s+2)(s+20)}$$

to meet the following requirement.

- (i) Phase margin $\geq 35^\circ$
(ii) Velocity error constant $\leq 20 \text{ sec}^{-1}$

7

Unit-V

5. (a) Give advantages at state space technique.
(b) Obtain the state model by foster's form of a system whose transfer function is

2

$$\frac{s^2 + 4}{(s+1)(s+2)(s+3)}$$

7

- (c) Check the observability and controllability of the system by applying Kalman's test.

7

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

and

$$Y = [3 \quad 4 \quad 1] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

(d) Obtain the state transition matrix when

$$A = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix}$$

7

http://www.csvtuonline.com

Whatsapp @ 9300930012

Your old paper & get 10/-

पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से

325553(25)

http://www.csvtuonline.com