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Total No. of Questions : 6] [Total No. of Printed Pages : 6

EG-183

B.E. V Semester (CGPA) Elect. & Commun. Engg. Examination 2018

CONTROL SYSTEM

Paper - EL-504

Time Allowed : Three Hours] *[Maximum Marks : 60*

Note : Attempt all questions. Each question carry equal marks.

Q.1. Explain any three

a) d.c. servo motors

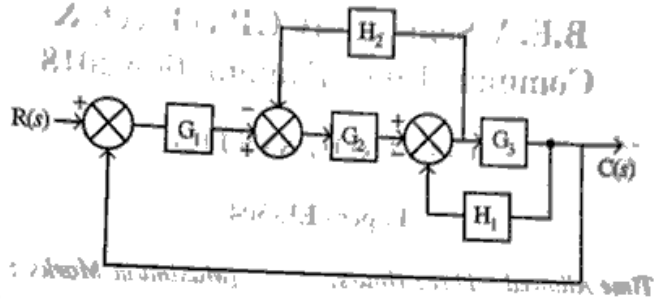
b) PID controller

c) Routh Hurwitz criterion

d) Phase lead compensation

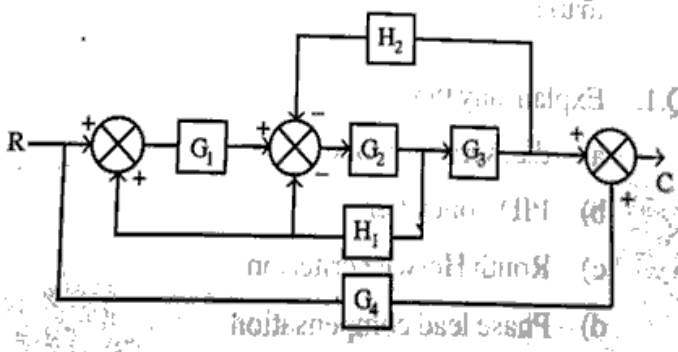
e) Z-transform

Q.2. Find the ratio $\frac{C(s)}{R(s)}$ of the system shown in figure by block diagram reduction technique.



OR

Obtain the transfer function C/R of the block diagram shown in figure by signal flow diagram.



Q.3. Explain various types of systems. A feedback system is described by the following transfer function

$$G(s)=\frac{12}{s^2+4s+16},\ H(s)=KS$$

the damping factor of the system is 0.8. Determine the overshoot of the system, and the value of K.

OR

Explain concept of steady state error. The open loop transfer function of unity feedback system is given by

$$G(s)=\frac{50}{(1+0.1s)(s+10)}$$

Determine the static error coefficient K_p, K_v, and K_a.

Q.4. Explain absolute and relative stability the forward path transfer function of a unity feedback system is given by

$$G(s)=\frac{K}{s(s+4)(s+5)}$$

Sketch the root locus as K varies from zero to infinity.

OR

Discuss the advantages of Routh-Hurwitz criterion. Sketch the root locii for

$$G(s)=\frac{K(s+1)}{s^2(s+3.6)},\ H(s)=1$$

Q.5. Explain the correlation between time and frequency response. Draw the Bode plot for the transfer function

$$G(s) = \frac{50}{1(1+0.25s)(1+0.1s)}$$ and

Determine, gain and phase cross over frequency, gain and phase margin.

OR

Explain the term gain and phase margin. Design a suitable phase log compensating network for

$$G(s) = \frac{K}{s(s+0.1s)(1+0.2s)}$$ to meet the following specification $K_v = 30\text{sec}^{-1}$, pm $\geq 40°$

Q.6. a) Discuss the properties of inverse Z-transform.

b) Discuss the advantages and limitations of state space techniques.

OR

Explain state models construct the state model of a system characterized by

$$\frac{d^3y}{dt^3} + 6\frac{d^2y}{dt^2} + 11\frac{dy}{dt} + 6y = u$$

Give the block diagram representation of the state model.

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