Exam.Code:0934
Sub. Code: 6762

2062

B.E. (Electrical and Electronics Engineering)

Fourth Semester

PC-EE-403: Control Engineering - I

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part*

x-x-x

1. a) Discuss significance of regenerative control systems.
b) Write and explain the parameters by which absolute stability and relative stability can be found out.
c) Give one physical example of error detector, control component, feedback element and controlled system of a control system.
d) Differentiate between continuous control system and discrete control system.
e) How dynamic behaviour of a control system is affected by feedback?

(5*2)

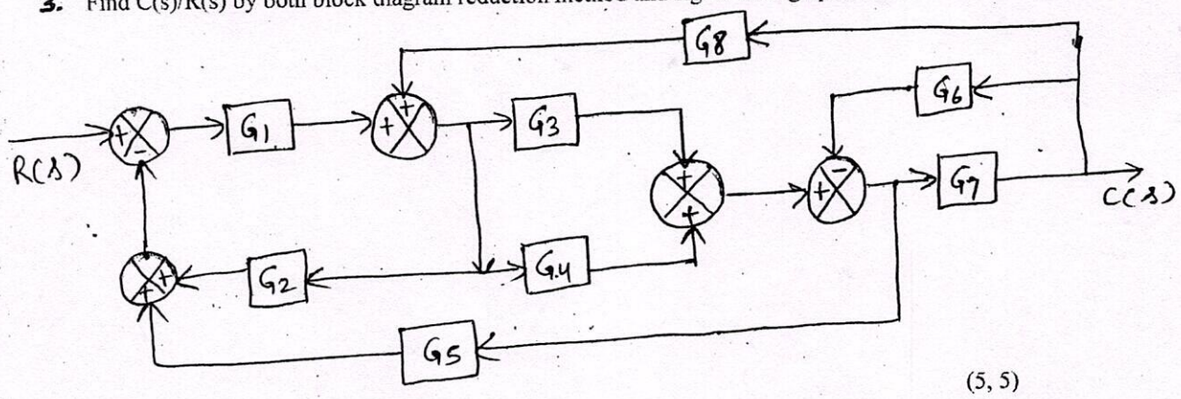
PART-A

2. (a) Draw neat and clean block diagram of closed loop control system and explain function of each component.

(b) Explain working and operation of stepper motor.

(5, 5)

3. Find C(s)/R(s) by both block diagram reduction method and signal flow graph method.



(5, 5)

4. (a) Find all the time response specifications for a unity feedback system whose open loop transfer function is $G(s) = \frac{25}{s(s+6)}$

(b) The open loop transfer function of unity feedback system is

$$G(s) = \frac{K}{(s+2)(s+4)(s^2+6s+25)}$$

By applying Routh's-Hurwitz criterion, discuss stability of closed loop system as a function of K. Determine value of K which will cause sustained oscillations in closed loop system. What are the corresponding oscillations frequencies?

(5, 5)

P.T.O.

PART-B

5. Sketch Root Locus for $G(s)H(s) = \frac{K(s+1)}{s^2(s+3)(s+5)}$

(10)

6. Comment on stability using Nyquist Stability Criterion, for the system whose open loop transfer function is

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

Also, find GM and PM.

(10)

7. Construct Bode Plot for unity feedback system whose open loop transfer function is

$$G(s)H(s) = \frac{10}{s(1+s)(1+0.02s)}$$

(10)

x-x-x