ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END-SEMESTER EXAMINATION : JANUARY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	B.TECH	**Semester:**	VII
Paper Title :	**CONTROL SYSTEMS**	**Paper Code:**	**EEE44101**
Maximum Marks :	40	**Time duration:**	3 hours
Total No of questions:	08	**Total No of Pages:**	02
Note:	1. All parts of a Question should be answered consecutively. 2. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. 4. Submit scan copy of the answers on A4 sheet.		

Answer all the Groups

Group A

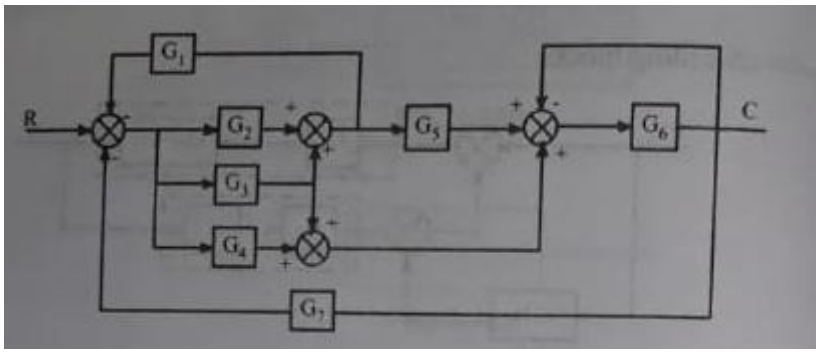
Answer all the questions of the following $5 \times 1 = 5$

1. **a)** What do you mean by Transfer function of a control system?
b) State Routh-Hurwitz Criterion.
c) What do you mean Controllability and Observability?
d) Explain with suitable diagram PID controller.
e) How to find out the centroid from a Root Locus graph?

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. Construct an equivalent SFG from the given block diagram and evaluate the transfer function



3. A unity negative feedback control system has an open loop transfer function, G(s). Determine the range of K for which the system is
a) Stable
b) Unstable
c) Marginally Stable. Also calculate the frequency of oscillation.

[1.5+1.5+2]

$$G(s) = \frac{K}{s(s^2 + s + 1)(s + 4)}$$

4. A unity negative feedback control system has an open loop transfer function

$$G(s) = \frac{K(s+2)(S+1)}{(s+0.1)(s-1)}$$

Using Routh Stability criteria determine the range of K for which closed loop system has 1 and 2 poles at RHS of s-plane.

5. Sketch the Bode plot for

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

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. Sketch the Root locos for an open loop transfer function of a unity feedback control system is given below and determine

a) the value of K for damping factor=0.5
b) the value of K for marginal stability
c) frequency of oscillation at marginal stability condition
d) the value of K at s=-6

$$G(s) = \frac{K}{s(s+1)(s+3)}$$

[2+2+3+3]

7. Consider a RC low pass filter and sketch the Polar and Bode Plot for it. Also find the corner frequency for the corresponding system from Bode plot.

[3+5+2]

8. a) A system with an open loop transfer function

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

Sketch Nyquist plot.

b) What do you mean by Gain- Crossover point and Gain Margin (GM). [7+3]