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:	8	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Answer all the Groups

Group A

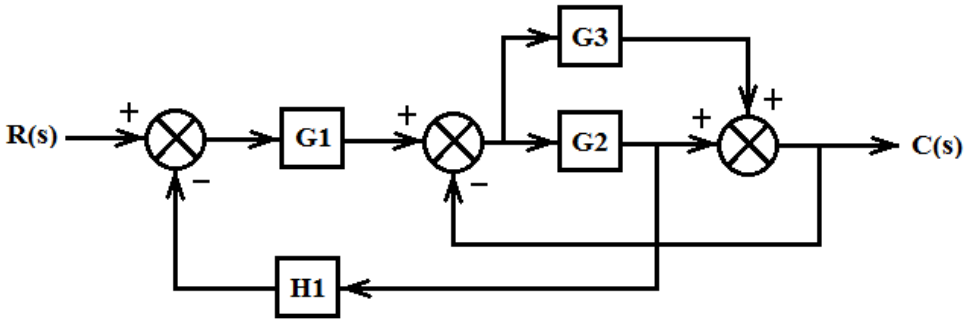
Answer all the questions of the following $5 \times 1 = 5$

1. **a)** Give the expression for peak overshoot for a second order system.
b) What is the nature of response if the poles are complex conjugate?
c) What is static acceleration error constant?
d) Give a practical example of a closed-loop system with proper reasoning.
e) Mention two disadvantages of transfer function based analysis.

GROUP –B

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

2. For the block diagram of the system shown in the following Figure, determine the overall transfer function using block diagram reduction technique.



3. If the loop transfer function of a negative feedback control system is $G(s)H(s) = \dfrac{K}{(s+1)^3}$, determine the gain K for a closed-loop pole to be at $-\dfrac{1}{2} + j\dfrac{\sqrt{3}}{2}$.

4. Determine the step response of the system, the transfer function of which is given by

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

5. Calculate the angle of asymptotes and their centroid for the system having

$$G(s)H(s)=\frac{K(s+2)}{s(s+1)(s+4)} \quad K>0$$

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GROUP –C

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

6. Draw the root locus of the system having the open-loop transfer function as

$$G(s)H(s)=\frac{K}{s(s+3)(s^2+2s+2)},\ K>0.$$

7. Sketch the Bode plot of a unity negative feedback closed loop system of which open loop transfer function is given by $G(s)=\frac{5(s+2)}{s(s+4)(s+10)}$ and comment on stability of the system.

8. Consider a feedback control system with loop transfer function $G(s)H(s)=\frac{2(s-1)}{s(s+2)^2}$, determine (a) the gain crossover frequency (GCF), (b) phase crossover frequency (PCF) of the system and (c) comment on stability of the system based on the above GCF and PCF.

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