| | **ADAMAS UNIVERSITY** | | |
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| | **END-SEMESTER EXAMINATION : JANUARY 2021** | | |
| | (Academic Session: 2020 – 21) | | |
| **Name of the Program:** (Example: B. Sc./BBA/MA/B.Tech.) | B. Tech | **Semester:** (I/III/ V/ VII/IX) | VII |
| **Paper Title :** | Control System | **Paper Code:** | EEE43115 |
| **Maximum Marks :** | 40 | **Time duration:** | 3 Hrs |
| **Total No of questions:** | 8 | **Total No of Pages:** | 2 |
| *(Any other information for the student may be mentioned here)* | | | |

*Answer all the Groups*
**Group A**
Answer all the questions of the following                    $5 \times 1 = 5$

**1.**   **a)** What is transfer function?
**b)** What is MIMO system?
**c)** What are the advantages of close loop system?
**d)** Explains with example about open loop system.
**e)** Define pole and zero of a transfer function.

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

**2.**   Construct a signal flow graph by considering the following algebraic equations:
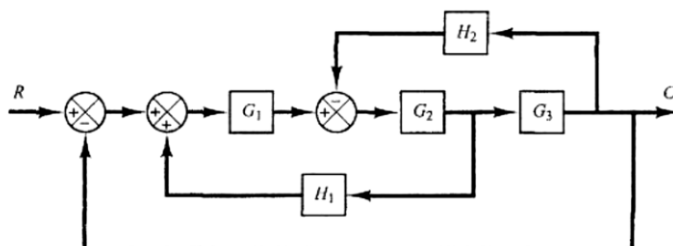
$y_2 = a_{12} \, y_1 + a_{42} \, y_4$
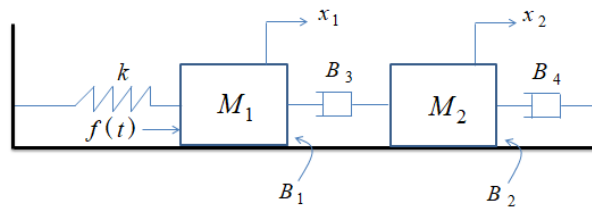$y_3 = a_{23} \, y_2 + a_{53} \, y_5$
$y_4 = a_{34} \, y_3$
$y_5 = a_{45} \, y_4 + a_{35} \, y_3$
$y_6 = a_{56} \, y_5$

**3.**   Find transfer function of the following block diagram.

**4.** Analyze the following system to obtain the transfer function:



**5.** Determine the error coefficient and static error for unity and non-unity feedback system

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

$$H(s) = (s+2)$$

## GROUP –C
Answer *any two* of the following                    $2 \times 10 = 20$

**6.** Utilize the Routh table to determine the number of roots of the following polynomials in the right half of the s-plane. Comment about the stability of the system.

$$(a)\ s^5 + 2s^4 + 3s^3 + 6s^2 + 10s + 15$$
$$(b)\ s^5 + 6s^4 + 15s^3 + 30s^2 + 44s + 24$$

**7.** A unity feedback control system has

$$G(s) = \frac{K}{s(s+2)(s+5)}$$

Sketch the root locus

**8.** Sketch the bode plot and determine the gain cross over and phase cross over frequencies

$$G(s) = \frac{10}{s(1+0.5s)(1+0.1s)}$$

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