Feedback Control System
## (New) (1030)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** questions from each unit.
5. Figures to the right indicate full marks.
6. Use of non - programmable calculator is allowed.
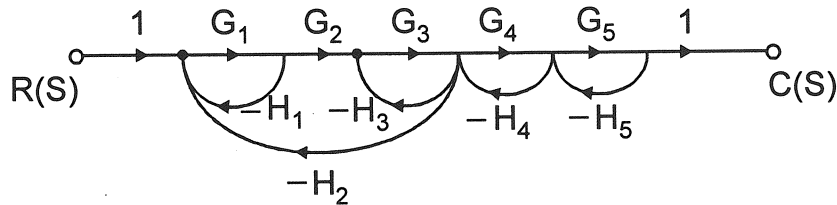7. Assume suitable data if necessary.

UNIT - I

1. a) Explain closed loop control system with the help of block diagram & compare the open loop and closed loop control system. **10**

    b) Obtain the expression for C_1 and C_2 for the given multiple input multiple output system. **10**
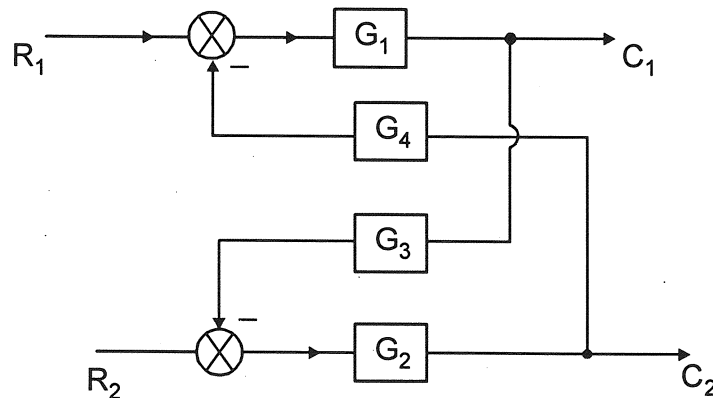
c)   Find C (s) / R(s) :-   10

UNIT - II

2.   a)   What are the different standard Test signals ? Derive the expressions
          for Kp, Kv and Ka.   10

     b)   Check the stability of the following characteristics equations by
          Routh's criterion.   10

          i) $s^6 + 3s^5 + 4s^4 + 6s^3 + 5s^2 + 3s + 2 = 0.$

          ii) $s^8 + 5s^6 + 2s^4 + 3s^2 + 1 = 0.$

     c)   Write a short note on :-   10
          i)   Synchros.
          ii)   Tachometer.

UNIT - III

3.   a)   Explain the rules for the construction of root locus.   10

     b)   For the feedback system.   10

          $$GH(s) = \frac{K(s+4)}{s(s+2)(s+6)(s+8)}$$

          Draw the complete root locus.

     c)   Sketch the root locus : K>0.   10

          $$GH(s) = \frac{K(s+2)}{(s+1+j\sqrt{3})(s+1-j\sqrt{3})}$$

UNIT - IV

4.   a)   State nyquist stability criterion, Also explain the steps while drawing
          the nyquist plot.   10

b)   The Control system has -   **10**

$$G(s) H (s) = \frac{25(s+4)}{s(s+1)\ (s+10)}$$

Sketch Bode plot. & Determine.
i)   Gain Margin.
ii)   Phase Margin.
iii) Stability.

c)   Write a short note on :   **10**

i)   Polar plot.

ii)   Steps to draw the Bode plot.

UNIT - V

5. a)   What are the advantages of state space analysis, And Define state, state variables, state space, and state vector.   **10**
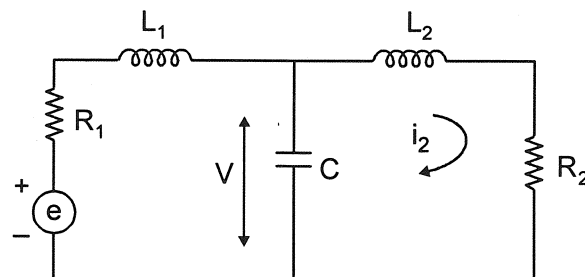
b)   Write a short note on :-   **10**

i)   Fuzzy logic control system.

ii)   PI and PD controllers.

c)   For the system shown below, find state model using the physical variable for state variables.   **10**

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