Total No. of Questions : 8]   [Total No. of Printed Pages : 2

Roll No ....

EX-602

B.E. VI Semester

Examination, June 2017

Control System

Time : Three Hours

Maximum Marks : 70

Note:
i) Attempt any five questions out of eight questions.
ii) All questions carry equal marks.
iii) Assume suitable data, if required.

1. a) Write a short note on Manson's Gain Formula which is used for solving signal flow graph.
   b) What are the basic differences between open and closed loop control system and which one is preferred mostly and why?

2. a) Write down the advantages and disadvantages of transfer function approach.
   b) The signal flow graph for a system is given below. Find the transfer function $\frac{Y(s)}{U(s)}$.

[2]
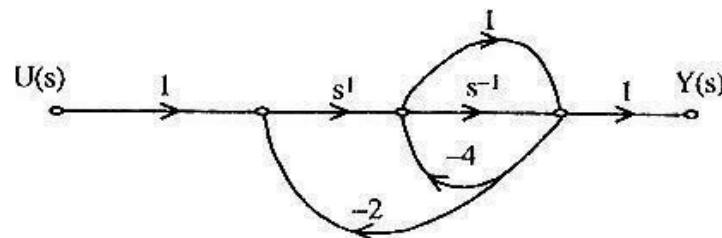
3. a) Explain the concept of Relative Stability and Absolute Stability.
   b) Write a short note on standard test signals for analyzing the time response of any control system.

4. a) For a unity feedback control system the forward path gain $G(s) = \frac{k}{s(s+2)(s^2+2s+2)}$, then find the value of k for which the Root-locus crosses the imaginary axis and also find the value of angle of departure for complex roots.
   b) For a unity feedback control system having its forward path transfer functions as, $G(s) = \frac{20}{(s+1)(s+5)}$.

   Determine characteristics equation of the system ω_n, ω_d, t_p, M_p, damping factor and time at which First overshoot occurs.

5. a) Write a short note on the advantages of Bode plot.
   b) The limitation of root locus analysis is over come by Bode plot, this sentence is true or false, explain in details.

6. a) Explain the term Gain Margin.
   b) Draw the Nyquist plot for

   $G(s) \cdot H(s) = \frac{1}{s^2(1+sT_1)(1+sT_2)}$ and make a comment on stability.

7. a) Write down the advantages of phase lead-lag compensation network.
   b) Explain the PID Controller in Details.

8. a) Write short note on State space and State variable.
   b) Explain the relationship in between the state equation and transfer function.

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