MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : EC601 Control System & Instrumentation

UPID : 006637

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) Write one advantage of proportional controller.

(II) G(S)H(S) = {1 / (5+S) (6+S)} Find K_P.

(III) Define stability.

(IV) Define state equation.

(V) What is limit cycle?

(VI) For any electrical signal, the measurement of energy distribution in frequency domain is done by which instruments?

(VII) What is continuous time system?

(VIII) Write one advantage of proportional plus integral controller.

(IX) G(S)H(S) = {1 / S(5+S) (6+S)} Find K_V.

(X) What is bandwidth?

(XI) Define non touching loop.

(XII) What is relative stability?

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. Explain proportional controller with an example [5]
3. G(S)H(S) = {1 / (20+S) (50+S)} Find K_P. [5]
4. Explain proportional plus derivative controller with an example. [5]
5. Explain lead compensation. [5]
6. Explain lead – lag compensation. [5]

Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

7. Explain PID controller with an example. [15]
8. C(s)/ R(s) = 25 / (S2+6S+25) Determine the characteristics equation, natural frequency, damping factor, damped frequency of oscillation, peak time, maximum overshoot, the time at which 1st undershoot occurs, time period of oscillation, number of cycles completed before the steady state. [15]
9. State Routh Stability Criterion. [15]
   Comment on the stability of a closed loop system whose characteristic equation is $S^3+2S^2+3S+1=0$
10. Consider a feedback system with characteristics equation {1 + K /(S+1) (s+2)} =0; K>=0. Draw root locus. [15]
11. Consider a feedback system with characteristics equation {1 + K / S(S+3) (S2+2S+2)} =0; K>=0. Draw root locus. [15]

*** END OF PAPER ***