Question Paper Code : 31408

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fifth Semester

Aeronautical Engineering

EE 2365/EE 58/AE 1304/080180023/10122 AE 505 – CONTROL ENGINEERING

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

(Semi log sheet and Graph sheet should be provided)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are basic components in electrical system?

2. What is the need for analogous quantities in various systems?

3. What are the advantages feedback system?

4. Define : Mason's gain formula?

5. What is steady state error?

6. Obtain the laplace transform of impulse input.

7. What are the conditions for stability?

8. What is the application of root locus diagram?

9. What are the advantages of digital controller?

10. What is sampling time?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the working of simple pneumatic and hydraulic system in detail.

Or

(b) With a suitable illustration, explain various mechanical components.

12. (a) Obtain the transfer function of the following block diagram. (Fig. 1)

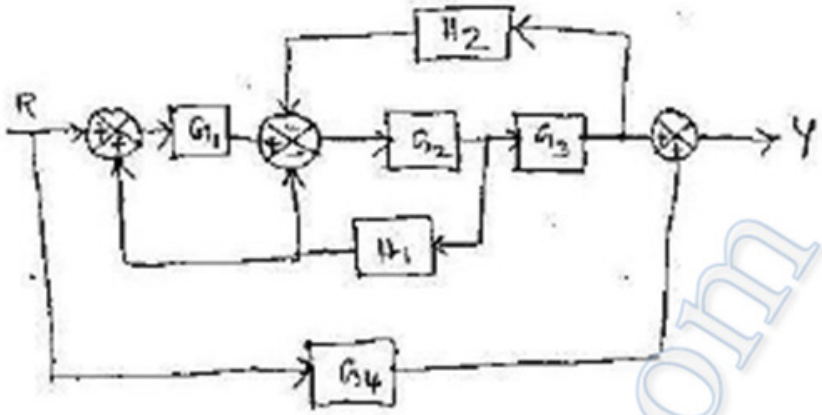

Fig. 1

Or

(b) Obtain the transfer function of the following signal flow graph (Fig. 2).

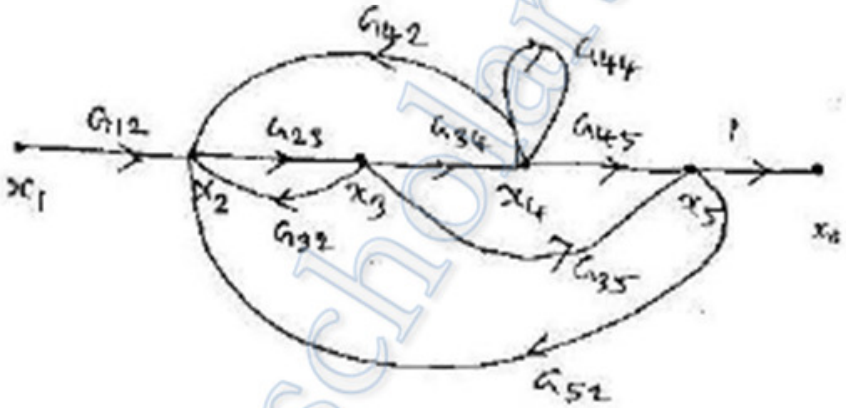

Fig. 2

13. (a) Obtain the step response of the following system (Fig.3)

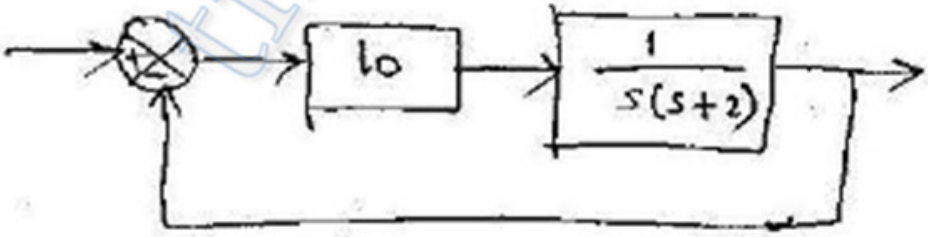

Fig. 3

Or

(b) Determine the error constants of the unity feedback system with $G(s)=\frac{K}{S(S+1)}$.

14. (a) Draw the Bode Plot for the following open loop transfer function and hence obtain gain cross over frequency.

$$G(s) = \frac{75}{s(0.1s+1)(0.5s+1)}$$

Or

(b) Draw the root locus of the following loop transfer function when K varies from 0 to ∞.

$$G(s)H(s) = \frac{K}{s(s+1)(s+2)}.$$

15. (a) With suitable equation, explain digital PID controller, in detail.

Or

(b) With a suitable block diagram, explain the working of digital control system.