

Reg. No. :

Question Paper Code : 90075

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Fifth Semester

Aeronautical Engineering

AE 8505 – CONTROL ENGINEERING

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between hydraulic and thermal systems.
2. What are the types of control system?
3. What do you mean by feedback control systems?
4. What is signal flow graph?
5. What is Laplace transformation in control system?
6. What is the Laplace transform and Fourier transform? Differentiate between the two.
7. What are the different types of systems based on stability?
8. Why is stability important in control systems? What is stability criteria in control system?
9. Why we use Z-transform in control system? What is pole and zero in Z-transform?
10. Differentiate between analog and digital signals?

PART B — (5 × 13 = 65 marks)

11. (a) (i) How does flight control system work? (5)
- (ii) What is principle of hydraulic system? Explain with the help of a neat diagram. (5+3)

Or

- (b) (i) Compare hydraulic and pneumatic systems. (10)
- (ii) Explain general parameters for designing an intelligent mechatronic system. (3)
12. (a) (i) What is SFG? Explain each terminology in SFG in detail with a diagrammatic representation. (5)
- (ii) Reduce the system to a single transfer function. (8)

Or

- (b) (i) How can control system reduce steady-state error? (3)
- (ii) Simplify the block diagram to obtain the close-loop transfer function $\frac{C(S)}{R(S)}$. (10)

13. (a) (i) Determine whether the integral $\int_0^{\infty} \frac{1}{1+t^2} dt$ converges. If the integral converges, give its value. (5)
- (ii) How do you solve for steady-state error? [Refer Figure 13 (a) (ii)] (8)

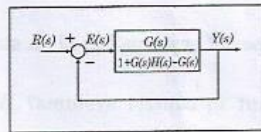


Figure.13 a (ii)

Or

- (b) (i) List the various properties of Laplace transform. (8)
(ii) What is steady-state error in PI controller? Explain. (5)
14. (a) (i) What are the advantages of root locus system? (6)
(ii) What are breakaway points? Explain. (7)

Or

- (b) (i) What is a Bode plot of a control system? Explain. (5)
(ii) What is an advantage of using Bode plot? Explain. (8)
15. (a) (i) What is a PID Controller? Explain. (5)
(ii) What are the advantages of sampled data control system? Explain. (8)

Or

- (b) (i) What is a PID Temperature Controller? Explain. (6)
(ii) What is sampled data control system briefly explain using suitable examples? Explain. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the ten Rules for reduction of Block Diagram model and Procedure for reduction of Block Diagram model.

Or

- (b) Explain the hydraulic operated devices in feedback control system.