

Reg. No. :

Question Paper Code : 50081

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fifth Semester

Aeronautical Engineering

AE 8501 – FLIGHT DYNAMICS

(Common to: Aerospace Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw a curve showing variation of power available and power required with respect to altitude.
2. Write down the Conditions for minimum drag and power required.
3. Define load factor and state its limitations.
4. How an aircraft performs a coordinated turn?
5. How a shift In CG location influences the stability of an aircraft?
6. Name some controls in an airplane and write their purpose.
7. What is yaw damping?
8. Define sideslip.
9. What are the different modes of stability?
10. What is the effect of freeing the control stick of an airplane?

PART B — (5 × 13 = 65 marks)

11. (a) Draw a drag polar curve for vehicles from low speed to high speeds and explain.

Or

- (b) Draw a flight in cruising condition, show various forces and moments acting on it and explain.

12. (a) Draw a V-n diagram and explain for different altitude and different speed regime.

Or

- (b) Derive an expression for range and endurance of takeoff and landing.

13. (a) Explain how to calculate change in pitching moment due to a change in angle of attack.

Or

- (b) Explain the physical significance of stick fixed and stick free stability of an aircraft.

14. (a) Discuss on cross-coupling parameters and its effect on an airplane.

Or

- (b) Enumerate the various parameters for yaw damping.

15. (a) Explain autorotation and spin.

Or

- (b) Explain divergence and Dutch roll.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss and perform a design process to set the incidence angles for longitudinal stability.

Or

- (b) Draw a figure of an aircraft in right sideslip and arrive the necessary static directional stability equations.