Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 50033

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fifth/Sixth Semester

Aeronautical Engineering

AE 3691 — FLIGHT DYNAMICS

(Common to : Aerospace Engineering)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw an accelerated flight showing various forces and moments acting on it.

2. What are the different types of drag?

3. What are the limitations on turning a passenger aircraft?

4. Define range and endurance.

5. Write a note on degree of freedom of rigid bodies in space.

6. What are the various controls for aircraft's stability?

7. What is the relationship between directional and lateral stability?

8. State the three factors that affect lateral stability.

9. What do understand by the term dynamic longitudinal stability?

10. What is the effect of freeing the stick?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss with a neat sketch on the variation of thrust, power with velocity and altitudes for air breathing engines.

Or

    (b) Explain about power available and power required curves with reference to change in altitude.

12. (a) Explain in detail about V-n diagram.

Or

(b) Explain about climbing and gliding flights and derive the expression for maximum rate of climb and minimum rate of sink.

13. (a) Explain about stick fixed stability and influence of CG location on stability.

Or

(b) Write short notes on the following:

(i) Effects of fuselage and nacelle in stability (7)

(ii) Symmetric maneuvers (6)

14. (a) Explain the following:

(i) Dihedral effect (7)

(ii) Aileron reversal (6)

Or

(b) Explain the following:

(i) Weather cocking effect (7)

(ii) Rudder lock (6)

15. (a) Describe the role of dorsal fin and ventral fin in directional stability.

Or

(b) Write briefly on the following.

(i) Dutch roll (7)

(ii) Auto rotation and spin (6)

PART C — (1 × 15 = 15 marks)

16. (a) Consider a typical aircraft of your choice and determine various basic maneuvering performance parameters for your aircraft.

Or

(b) Discuss on different modes of stability and its importance in commercial and fighter airplanes.

——————

2   50033