Question Paper Code : 91029

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fifth Semester

Aeronautical Engineering

AE 2301/AE 51/10122 AE 501 — FLIGHT DYNAMICS

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between troposphere and stratosphere?
2. Define absolute ceiling and service ceiling.
3. How are load factors and bank angle related?
4. What is V-n diagram? Define load factor.
5. [illegible] neutral point of an airplane
6. Distinguish between stability and controllability.
7. Define dihedral effect.
8. What is the need for a fin in an airplane?
9. What is Phugoid motion?
10. What is Dutch roll?

PART B — (5 × 16 = 80 marks)

11. (a) Discuss in detail various types of drag in an airplane and methods of minimizing the drag.

Or

(b) Derive condition for minimum thrust and power required in straight and level flight.

12. (a) Derive the Brequet Range and endurance for both propeller and jet aircraft.

Or

(b) Explain in detail about the V-n diagram with gust load.

13. (a) Write shorts on :

(i) Stick force per 'g' (8)

(ii) Aerodynamic balancing. (8)

Or

(b) (i) Discuss the power effect on longitudinal static stability of jet aircraft. (8)

(ii) Derive an expression for stick fixed neutral point. (8)

14. (a) (i) Explain the requirements of rudder in aircraft. (8)

(ii) Discuss with suitable example the coupling between rolling and yawing moment. (8)

Or

(b) Discuss in detail the contribution of various components of the airplane on static directional stability.

15. (a) Explain in detail the phenomena of autorotation and spin and discuss how the pilot can recover form the Situation.

Or

(b) Write short notes on :

(i) Spiral and directional divergence. (8)

(ii) Stability derivatives in longitudinal dynamics. (8)