B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 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 Zero lift drag?

2.   Draw SFC versus altitude curve and SFC versus velocity.

3.   Define Stalling Speed.

4.   What is service ceiling and absolute ceiling?

5.   Define static and dynamic stability.

6.   Define Hinge Moment.

7.   What is Dihedral Effect?

8.   What is weather clocking stability?

9.   Write some different modes of motion in dynamic system?

10.   Define Dutch Roll.

PART B — (5 × 16 = 80 marks)

11.   (a)   Derive the Estimation of airplane drag in low speed aircraft.

Or

      (b)   Derive the conditions for minimum drag and minimum power required.

12. (a) Derive the Range equation for a propeller powered aircraft.

Or

(b) What is load factor and explain the salient features of V-n diagram?

13. (a) How does the aft position of the tail affects the stability of the aircraft. Support your theory with appropriate derivation.

Or

(b) Derive the elevator hinge moment to determine the static margin for an aircraft.

14. (a) Quantitatively explain the contribution of different components of aircraft towards directional stability and explain directional control.

Or

(b) Briefly explain Aileron reversal, One engine inoperative condition and Rudder lock.

15. (a) Discuss various stability derivatives relevant to lateral Dynamics.

Or

(b) Explain Dutch roll, Spiral divergence and auto rotation.

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