D-203

B. Tech. EXAMINATION, May 2018

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

(AER)

AER206B

AEROPLANE PERFORMANCE, STABILITY AND CONTROL AER

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit IV

7. Discuss the following : **15**

(a) Assymmetric flight

(b) Weather Cock Stability

(c) Dihedral Effects.

8. What do you mean by split up of equation in symmetrical and non-symmetric groups of motion ? Justify your answer in detail. **15**

Unit I

1. What do you mean by ISA ? Derive the relation between Geopotential and Geometric altitude. **15**

2. Define the following : **15**

(a) Aerodynamic centre

(b) Angle of Attack

(c) V/STOL Configuration.

Unit II

3. Prove that thrust required which varies inversely as $\frac{C_L}{C_D}$ and power required varies inversely as $\frac{C_L^{\frac{3}{2}}}{C_D}$. **15**

4. (a) An airoplane weighing 5000 kg is flying at standard sea lavel with a velocity of 200 m/sec. At this velocity, the $\left(\frac{L}{D}\right)$ ratio is a maximum. The wing area and the Aspect Ratio are 18 m^2 and 8.5 respectively. The Oswald efficiency factor is 0.93. Find the total drag of the Aeroplane. **10**

(b) Discuss the effect of span on the Induced drag. **5**

Unit III

5. Derive an expression for the stick fixed static longitudinal stability of the aeroplane. **15**

6. (a) Derive an expression for elevator angle per g. **10**

(b) Explain the Neutral point and Power effects. **5**