No. of Printed Pages : 2

BAS-017

00538

B.TECH. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

June, 2013

BAS-017 : FLIGHT MECHANICS

Time : 3 Hours *Maximum Marks : 70*

Note : *Attempt **seven** questions in all. Q.No. 1 is **compulsory**. Attempt **any six** questions from the remaining questions.*

1. Write short notes on :

(a) Control reversal 3

(b) Stick fixed longitudinal static stability 2

(c) Damping in roll 2

(d) The stick fixed maneuver point lies forward of stick fixed neutral point 3

2. Define cross coupling. Describe its effects on lateral and directional controls. **10**

3. How does wing dihedral affects stability ? Explain with diagram. **10**

4. How does an aircraft is flown in level flight in case one of the engine on the right wing tails ? What is design consideration for the rudder? Explain. **10**

5. Derive the stick-fixed pitching moment coefficient expression neglecting propeller wind milling and power effects. **10**

6. Derive the expression for stick force required by the pilot in level flight. **10**

7. (a) Explain the gadgetry for improving the stick force gradient. **5**

   (b) Indicate the aft and forward centre of gravity limits (Free flight, Ground effect, with power-stick fixed and stick free, propeller wind milling & usable c.g. range on the mean aerodynamic chord) **5**

8 Derive the expressions for the elevator angle per 'g' for the pull-up & turn maneuvering flights. **10**

9 An aircraft of 11,000 kg mass is designed with the line of thrust 0.9 meters above the line of drag. In normal flight the drag is 18.2kN and the centre of pressure on the main plane is 150 mm behind the c.g. If the centre of pressure of the tail plane is 10 meter behind the c.g., what is the load on the tail plane in trim condition. **10**