



Reg. No. :

Name :

First Semester M.Tech. Degree Examination, March 2014
(2013 Scheme)
Branch : Electrical And Electronics Engineering
Streams : Control Systems, Guidance and Navigational Control
EGC1002 : INTRODUCTION TO FLIGHT

Time : 3 Hours

Max. Marks : 60

- Instructions :** 1) Answer **any two** full questions from **each** Module.
2) Standard atmosphere table in **both** systems of Units is to be allowed.

MODULE – 1

1. a) Define different attitude layers of atmosphere. 5
b) Calculate the standard atmosphere values of temperature, pressure and density at a geopotential attitude of 12 km. 5
2. a) Distinguish between laminar and turbulent flow. What is Reynolds number ? How it varies with laminar and turbulent flow ? 7
b) Define Mach number. Calculate the Mach number of an airplane flying with a velocity 800 ft/s at a standard attitude of 30,000 ft. 3
3. a) What is meant by aerodynamic heating ? 5
b) State and explain Buckingham P1 theorem. 5

MODULE – 2

4. a) What is an airfoil ? Differentiate between symmetric and cambered airfoils. What is the effect of wing geometry on the amount of lift produced. 8
b) For a NACA 4412 airfoil calculate the lift coefficient if the angle of attack is 4° and free stream Mach number is 0.7. 2

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5. a) Distinguish between finite wings and infinite wings. 3
- b) The pressure at a point on the wings of an airplane flying with a velocity 75 m/s at standard attitude of 2000 m is 7.58×10^4 N/m². Calculate the pressure coefficient. 3
- c) What is the importance of L/D ratio curve? 4
6. Write notes on :
- a) Angle of attack and stalling of airfoils. 4
- b) Center of pressures 3
- c) Swept wings 3

MODULE – 3

7. a) Explain the different control surfaces in airplanes. 3
- b) Explain the term state stability in the context of airplane performance. 4
- c) What is meant by dihedral effect? 3
8. a) What is the use of flaps and slots in airplanes. 3
- b) What is meant by dynamic stability? 4
- c) Compare the performance and contest of launch vehicle with aerospace vehicles. 3
9. a) Explain the term dihedral angle. 2
- b) Explain the term longitudinal state stability. What are the criteria for longitudinal state stability. 5
- c) Differentiate between the dynamics of Helicopter and UAVs. 3
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