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10AE45

Fourth Semester B.E. Degree Examination, June / July 2014
Elements of Aeronautics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1
 - a. Explain the types of balloons, with a neat sketches wherever necessary. (06 Marks)
 - b. What are the differences between Monoplane and Biplane? (04 Marks)
 - c. Discuss the recent developments related to aircraft materials. (10 Marks)
- 2
 - a. Write the lift equation and derive for it. (08 Marks)
 - b. Define the following terms with neat sketches : i) Airfoil profile ii) Airfoil iii) Chord iv) Leading Edge v) Trailing Edge vi) Maximum Thickness vii) Camber viii) Mean Camber line ix) Angle of attack x) Center of pressure xi) Aerodynamic center xii) Center of gravity. (12 Marks)
- 3
 - a. Establish a relation between temperature pressure and altitude considering isothermal layer and gradient layer. (10 Marks)
 - b. Define the following terms : i) Absolute altitude ii) Geometric altitude iii) Geopotential altitude. (06 Marks)
 - c. With a neat sketch, explain the axes of the airplane. (04 Marks)
- 4
 - a. State the laws of Kepler and hence prove the third law. (08 Marks)
 - b. Briefly describe the main categories of space flight vehicles and explain primary sequential phases of space missile. (12 Marks)

PART - B

- 5
 - a. Write the general types of construction of aircraft structure and explain briefly. (10 Marks)
 - b. Explain the stress – strain diagram comparing the behaviour of composites with metals. (10 Marks)
- 6
 - a. With a neat sketch, explain the liquid propellant of rocket engines. (10 Marks)
 - b. Bring out the general classification of Internal combustion engines in aircraft. Describe the various cylinder arrangements used in Internal combustion engine. (10 Marks)
- 7
 - a. Explain in brief a typical hydraulic system for a large aircraft. (10 Marks)
 - b. What is the importance of oxygen? Bring out the characteristics and types of oxygen. (10 Marks)
- 8
 - a. What is a control system? Why a flight control system is required in an aircraft? Explain the main control surfaces of a flight control system. (10 Marks)
 - b. How are aircraft instruments classified? Explain Pitot – static system with a neat diagram. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.