

End Semester Examinations - 2015-16 Even Semester - May 2016

14AE2030 Basics of Aerospace Engineering

Set A

Time : 3 hrs
Total Marks: 100

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1. 1. a) What are Ornithopters ? 4 Marks
- b) What is the contribution of Sir George Cayley? 4 Marks
- c) Calculate the values of pressure, density and temperature for the standard atmosphere at an altitude of 15000 m. 12 Marks
- The standard sea level values are pressure = 101325 N/m^2 , density = 1.2256 Kg/m^3 and temperature = 288.16 K. The temperature lapse rate $a = -0.0065 \text{ K/m}$
- OR**
2. 2. a) Name the brothers who had the first successful take-off in the history of mankind. 2 Marks
- b) Name any two materials used for the construction of aircrafts over the years. 2 Marks
- c) Define standard atmosphere. Derive an expression for pressure and density ratio
- (i) In the isothermal region of the standard atmosphere.
- (ii) In the isothermal region of the standard atmosphere 16 Marks
3. 3. a) Define angle of attack and mean chamber line of an aerofoil. 4 Marks
- b) Describe the major components of an aeroplane with a neat sketch and explain their functions. 16Marks
- OR**
4. 4. An airplane is flying at a velocity of 120 m/s at a standard altitude of 4 km. The pressure coefficient at a point on the fuselage is -1.9. What is the pressure at this point.
- The standard sea level values are pressure = 101325 N/m^2 , density = 1.2256 Kg/m^3 and temperature = 288.16 K. The temperature lapse rate $a = -0.0065 \text{ K/m}$ 20 Marks
5. 5. a) Distinguish between symmetrical airfoil and cambered airfoil 4 Marks
- b) Define the term torsion as it relates to an aircraft structure. 4 marks
- c) Define the term pressure coefficient and for a standard airfoil 12 marks
- OR**
6. 6. a) What is spar? Explain in detail how it is used in carrying the Load? 5 Marks
- b) Explain with neat sketch the wing and fuselage construction. 15 Marks
7. 7. a) What do you mean by air-breathing engine? Give four examples of air-breathing engine. 10Marks
- b) Describe the working of a turbojet engine. Depict the Various thermodynamic processes occurring in it on P-V diagram. 10 Marks
- OR**
8. 8. a) What are the four thermodynamic processes of an ideal Bryton cycle ? 5 Marks
- b) Describe the working of a turboprop engine. Depict the Various thermodynamic processes occurring in it on P-V and T-S diagram. 15 Marks

9. a) What do you mean by non air-breathing engine? Give two examples of non air-breathing engine. 6 Marks

b) Explain with sketch a liquid propelled rocket engine. What are the merits compared to solid propelled system. 14 Marks

Wishing you All the Best
