Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14AE2001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **INTRODUCTION TO AEROSPACE ENGINEERING** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the invention of Sir George Cayley. | CO1 | 5 |
| b. | Distinguish between troposphere and stratosphere. | CO1 | 5 |
| c. | Calculate the values of pressure, density and temperature for the standard atmosphere at an altitude of 14500 m.  The standard sea level values are pressure = 101325 N/ m2, density = 1.2256 kg/m3 and temperature = 288.16 K. The temperature lapse rate a = -0.0065 K/m | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Explain the contributions of the Wright brothers . | CO1 | 5 |
| b. | Calculate the mass of air contained in a room 9 m long,10 m wide and 7 m high. Assume standard atmosphere pressure and temperature 1 atm and 250 K, respectively. | CO1 | 3 |
| c. | Define standard atmosphere. Derive an expression for pressure and density ratio.  i) in the isothermal region of the standard atmosphere.  ii) in the gradient region of the standard atmosphere. | CO1 | 12 |
|  |  |  |  |  |
| 3. | a. | Write a brief note on airfoil nomenclature. | CO1 | 5 |
|  | b. | An airplane is flying with Mach number 0.218 at a standard altitude of 5 km. The pressure coefficient at a point on the fuselage is - 1.2. What is the pressure at this point?  The standard sea level values are pressure = 101325 N/ m2, density = 1.2256 kg/m3 and temperature = 288.16 K. The temperature lapse rate a = -0.0065 K/m | CO2 | 15 |
| (OR) | | | | |
| 4. | a. | Explain the classification of the aircraft . | CO1 | 5 |
|  | b. | What is rudder ? What is its use and how does it help in aircraft maneuver? | CO2 | 5 |
|  | c. | Experiment were conducted in a wind tunnel with a wind speed 50 km /hr on a flat plate of size 2 m long and 1 m wide. The density of air is 1.15 kg/m3. The coefficient of lift and drag are 0.75 and 0.15 respectively. Determine i. Lift force ii. Drag force | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Distinguish between the monocoque and semi monocoque structures. | CO2 | 5 |
|  | b. | Explain the construction of fuselage and wing and its predominant types with a neat sketch. Explain the functions of its components. | CO2 | 15 |
| (OR) | | | | |
| 6. | a. | Define sandwich structure and explain its advantages and disadvantages in aircraft structure | CO1 | 8 |
|  | b. | Explain the function of ribs, spar and wing box with figures. | CO2 | 12 |
|  |  |  |  |  |
| 7. | a. | What are the method of reducing the jet noise and increasing propulsive efficiency. Explain with neat sketch the different components and the working principle of turbofan Engine with front fan. | CO2 | 12 |
|  | b. | Explain the following terms and derive the equations as applied to Jet Propulsion: Thrust Specific fuel consumption, Thrust Power, Propulsive power and Propulsive efficiency. | CO1 | 8 |
| (OR) | | | | |
| 8. | a. | Explain the function of Pitot -Static system with neat sketch. | CO1 | 5 |
|  | b. | Describe the working of a jet engine. Depict the various thermodynamic processes occurring in it on P-V diagram. | CO1 | 15 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | State the advantages and disadvantages of solid propellants. | CO1 | 5 |
|  | b. | Discuss the working principle of rocket with neat sketch .Derive the expression for specific impulse (Isp) for a rocket engine in terms of the temperature of combustion chamber (To) and the molecular weight of the propellant. | CO2 | 15 |

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