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**INSTITUTE OF AERONAUTICAL ENGINEERING****(Autonomous)**

B.Tech III Semester End Examinations (Regular) - November, 2018

**Regulation: IARE – R16****INTRODUCTION TO AEROSPACE ENGINEERING****Time: 3 Hours****(AE)****Max Marks: 70****Answer ONE Question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****UNIT – I**

1. (a) Describe about earth's atmosphere in detail. Explain with neat sketches. [7M]  
(b) Differentiate between the Lighter-than-air and heavier-than-air aircrafts highlighting the salient features of these. Illustrate the various categories of aircrafts that fall under each of these aircraft types. [7M]
2. (a) What is an ornithopter? Can ornithopters be called flying machines? Justify your answer. [7M]  
(b) Write about Sir George Cayley and about his experiments and contribution towards aeronautics. [7M]

**UNIT – II**

3. (a) Explain in detail about biplanes and monoplane aircrafts with a neat sketch. [7M]  
(b) Explain lift generating conditions with neat graphical representation. [7M]
4. (a) Explain the relation between pressure distributions over an aerofoil for different angle of attack? Explain with relevant sketch? [7M]  
(b) What is Magnus effect? State few applications of this effect and enumerating their advantages and disadvantages. [7M]

**UNIT – III**

5. (a) What do you understand by the “lateral stability” of an aircraft? Discuss how the lateral stability of an aircraft is maintained. [7M]  
(b) Explain in detail the performance parameters with the expression for “Range” and “Endurance” of an aircraft. [7M]
6. (a) Discuss with examples features of VTOL and V/STOL aircraft takeoff and landing strategies. [7M]  
(b) Distinguish between the three reference systems used in the steady flight analysis, lateral and longitudinal stability. [7M]

#### UNIT – IV

7. (a) Describe the basic concept of a monocoque and semi -monocoque structure? Explain with neat sketches. [7M]
- (b) Describe the basic properties and applications for aluminum alloys used in airplane wing structures? [7M]
8. (a) With basic principle explain about the jet engines for thrust production for high speed aircraft? [7M]
- (b) Distinguish between liquid propellant rocket engine and solid propellant rocket motor? [7M]

#### UNIT – V

9. (a) Enumerate and discuss the objectives of different types of space missions citing an example of each of the missions undertaken. [7M]
- (b) Discuss the factors to be considered in designing spacecrafts that will eventually come down and re-enter atmosphere [7M]
10. (a) All spacecrafts will eventually come down and re-enter atmosphere – yes or no justify. [7M]
- (b) Write about the Indian effort in aviation, missile and space technology. [7M]

