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Question Paper Code: AAE001



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Regular) - December, 2017

Regulation: IARE – R16

INTRODUCTION TO AEROSPACE ENGINEERING

(Aeronautical Engineering)

Time: 3 Hours

Max Marks: 70

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Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

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## UNIT – I

1. (a) Define microgravity and explain the benefits of microgravity on space vehicle operation. [7M]  
(b) Explain about the earth's atmosphere and its various layers as per thermal distribution. What do you mean by lapse rate? [7M]
2. (a) Discuss about the Environmental Impact over Spacecraft Design and its remedies. [7M]  
(b) Explain about low earth orbit. What happens if the Shuttle reduces its velocity. [7M]

## UNIT – II

3. (a) Write in detail about airfoil and nomenclature of airfoil. Explain how the airfoils are classified into NACA 4 series, NACA 5 series and NACA 6 series. [7M]  
(b) Explain in detail about drag polar curve. [7M]
4. (a) Write short notes on [7M]
  - i. Centre of pressure,
  - ii. Aerodynamics Centre
  - iii. Pressure distribution over the airfoil  
(b) Draw a neat sketch and explain the important components of the aircraft and its functions. [7M]

## UNIT – III

5. (a) Write short notes on Cruise, Climb, Range and Endurance. [7M]  
(b) Discuss on static stability and longitudinal stability with suitable expression. [7M]
6. (a) What is meant by stability of an airplane? Describe the various types of stability and instability. [7M]  
(b) Describe the criteria of dynamic stability of an aircraft with suitable sketch. [7M]

#### UNIT – IV

7. (a) Differentiate between monocoque and semi-monocoque construction and their advantages. [7M]  
(b) Compare working principle of aircrafts and rockets in terms of propulsive devices. [7M]
8. (a) Discuss working methods of various turbo jet engine with suitable sketches. [7M]  
(b) Discuss about different types of air breathing engines and non-air breathing engines. [7M]

#### UNIT – V

9. (a) How the spacecraft attitude is controlled? Explain the determination method of attitude control. [7M]  
(b) Discuss the operational methods of satellite systems with suitable illustration. [7M]
10. (a) How Antennas work in radio station for communication? What are the types of antenna used. [7M]  
(b) Explain different types of thermal control systems used in satellites. Write any one with suitable sketches. [7M]

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