

Code: 9A21401

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**II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
INTRODUCTION TO AEROSPACE ENGINEERING**

(Aeronautical Engineering)

Time: 3 hours

Max Marks: 70

**Answer any FIVE Questions
All Questions carry equal marks**

1. What was the critical aerodynamics contribution that the Wright Brothers implemented in order to achieve the first heavier-than-air flight?
2. Explain how you can give the summary and final word about Aerospace Engineering in introductory level.
3. Explain what the Aerodynamic Forces on a wing are. Derive the equations.
4. Derive minimum glide angle of aircraft and also derive stalling speed equation for aircraft.
5. Explain about "The Van Allen Belts" with the help of figure. Explain the Environmental Impact on Spacecraft Design.
6. Explain the following satellite subsystems.
 - (a) Thermal Control.
 - (b) Power Systems.
7. Explain in detail about the space shuttle and Apollo-Soyuz.
8. Explain the four stages like problem definition, incubation and synthesis, analysis and evaluation of the design process.

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1. Discuss a leading scientific advancement that contributed to the growth of the commercial airline industry.
2. Explain in detail what is Aerospace Engineering?
3. Explain what is the working principle of rocket engine and also. Describe the different components of rocket.
4. Derive the equation to calculate maximum lift-to-drag ratio of aircraft.
5. How to calculate the distance from the center of earth to the microgravity environment (r_μ). Explain the benefits of microgravity.
6. (a) Explain Attitude Determination and Control.
(b) Explain propulsion and station keeping.
7. Compare Mercury, Gemini, Apollo and Skylab.
8. What are the important roles of computer-aided Engineering design and Analysis.

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1. Explain the introduction of jet Aircraft during World War II.
2. Explain the following:
 - (a) The stone age of Engineering.
 - (b) The bronze age to the Iron age of Engineering.
 - (c) Hellenistic period of Engineering.
 - (d) Vitruvius writings of known technology.
3.
 - (a) Explain profile drag and induced drag with the help of figure.
 - (b) Explain about rocket engine. Draw neat sketch.
4.
 - (a) Explain static stability and dynamic stability.
 - (b) Explain pitch, roll and yaw of aircraft with the help of figure.
5. What is Microgravity? Explain law of gravitation and low Earth orbit.
6. Explain an operational satellite system after launched and placed into an orbit. Explain element of a satellite.
7.
 - (a) Explain different design choices of space suits.
 - (b) Write short notes on life support systems.
8. Explain the following:
 - (a) Personal design portfolio.
 - (b) LTA vehicle design hints.

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1. Explain the following:
 - (a) Commercial Air Transport.
 - (b) Conquest of space.
2. Explain the following:
 - (a) The Industrial Revolution of Engineering.
 - (b) The Renaissance.
3. Explain working principle and construction details of aircraft and rocket engines.
4. (a) Explain Static Forces and Moments on an aircraft. Derive equations. Draw neat sketches.
(b) Explain Static Stability and Dynamic Stability.
5. Explain in detail how does the space environment differ from that of earth.
6. Explain the following satellite bus-sub systems.
 - (a) Structures, Mechanisms and Materials.
 - (b) Communication and Telemetry.
7. Write short notes on the following:
 - (a) International space station.
 - (b) Space shuttle extravehicular mobility unit.
8. Explain lighter-than-air vehicle design project.
