

Code No: A109212101

**R09****Set No. 2**

**II B.Tech I Semester Examinations, MAY 2011**  
**INTRODUCTION OF AEROSPACE ENGINEERING**  
**Aeronautical Engineering**

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions  
 All Questions carry equal marks

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1. (a) What were the remarkable studies of the scientist Langley during 18<sup>th</sup> century in North America?  
 (b) Explain in detail about 'aerodromes' developed by the American scientist Langley. [7+8]
2. Describe the objectives and Mission details of Apollo - Sayuz programme. [15]
3. (a) Write a short note on the working of a turbojet engine.  
 (b) Write a short note on the working of a turbofan engine. [8+7]
4. Write short notes on
  - (a) Mechanisms of a satellite.
  - (b) Materials used in manufacture of satellites.
  - (c) Satellite bus system. [15]
5. Discuss 'Concurrent engineering'. [15]
6. Describe Renaissance. [15]
7. Describe the differences in the atmospheres of Mars and Jupiter. What could be the contributing factors for such environments to be established over time on these planets? [15]
8. (a) Write a short note on stalling speed of an aircraft that is in steady and level flight.  
 (b) Consider an aircraft weighing 7500 N, traveling in straight and level flight at an altitude of 5000 m under a thrust of 2000 N. Its wing surface area is 145 m<sup>2</sup>, and aspect ratio is 7.67. Determine the stall speed of the aircraft. Given air density at 5000 m = 0.73762 kg/m<sup>3</sup>, and  $(C_L)_{max} = 1.4$ . [8+7]

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**R09****Set No. 4**

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Time: 3 hours

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Answer any FIVE Questions  
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1. (a) Write a note on Apollo human spaceflight program.  
(b) Write a note on Apollo-Suyuz human spaceflight program. [8+7]
2. Write short notes on the following:
  - (a) Low Earth Orbit (LEO)
  - (b) Benefits of microgravity [8+7]
3. Write a detailed note on the power systems employed in the design of satellite launch vehicle. [15]
4. Assuming that you are addressing high school students, how could you describe the profession of engineering? Also how would you encourage them to pursue a career in engineering? [15]
5. Write notes on design of
  - (a) Mission
  - (b) Performance
  - (c) Safety requirements of lighter than air aircraft [5+5+5]
6. (a) Provide a brief account of the attempts made by French engineer Felix Du Temple and Russian scientist Alexander Mozhaiski in building a powered model airplane during 19<sup>th</sup> century.  
(b) What was the role of Aeronautical Society of Great Britain in the field of Aeronautics during 19<sup>th</sup> century? [8+7]
7. What are the parameters pertaining to the performance of an aircraft? Discuss with respect to steady flight. [15]
8. Compare the aircraft and the rockets, explaining the major differences. [15]

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1. Write a detailed note on the EMU Spacesuit construction. [15]
2. Write short notes on the following with regard to application of a satellite mission.
  - (a) Military and national security
  - (b) Civil
  - (c) Commercial. [3×5]
3. Write a detailed note on Computer Aided Machining (CAM). [15]
4. What is meant by 'Mach number' (M) and how is it related to the compressibility of the air? What is its importance? [15]
5. What are the criteria for longitudinal static stability of an aircraft? [15]
6. (a) With the help of a neat sketch explain the attempts made by Sir George Cayley to design and test a full sized airplane. Also discuss the features of 'Boy-carrier'.  
(b) Discuss the features incorporated by Sir George Cayley in his design of governable Parachutes, during 19<sup>th</sup> century. [7+8]
7. Write a detailed note about the efforts of Dr Charles Draper in developing inertial navigation system that has been effectively utilized in Apollo's landing on Moon and all strategic missile applications. [15]
8. Considering the temperature extremes of space show that the equilibrium temperature for a body at a distance from the Sun depends not only upon the distance, but also varies directly with the value of ratio between solar absorption coefficient ( $\alpha$ ) and the emissivity ( $\varepsilon$ ) of the body. [15]

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**R09****Set No. 3**

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**Aeronautical Engineering**

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions  
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1. Write short notes on the following
  - (a) Command and control center operations
  - (b) Data storage center operations
  - (c) Data analysis and distribution center operations [3×5]
2. (a) Define the three axes of motion of an aircraft with the help of a sketch.  
 (b) Write a detailed note on the effects of various controls available on an airplane to control the roll, pitch, and yaw motions of the aircraft. [7+8]
3. Write a detailed note on space debris. [15]
4. Discuss the importance of Aerodynamics for aviation. [15]
5. (a) Lighter than air - and Heavier than air - carriers - compare and contrast.  
 (b) Explain in detail the attempts made by the German researcher Lilienthal to fly in air with the help of the glider he designed. [7+8]
6. Mention a few aspects relating LTA (Lighter than air) vehicle design so that the vehicle becomes controllable. [15]
7. Distinguish between Science and Technology. [15]
8. Describe
  - (a) Apollo Mission
  - (b) Sayuz Mission
  - (c) Apollo - Sayuz Mission different from (a) and (b) above. [5+5+5]

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