

Code No: A109212101

R09**Set No. 2**

II B.Tech I Semester Examinations, November 2010
INTRODUCTION OF AEROSPACE ENGINEERING
Aeronautical Engineering

Time: 3 hours**Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Write a detailed note on microgravity. What is the magnitude of microgravity in terms of gravitational force of acceleration of Earth?
(b) Assuming 6370 km as the radius of the earth estimate the distance above the surface of the earth where the microgravity effects or near-weightless condition could be felt. [8+7]
2. With the help of neat sketches, explain the design of an airfoil as wing that provides lift to an aircraft. [15]
3. With fundamental concepts explain how to draw straight lines, parallel lines, perpendicular lines, and angles. [15]
4. (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 19th century. [7+8]
5. Obtain the equations for endurance and range of a Jet aircraft. [15]
6. Discuss Indian Science and Technology. [15]
7. Present a detailed report on an oceanographic mission as a case study. [15]
8. Explain the physiological effects of extravehicular activity on human body. What were the methods currently in practice to prevent such effects? [15]

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R09**Set No. 4**

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Answer any FIVE Questions
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1. (a) "Lilienthal was the first human to be photographed in an airplane as a pilot" and got his research work published as articles. Elaborate.
(b) Present a detailed note on the work of German researcher Lilienthal with regard to glider experiments. [7+8]
2. Explain developments in Engineering that took place during the stone age, bronze age, and iron age. [15]
3. Write short notes on the following:
(a) Projection in drawing
(b) T-square drawing instrument
(c) Triangle drawing instrument [3×5]
4. Describe the aircraft and rocket and engines. [15]
5. Compare the way aircraft and helicopters fly. [15]
6. Describe
(a) Satellite structures.
(b) Satellite propulsion.
(c) Power systems. [5+5+5]
7. Write a detailed note on Martian environment. [15]
8. Describe
(a) US space suit design.
(b) USSR (Russian) space suit design.
(c) Your judgement on superiority of one over the other. [15]

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R09**Set No. 1**

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Aeronautical Engineering

Time: 3 hours**Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the motivation for the United States to develop a space program.
(b) Write about the major contribution of the European Space Agency (ESA) in the U.S. space program. [8+7]
2. Write short notes on the following
(a) Solar winds
(b) Solar flares
(c) Solar activity [3×5]
3. Explain developments in Engineering that took place during the Hellenistic period, and Middle ages. [15]
4. Write detailed notes on
(a) longitudinal static stability of an aircraft,
(b) Stall Speed. [8+7]
5. Write short notes on the following:
(a) Lift curve for symmetrical and cambered airfoils
(b) The effect of Reynold's number on lift curve
(c) The effect of Reynold's number on drag curve [5+5+5]
6. Write notes on design of
(a) Mission
(b) Performance
(c) Safety requirements of lighter than air aircraft [5+5+5]
7. Describe manned flights to the moon. How are they different from human flight to low earth orbit? Explain with stress on magnitudes of design and risk factor. [15]
8. Present a detailed report on a space-based telecommunication system as a case study. [15]

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R09**Set No. 3**

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Answer any FIVE Questions
All Questions carry equal marks

1. Describe the various components of a rocket and explain its working principle. [15]
2. (a) Write a short note on 'maximum lift-to-drag ratio'.
(b) What do you understand by "Endurance", and "Range" of an aircraft? [8+7]
3. Write short notes on the following with regard to propulsion and station keeping practices:
 - (a) Satellite orbit change
 - (b) Attitude control
 - (c) Satellite End-of-life (EOL) disposal [3×5]
4. How did the development of Electricity give rise to the industrial revolution in the late 1700s? [15]
5. Mention a few aspects relating LTA (Lighter than air) vehicle design so that the vehicle becomes controllable. [15]
6. Discuss in detail the NASA plans of a comprehensive space program to place a space station with permanent human presence in low earth orbit and other relevant technical aspects. [15]
7. (a) Discuss the reasons for choosing a white colored thermal micrometeorite material as the outer garment for a space suit.
(b) Describe two solutions in practice to overcome the space debris problem. [8+7]
8. What are the major problems associated with human extravehicular activity in space? Compare the currently available measures to counteract these problems. [15]
