

Code No: A109212101

R09

Set No. 2

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

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. Write short notes on the following:
 - (a) Coefficient of lift
 - (b) Coefficient of drag
 - (c) Reynold's number[5×3]
2. What are meant by 'design' and 'Design skill'? [15]
3. List out and discuss in detail the advanced spacesuit considerations. [15]
4. All spacecraft will eventually come down and re-enter atmosphere - yes or no? Justify. [15]
5. Enumerate the various aerodynamics related experiments conducted by Sir George Cayley. [15]
6. Compare the way aircraft and helicopters fly. [15]
7. With the help of a neat sketch, explain the working of an omni-directional antenna creating uplink and downlink of data with the satellite. [15]
8. Explain the findings of Isaac Newton that led to Newtonian Physics. How does Einstein's general theory of relativity superseed the concepts of Isaac Newton? [15]

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Answer any FIVE Questions
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1. Write short notes on the following with regard to propulsion and station keeping practices:
 - (a) Initial spin-up
 - (b) Station keeping (N-S, and E-W)
 - (c) Angular momentum management [3×5]
2. Explain the working principle of a rocket engine. Describe the different components of a rocket. [15]
3. Write a detailed note on Computer Aided Design / drafting (CAD). [15]
4. Write detailed notes on
 - (a) longitudinal static stability of an aircraft,
 - (b) Stall Speed. [8+7]
5.
 - (a) Write short notes on Galactic cosmic rays.
 - (b) Explain Solar cosmic rays. [7+8]
6. Write in detail on human performance in low-gravity environments. [15]
7. Over the ages the development of civilization was not Steady - Justify. [15]
8.
 - (a) Provide a detailed note on the development of balloons during the 18th century that flew in air and created history in lifting a human being off the ground for a sustained period of time.
 - (b) Discuss the factors basically employed in the design of flapping wing of ornithopters, which were subsequently modified by Sir George Cayley and the concepts in the design of an airplane that paved way to the development of current modern aircraft. [7+8]

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1. Bring out the salient features that are involved in the design of a spacesuit. What do the terms EMU and HUT mean? [15]
2. (a) Differentiate between lighter-and heavier-than-air flights.
(b) Illustrate the developments that took place during 18th and 19th centuries in the area of heavier-than-air flight. [7+8]
3. (a) What do you understand by the Van Allen belts?
(b) Write about the structure of Magnetosphere. [7+8]
4. Write short notes on
 - (a) Elements of a satellite.
 - (b) Power systems of a satellite.
 - (c) Mechanisms of a satellite. [5+5+5]
5. Explain in detail the design process. [15]
6. Describe the aircraft and rocket and engines. [15]
7. Discuss longitudinal and lateral stabilities of an aircraft. [15]
8. Discuss the development of technology from the days of 'wheel'. [15]

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Set No. 3

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1. Write a detailed note on the near Earth radiative environment. [15]
2. Discuss the various sources of drag that opposes an aircraft's motion through air. [15]
3. Explain developments in Engineering that took place during the Hellenistic period, and Middle ages. [15]
4. (a) Explain the need for insulating and plating the satellite components. Cite a few examples.
(b) Discuss communication and telemetry systems of a satellite. [7+8]
5. Compare Mercury and Gemini Missions. [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. Compare steady and accelerated flights of an aircraft, mentioning the governing equations. [15]
8. 'Safety is the most important aspect of aircraft design' - Justify. [15]
