JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
I .B.TECH –SUPPLEMENTARY EXAMINATIONS JANUARY- 2010
INTRODUCTION TO AEROSPACE ENGINEERING
(AERONAUTICAL ENGINEERING)

Time: 3hours   **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. Give the major contributions of Sir George Cayley towards aeronautical field?

[16]

2. What do you mean by actuation system? Explain about a basic hydraulic system along with its components? [16]

3. What is hydrostatic equation? Define geometric altitude, absolute altitude, and geopotential altitude and derive the relation between geopotential and geometric altitude. [16]

4. What is the design criterion for the construction of an aircraft structure? Explain the truss construction of an aircraft with neat sketches. [16]

5. Explain the working of piston engine and indicate its PV-diagram. Give advantages and disadvantages between piston and turbojet engines. [16]

6. Explain in detail about the flow over cross-section of the wing and compare it with flow over an airfoil. [16]

7. Explain the static and dynamic responses of an aircraft after it has been disturbed by a small force. Indicate the forces acting on a aircraft in straight & level flight.

[16]

8. Describe Kepler's laws of planetary motion. Discuss about elements of an operational satellite system. [16]

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Code.No: 41025 | R07 | SET-2

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1. Discuss about the 'Aeronautical Triangle' that dominated the development of aeronautics? [16]

2. What do you mean by pitot static instruments & explain about them? [16]

3. Define aerodynamic forces & moments and pictorially present them over an airfoil. Obtain the relation between normal & axial forces and lift & drag forces. [16]

4. Write in detail about monocoque & semi-monocoque construction with appropriate sketches. [16]

5. Describe the operation of rocket engines with the help of neat diagram. Give the classification of rockets with examples for each of them. [16]

6. Explain in detail the production of drag & moment on an airfoil with neat sketches. [16]

7. Derive the equations of motion of an aircraft in steady-level flight? [16]

8. Explain the anatomy of a space mission. [16]

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1. What is a biplane & explain all its design features? [16]

2. What is a gyroscope & its characteristics? Explain in brief about different gyroscopic instruments. [16]

3. At 12km altitude in standard atmosphere the pressure, density & temperature are 1.9399×10^4 N/m^2, 3.119×10^{-1} Kg/m^3, and 2.116 K respectively. Using these calculate the pressure, temperature and altitude at an altitude of 18 km. [16]

4. Explain about various structural members used in aircraft construction. [16]

5. Write in detail about jet engine and its components Derive thrust equation for a jet engine. [16]

6. Define aerodynamic forces & moments and pictorially present them in an airfoil. Obtain the relation of normal, axial force with lift & drag force? Explain the principal behind generation of lift on an airfoil. [16]

7. Discuss in detail about the parameters affecting the performance of an aircraft. [16]

8. Explain in details about a communication satellite. [16]

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Code.No: 41025   R07   SET-4

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Answer any FIVE questions
All questions carry equal marks

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1. Write about the contributions of Wright brothers in the field of aeronautics? [16]

2. Write a short note on primary control surface of aircraft & explain about their operations?   [16]

3. What is maneuvering? Explain about taxiing, climbing and gliding maneuvers. with neat sketch.   [16]

4. What is the design criterion for the construction of an aircraft structure? Explain any one type of construction in detail.   [16]

5. Explain the principle and operation of a turbo engine with sketch? Write the difference between Ramjet and Turbojet.   [16]

6. How is skin friction caused? Why is the skin friction becoming greater importance recently?   [16]

7. Explain in detail about static and dynamic stability. With the help of diagram, explain yawing, pitching and rolling moment responses to these stability characteristics.   [16]

8. Discuss in detail about the elements of satellite.   [16]

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