R09

Code No: C7605

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations March/April-2011
FUNDAMENTALS OF AEROSPACE ENGINEERING
(AEROSPACE ENGINEERING)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1. Explain the variation of temperature with altitude. Define various altitudes and give the relationships between them. Calculate the pressure, pressure ratio, temperature, density & density ratio at an altitude of 14 km. [12]

2. Starting from continuity equation derive Bernoulli's equation and explain its application in air speed indicators and wind tunnels. A wind tunnel located at a pressure altitude of 500 meters (ρ = 1.1674 kg/m^3, p = 95472 N/m^2), has a circular test section with 3 meter diameter. The air speed is 80 m/sec in the test section, which is vented to the ambient atmosphere. The air speed in the larger diameter section just upstream of the contraction is 16 m/sec. Calculate upstream diameter, dynamic pressure in the test section, upstream pressure and height of mercury column. [12]

3. Explain in detail about vortex flow and generation of lift through circulation. [12]

4. Describe about supersonic flow and temperature effect of hypersonic flow? [12]

5. Discuss in detail about:
   a) Leading & trailing edge devices.
   b) Deep stall.
   c) Effect of sweep back on maximum lift.
   d) Airfoil selection & wing design. [12]

6. Describe about stability and control of an airplane and give the conditions for static longitudinal stability. Also explain about static margin and neutral point. [12]

7. What are the structural elements and materials used in the construction of an aircraft? [12]

8. Explain in detail about elliptical orbits & Kepler's laws of planetary motion. [12]

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