Code No: 07A42101 **R07** **Set No. 2**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II B.TECH II SEM–REGULAR/SUPPLEMENTARY EXAMINATIONS MAY - 2010
AERODYNAMICS - I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Sketch a swept back wing showing sweep, taper and dihedral. Explain the utility of these features. Draw neat sketches. [16]

2. Describe various flows like viscous, inviscid, compressible, incompressible, rotational and irrotational, and the effects on a wing. [16]

3. (a) Derive the moment coefficient about the leading edge for a cambered airfoil.
   (b) Also, derive the moment coefficient about quarter chord point for a cambered airfoil. [12+4]

4. Explain briefly about the lift, drag and moment is used in analysis of airplane.[16]

5. Consider a velocity field where the x and y components of velocity are given by u = cx / $(x^2 + y^2)$ and v = cy / $(x^2 + y^2)$, where c is a constant. Obtain the equations of the stream lines. [16]

6. Explain with neat sketch various types of source panel methods. [16]

7. (a) Describe in brief the merits of 'Lifting Surface Theory' for predicting lift dis tribution on a wing with an arbitrary planform. Make use of sketches and other representations in this regard.
   (b) Compare the formulation in (a) above with that in the classical lifting line theory with details. [8+8]

8. Derive the fundamental equation of Prandtl's lifting line theory and calculate the drag coefficient on the finite wing. [16]

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