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**AE 8401 Aerodynamics**

**Important 13mark questions**

**Unit I**

1. What is Bernoulli's theorem? Derive the expression for Bernoulli's equation.
2. Derive an expression for 'stream function' and 'velocity potential function' for source flow.

**Unit II**

1. Briefly explain Kutta-Joukowski theorem.
2. Show that streamlines and equipotential lines are mutually perpendicular.

**Unit III**

1. Explain in detail about thin airfoil theory.
2. Explain Cauchy Riemann relations in detail.

**Unit IV**

1. Explain the following in detail.
  - (i) Horse shoe vortex.
  - (ii) Biot-savart law
2. Derive the fundamental equation of Prandtl's lifting line theory.

**Unit V**

1. What is displacement thickness? Derive an expression for displacement thickness of flow over a flat plate.
2. Define the concept of boundary layer and briefly explain in detail the incompressible boundary layer over the flat plate.