Code No: 45046 **R07** **Set No - 4**

III B.Tech I Semester Regular Examinations,Nov/Dec 2009
AERODYNAMICS-II
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Write short notes on
   i. Wall interference
   ii. Correction to drag coefficient for the error arising from upflow
   iii. Correction to lift coefficient for the error arising from supports of the model.
   (b) Explain methods to eliminate the effect of supports on Lift and Drag of a model. [9+7]
2. Derive $\theta-\beta$ -M relation. [16]
3. (a) Describe in detail about various pressure measuring devices.
   (b) What are various measurement errors encountered during the testing a model and how to capture and minimize these errors? [8+8]
4. (a) Discuss about linearized subsonic flow over an airfoil using perturbation velocity potential equations for a compressible flow.
   (b) Obtain the Prandtl-Glauert similarity rule for lift coefficient (C_l) and moment coefficient (C_m) relating incompressible flow to subsonic compressible flow over a 2D profile. [6+10]
5. (a) Write a note on choked flow condition in a Convergent-Divergent nozzle with relative plots.
   (b) A normal shock wave is standing in the test section of a supersonic wind tunnel, upstream of this wave M_1=3, P_1=0.5 atm, T_1=200 K. Find the flow variables after the shock wave. [6+10]
6. (a) Explain in detail the high-temperature effects and viscous interaction in hypersonic flows.
   (b) Explain in detail the viscous interaction and entropy layer in hypersonic flows. [8+8]
7. Derive energy equation for a 3 dimensional inviscid, compressible flow. [16]
8. (a) Explain your understanding by air-divergence Mach number and Area rule.
   (b) Explain about supercritical airfoil with relevant plots. [8+8]

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