

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE – SEMESTER–VIII • EXAMINATION – SUMMER • 2014**

**Subject Code: 180105****Date: 27-05-2014****Subject Name: High Speed Aerodynamics and Experimental Techniques****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) To explain  $\theta - \beta - M$  diagram and prove  $\beta = 1.20$  for hypersonic flow. **07**  
 (b) Explain conical flow method treatment for Rectangular wings. **07**
- Q.2** (a) Explain Entropy Layer and Viscous Interaction with neat sketch. **07**  
 (b) Explain Hypersonic shock relations in terms of the hypersonic similarity parameter, **07**
- OR**
- (b) What is aerodynamic heating? Explain in details. **07**
- Q.3** (a) Write a short note on Centrifugal force corrections to Newtonian theory with neat sketch. **07**  
 (b) What is wind tunnel? Explain construction of subsonic open wind tunnel. **07**
- OR**
- Q.3** (a) Explain wind tunnel corrections and solid blockage with figure. **07**  
 (b) Write a short note on TANGENT-CONE METHODS for hypersonic flow. **07**
- Q.4** (a) Explain with neat sketch shock expansion methods for hypersonic flow. **07**  
 (b) What is supersonic wind tunnel? Explain Flow Visualization Techniques. **07**
- OR**
- Q.4** (a) Write a short note on NEWTONIAN THEORY. **07**  
 (b) Write a short note on LIFT EFFECT in wind tunnels. **07**
- Q.5** (a) Describe aerodynamic design consideration for the super-sonic aircraft. **07**  
 (b) Explain with neat sketch Delta & Arrow Wings. **07**
- OR**
- Q.5** (a) Explain with neat sketch Swept Wings. **07**  
 (b) Write a short note on Wave riders for hypersonic flow. **07**

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