Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ANE) (Sem.–7,8)

HIGH SPEED AERODYNAMICS

Subject Code : ANE-411

Paper ID : [A2066]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION–A

1. Answer briefly :

a) State Crocco' theorem.

b) What is a body of revolution?

c) What is a supercritical flow?

d) Name the equipment used in Supersonic flows.

e) What is small perturbation?

f) What is drag divergence Mach number?

g) What is a shock tunnel?

h) Name the various methods to control non dimensional numbers in wind tunnels.

i) What is a shock tube?

j) What is a characteristic wave?

SECTION-B

2. What is the condition for the oblique shock wave to keep attached?

3. How we can achieve nearly isentropic compression in a supersonic flow?

4. What is the effect on flow properties after passing through a shock wave?

5. What is a supercritical airfoil?

6. What do you mean by Critical Mach no.?

SECTION-C

7. A shock is moving at 2000 m/s in a duct with still air at 500K and 3 atm pressure. Find the velocity of the air that follows the shock. Also give its all other properties.

8. Supersonic flow with Ml=3, P=2atm, T=450K, through a duct is deflected by one of the walls by 5 degrees. The oblique shock formed reflects on the other wall (which is straight) of the duct. Find the final conditions after the second reflection (M3, T3, P3, Po3)

9. For the flow over the half diamond wedge shown in figure, find the inclinations of the shocks and expansion waves and the pressure distribution.