

**AE 3450 Thermodynamics and Compressible Flow**  
Assignment # 8

Note: Please show your work.

1) Problem 1 at end of Chapter 6 in John textbook.

2) Problem 5 at end of Chapter 6 in John textbook. Note that the oblique shock wave illustrated is not caused by the geometry shown. The oblique shock wave was generated by a body (not shown) above the image in  $M=3.5$  flow. You are asked to find the angle,  $\theta$ , for which the shock will not reflect off the wall. Hint: A reflected shock will not exist if the flow behind the first shock shown is not forced to turn.

3) Problem 7 at end of Chapter 6 in John textbook. Note that the oblique shocks are present because the "back pressure" (i.e. downstream of the nozzle) is greater than the "exit pressure" (i.e. just inside the nozzle exit location). Specify your flow direction (i.e. angle) in degrees relative to the horizontal centerline shown.

4) Problem 10 at end of Chapter 6 in John textbook. Note that there are oblique shocks at the sharp nose of the centerbody and normal shocks at the diffuser inlet.