

Problem 301A

An airplane is flying at a speed of 400 m/s at an altitude where the air temperature is -60°C (213°K). The gas constant for air is $280\text{ m}^2/\text{s}^2\text{ K}^\circ$ and the ratio of specific heats, γ , is 1.4. Find

1. The temperature at the stagnation point of the flow around the airplane.
2. The ratio of the pressure at the stagnation point to that far from the airplane. Assume isentropic flow.
3. The stagnation temperature if the speed of the airplane is 1000 m/s .