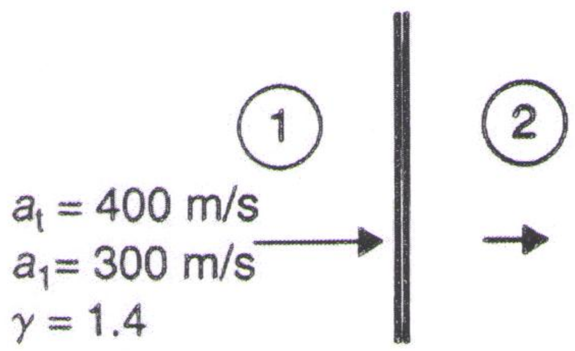
AE341: Airbreathing Propulsion
Quiz-1
Date: 03/02/2020
Duration: 30 minutes.
Total marks = 100 points (No partial marking)

Name:
Roll No.:

1. A normal shock flow is characterized by stagnation speed of sound at and speed of sound a as shown. Calculate: (a) M1 (b) M^*_2

25+25=50 points



M1: (a) The options are: [A] 1.99-2.0 [B] 2.01-2.03 [C] 1.97-1.98 [D] 1.95-1.96

The correct answer is [C]

M^*_2: (b) The options are: [A] 0.59-0.60 [B] 0.63-0.64 [C] 0.61-0.62 [D] 0.65-0.66

The correct answer is [C]

2. A turbojet engine is powering a fighter airplane. Its cruise altitude and Mach number are 10 km (T_a = 223.3 K and P_a = 0.265 bar) and 0.8, respectively. The exhaust gases leave the nozzle at a speed of 570 m/s and a pressure of 0.67 bar. The exhaust nozzle is characterized by the ratio $A_e / \dot{m}_a = 0.006$ $m^2 \cdot s/kg$. The fuel-to-air ratio is 0.02. Calculate -

   (a) The specific thrust ($T / \dot{m}_a$) in N-s/kg.

   (b) The propulsive efficiency (%)

25+25=50 points

(a) The options are: [A] 590-592 [B] 580-582 [C] 587-589 [D] 583-585

The correct answer is D

(b) The options are: [A] 101-103 [B] 98-99 [C] 95-97 [D] 104-106

The correct answer is A