Assignment-08

Due on 2020-11-11, 23:59 IST

1) In which of the following cases, there is a possibility of formation of a normal shock wave at the exit of a D nozzle? 1 point
   - Under expanded nozzle
   - Over expanded nozzle
   - Optimum nozzle
   - None of the above

2) The function of an exhaust nozzle is to: 1 point
   - Decelerate the flow
   - Allow for cooling of fluids
   - Increases jet noise
   - None of the above

3) Maximum work from a compressor can be obtained at Mach no. of: 1 point
   - 0.1
   - 0.2
   - 0.5
   - 1

4) The boundary layer thickness for the flow through an inlet diffuser: 1 point
   - Remains constant
   - Increases
   - Decreases
   - Initially increases then remains constant

5) For subsonic aircrafts, the most suitable nozzle type is: 1 point
   - Convergent nozzle
   - Convergent divergent nozzle
   - None of the above

6) External cooling of gas turbine blades is achieved using: 1 point
   - Liquid
   - Air
   - Exhaust gas
   - None of the above

7) Air enters an axial compressor at 3 atm. 988 K with a velocity of 20 m/s. The inlet area is 0.5 m². The f point specific heat of air is 1.005 kJ/kg K. What is the temperature at the exit of the nozzle? 1 point
   - 753.68 K
   - 808.3 K
   - 886.3 K
   - Can't be calculated

8) A radial engine operates at M = 1.5 at an altitude of 6000 m (+ Τ = 245.9 K, p0 = 6.44 bar, p0 = 0.224 kg/m³). The diameter of the inlet diffuser at entry: 1 point
   - 102 cm and the stagnation temperature at the nozzle entry is 1600 K. The calculated value of the fuel used is 43 MJ/kg. The properties of the combustion gases are same as those of air (γ = 1.4, K = 1.06, µ = 20.0 kg/m² s). The velocity of air at the diffuser exit is negligible. Calculate the efficiency of the ideal cycle: 1 point
   - 0.310
   - 0.382
   - 0.546
   - 0.366

9) The stagnation temperature at the inlet and exit of a combustor chamber are 627 K and 1600 K, respectively. If the heating value of the fuel is 43 MJ/kg: 1 point
   - Specific heat at constant pressure for air and hot gases are 1.005 kJ/kg K and 1.674 kJ/kg K, respectively. The flue gas exit ratio is: 1 point
   - 0.069
   - 0.056
   - 0.454
   - 0.325

10) The combustion in a gas turbine engine is a: 1 point
    - Isothermal process
    - Isobaric process
    - Isentropic process
    - Partially isobaric and partially isentropic process

11) The combustion in a gas turbine engine is a: 1 point
    - Partially isobaric and partially isentropic process

12) The efficiency of the ideal cycle: 1 point
    - 0.310