

UNIT – IV

8. Define multistaging. Derive the equation of minimum work during multistaging in reciprocating compressor. 15
9. A simple impulse turbine has a mean blade ring diameter of 70 cm and runs at 3000 r.p.m. The blade speed ratio is 0.46 and discharge is axial. The nozzle angle is 21° and blade friction factor is 0.95. Determine the blade angles and theoretical specific power output. 15

Roll No.

3112

B. Tech. 4th Semester (ME)
Examination – July, 2021

APPLIED THERMODYNAMICS

Paper : PCC-ME-202-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following :

2.5 × 6 = 15

- (a) Stoichiometric Air-Fuel ratio.
- (b) Desirable properties of refrigerants.
- (c) Nozzle efficiency.

- (d) Perfect inter-cooling.
- (e) Calorific value.
- (f) Sensible cooling and Dehumidification using Psychrometric chart.

UNIT - I

- 2. Enumerate various types of fuel with their field application. 15
- 3. The chemical formula for alcohol is C_2H_6O . Calculate the stoichiometric Air-Fuel ratio by mass and percentage composition of product of combustion per Kg of C_2H_6O . 15

UNIT - II

- 4. Explain the various types of air standard cycle like otto and diesel with their P-V, T-S diagrams and derive the equation for air standard efficiency, work output and mean effective pressure. 15
- 5. Explain Brayton cycle with its practical use and mathematical derivation. 15

3112-2300-(P-4)(Q-9)(21) (2)

UNIT - III

- 6. The reading in sling psychrometer are as follow : 15
 Dry bulb temperature $\Rightarrow 30^\circ\text{C}$, wet bulb temperature $\Rightarrow 20^\circ\text{C}$ barometric reading $\Rightarrow 740$ mm of Hg.
 Using steam table determine :
 - (i) dew point temperature
 - (ii) relative humidity
 - (iii) specific humidity
 - (iv) degree of saturation
 - (v) vapour density
 - (vi) enthalpy of mixture per Kg of dry air

- 7. (a) Explain the design of steam nozzle. 3
- (b) What do you understand by critical pressure ratio inflow through nozzle. Derive an expression for critical condition and find the expression for mass flow rate for same condition. 12

3112-2300-(P-4)(Q-9)(21) (3)

P. T. O.