

B.E.DEGREE EXAMINATIONS: MAY/ JUNE 2013

Fourth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

MEC212: Thermal Engineering and Fluid Mechanics

(Use of steam tables, Refrigeration tables and heat transfer data book are permitted)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The enthalpy of fluid during throttling will
 - a) increase
 - b) decrease
 - c) first decreases and then increases
 - d) constant
2. The device which when working in a cycle transfers heat from low temperature to high temperature is
 - a) Heat pump
 - b) Heat engine
 - c) Nozzle
 - d) compressor
3. The quantity of heat required to raise the temperature of 1kg of water from 0°C to the boiling point temperature corresponding to the given pressure is known as
 - a) Latent heat of vaporization
 - b) Sensible heat
 - c) Total heat of wet steam
 - d) Dryness fraction
4. Which of the following is not a boiler mounting
 - a) fusible plug
 - b) pressure valve
 - c) blow off cock
 - d) feed pump
5. Effect of under cooling
 - a) increases COP
 - b) decreases COP
 - c) increases refrigerating effect
 - d) Both (a) and (c)
6. The volume of air dealt by the compressor per unit time is _____
 - a) clearance ratio
 - b) free air delivered
 - c) volumetric efficiency
 - d) compression ratio
7. Surface tension is expressed in
 - a) N/m
 - b) N/m²
 - c) N²/m
 - d) N/m³
8. Normal acceleration in fluid flow situation exists only when
 - a) the flow is unsteady
 - b) the stream lines are straight and parallel
 - c) the flow is two dimensional
 - d) the stream lines are curved

(ii) List the various methods of governing of steam turbines and explain (6)

23. a) In a single stage single acting compressor the index of compression and expansion may be taken as 1.2. The clearance volume may be assumed as $1/19^{\text{th}}$ of the swept volume. A compressor of this type is required capable of compressing 7.6 cubic meter of free air per minute from 100kPa to 900kPa. It runs at 240 rpm with a mean piston speed of 220m/min. Find the bore and stroke of the cylinder and the work done per revolution

(OR)

b) Explain the working of simple vapour compression refrigeration system with P-Hand T-S diagram

24. a) A plate having an area of 0.6m^2 is sliding down the inclined plane at 30° to the horizontal with a velocity of 0.36 m/s. There is a cushion of fluid 1.8 mm thick between the plate and plane. Find the viscosity of the fluid if the weight of the plate is 280N

(OR)

b) The diameters of a pipe at the sections 1-1 and 2-2 are 200mm and 300 mm respectively. If the velocity of water flowing through the pipe at section 1-1 is 4m/s , Find i) Discharge through the pipe ii) Velocity of water at section 2-2

25. a) Derive Bernoulli's equation and list it's applications

(OR)

b) A horizontal pipe line 40 m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 25 m of its length from the tank, the pipe is 150mm diameter and its diameter is suddenly enlarged to 300mm. The height of water level in the tank is 8 m above the centre of the pipe. Considering all the losses, determine the rate of flow.
