[6008]-273

S.E. (Automobile & Mechanical) (Insem)
APPLIED THERMODYNAMICS
(2021 Pattern) (Semester - II) (202048)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:
1) *Solve Q.1 or Q.2, Q.3 or Q.4.*
2) *Figures to the right indicate full marks.*
3) *Use of electronic calculator is allowed.*
4) *Assume suitable data, if necessary.*
5) *Use of Psychometric chart and steam table allowed.*

Q1) a) A refrigeration machine using R-12 as refrigerant operates between the pressures 2.5 bar and 9 bar. The compression is isentropic and there is no under cooling in the condenser. The vapour is in dry saturated condition at the beginning of the compression. Estimate theoretical C.O.P. if the actual C.O.P. is 0.65 of theoretical value, calculate the net cooling produced per hour. The refrigerant flow is 5 kg/min. Properties of refrigerant are: **[7]**

Pressure (bar)	Temperature (°C)	Liquid enthalpy (kJ/kg)	Vapour enthalpy (kJ/kg)	Entropy of saturated vapour (kJ/kg-K)
9	36	70.55	201.8	0.6836
2.5	-7	29.62	184.5	0.7001

b) Draw and explain the following processes: **[8]**

i) Sensible heating

ii) Humidification

iii) Sensible cooling & humidification

iv) Sensible cooling & dehumidification

OR

Q2) a) Explain with neat sketch the working of a simple vapor absorption refrigeration cycle. **[7]**

b) The pressure and temperature of mixture of dry air and water vapour are 736 mm of Hg and 21 ℃. The dew point temperature of the mixture is 15 ℃. Find the following. **[8]**

    i) Partial pressure of water vapour in the mixture

    ii) Relative Humidity

    iii) Enthalpy of mixture

    iv) Specific Volume of mixture per kg of dry air

Q3) a) What is a heat engine? Differentiate between the internal and external combustion engines with applications. **[7]**

b) Compare between the air standard with fuel air cycle and actual cycle. **[8]**

OR

Q4) a) Draw valve timing diagram for 4-stroke S.I. engine and explain the same. **[7]**

b) Differentiate between S.I. and C.I. engine with applications explain in detail. **[8]**

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