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C-14-M-602

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BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
DME – SIXTH SEMESTER EXAMINATION

REFRIGERATION AND AIR CONDITIONING

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions :
1. Answer **All** questions.
2. Each question carries **Three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the term Ton of Refrigeration.
2. Write any two effects of sub cooling.
3. Write any three differences between vapour compression and vapour absorption systems.
4. Write any three types of expansion devices.
5. Write any six desirable properties of an ideal refrigerant.
6. State any six modern applications of air conditioning.
7. Define dry bulb temperature and wet bulb temperature
8. Define the term 'by-pass factor' of a cooling coil. Write an expression for by-pass factor in terms of temperature.
9. Write any three sources of sensible heat gains in air conditioned room.
10. Give any six possible causes for compressor which does not start in air conditioning system

PART-B

10X5=50

Instructions :

1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. A refrigeration system working on Bell-Coleman cycle, the air is compressed from a pressure 1 bar to 5 bar. Assume isentropic compression and expansion and ratio of specific heats is 1.4

    (a) Determine COP

    (b) Compare this value with that of Carnot cycle if the temperature of ambient air and cold chamber are 25^{o}C and 5^{o}C respectively.

12. A refrigerator machine uses R-12 as a working fluid. The temperature of R-12 in the evaporator coil is -5^{o}C and the gas leaves the compressor as dry saturated at a temperature of 40^{o}C. The mean specific heat of liquid R-12 between the above temperatures is 0.963 kJ/kg-K. Enthalpy of evaporation at 40^{o}C is 203.2 kJ/kg. Neglecting losses, find the COP.

    The properties of R-12 refrigerant are given below:

Temperature ^{o}C	Pressure bar	Enthalpy of liquid kJ/kg	Enthalpy of vapour, kJ/kg	Entropy of liquid, kJ/kg-K	Entropy of vapour kJ/kg-K
-5	2.61	31.4	185.4	0.1251	0.6991
40	9.6	74.6	203.2	0.2718	0.6825

13. Explain the working principle of Electrolux refrigeration system with the help of legible sketch.
14. Explain the working of flooded type evaporator with the help of legible sketch.
15. Explain the working of ice plant with the help of legible sketch.
16. (a) State any four types of air filters

    (b) Explain centrifugal dust collector with the help of legible sketch.
17. The atmospheric conditions are 30^{o}C and specific humidity of 12.5 grams/kg of air. Determine the following by using Psychrometric chart:

    (a) Partial pressure of air (b) Relative humidity (c) Dew point temperature

    (d) Web bulb temperature (e) Specific volume (f) Specific enthalpy of moist air
18. Explain year round air conditioning system with the help of legible sketch.

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