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C20-M–505

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER / NOVEMBER—2023

DME – FIFTH SEMESTER EXAMINATION

REFRIGERATION AND AIR CONDITIONING

Time : 3 Hours] [*Total Marks* : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define Ton of Refrigeration and write its value.

2. Define the term Coefficient of performance.

3. List the main components of vapour compression refrigeration system.

4. Distinguish between wet and dry compressions.

5. How do you classify compressors?

6. Write any three differences between air cooled and water cooled condenser.

7. Define air conditioning. State any two applications of air conditioning.

8. List any six applications of air conditioning.

9. List any six main equipment used in air conditioning.

10. How do you classify cooling towers?

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain steam jet refrigeration system with neat diagram.

(OR)

(b) A cold storage is supplied with 4000 kg of fish at 22°C. The fish has to be cooled to –10 °C. Freezing point of the fish is –2 °C. If the capacity of plant is 10 tons, how long will it take to cool the fish? Specific heats of the fish above and below the freezing point are 3 kJ/kgK and 1·25 kJ/kgK respectively. Latent heat of freezing = 220 kJ/kg.

12. *(a)* Explain vapour compression refrigeration system with the help of T-S and P-H diagrams.

(OR)

(b) Explain the Electrolux refrigerator with a neat sketch.

13. *(a)* Describe the working of an ice plant with the help of legible sketch.

(OR)

(b) Describe the working of a domestic refrigerator with the help of a legible sketch.

14. Humid air at 25°C DBT and 30% RH having moisture content of 6 gm/kg of dry air is humidified without changing the temperature by increasing the moisture content to 12 gm/kg of dry air. Find *(a)* final WBT, *(b)* final relative humidity and *(c)* change in enthalpy.

(OR)

Explain the working of Aspirating psychrometer with a neat sketch.

15. Explain the working of air cooler with a neat sketch.

(OR)

Explain the working of window air condenser with a neat sketch.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. A simple vapor compression plant produces 5 tons of refrigeration. The enthalpy values at the inlet to compressor, at the exit of compressor and at exit from the condenser are 183·2 kJ/Kg, 209·4kJ/Kg and 74·6 kJ/Kg respectively. Calculate *(i)* The refrigerant flow rate, *(ii)* The COP and *(iii)* The power required to drive the compressor.

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