

I.D. No. 24477

**B. Tech. 7th Semester F. Scheme Mechanical
Engineering–VII Examination, May–2014
REFRIGERATION & AIR CONDITIONING**

Paper–ME– 403-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Q. No. 1 is compulsory. Attempt five questions in total, at least one from each section.

1. (a) What are secondary refrigerants ? 5
- (b) What is vapour absorption Refrigeration system ? 5
- (c) Define the Gibbs Dalton law ? 5
- (d) What is cooling and dehumidifying coils ? 5

Section–A

2. (a) What are various fundamentals of air-conditioning system ? 10
- (b) What are various desirable properties of refrigerants ? 10

Section-B

4. The following data refer to a two-stage vapour compression system.

Condensing temp : 40°C

Flash inter cooler temp : 15°C

Evaporating temp : -15°C

Refrigerant used : R-717 (NH_3)

Refrigerant flow through H.P. side : 0.4 kg / S

Condensate is sub-cooled in condenser 5°C

Compression efficiencies : 80% each.

Find out : (i) Flow rate through evaporator

(ii) Tonnes of refrigeration

(iii) Total power input

(iv) C.O.P.

(v) Heat transfer to condenser. 20

5. In an absorption type refrigerator, the heat is supported

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1. The temp. in the refrigerator is to maintained

(3)

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is 72% of maximum C.U.P. Find the temp of the atmosphere as 25 °C. 20

Section-C

6. Explain the following :

(i) Sources of cooling load

(ii) Properties of moist air. 20

7. In a space to be air-conditioned the heat gains are as follows :

Heat gains through wall, roof, floor; 10 kw occupancy; 40 persons each with 75w sensible and 65w latent heat load :

Lighting : 1.5 kw

Ventilation : 0.33m^3 / per min/per person.

Infiltration : 150m^3 / h

Outdoor conditions : 43 °C DBT and $w = 0.017\text{ kg/kg}$ of dry air.

Indoor conditions : 25 °C DBT and $w = 0.01\text{kg/kg}$ of dry air.

Section-D

8. Explain the following :

- (i) Equipment selection for air conditioning system.
- (ii) Design of summer air-conditioning. 20

9. Write short note on the following :

- (i) Types of evaporators.
- (ii) Types of expansion devices. 20