00714

Diploma in Electrical and Mechanical Engineering

Term-End Examination

December, 2010

BME-043 : RAC/UTILIZATION

Time : 2 hours *Maximum Marks : 70*

Note : *All questions are compulsory. Use of calculator is allowed.*

1. Choose the correct answer : **14x1=14**

(i) COP is equal to the ratio of :

(a) heat absorbed and work done.

(b) heat rejected and work done.

(c) heat absorbed and heat rejected.

(d) work done and heat rejected.

(ii) Specific heat of vapour refrigeration should be :

(a) as small as possible.

(b) as large as possible.

(c) medium.

(d) none of the above.

(iii) Which one is the designation of R-22 ?

(a) $C_2 F_4 Cl_2$ (b) $CCl_3 F$

(c) CCl_2F_2 (d) $CHCl F_2$

(iv) Which one is the designation of R-718 ?

(a) Methane

(b) Carbon dioxide

(c) water

(d) Ammonia

(v) 'NTU' refers to

(a) nominal temperature units.

(b) normal transfer units.

(c) number of transfer units.

(d) non transferable units.

(vi) Newton's law of cooling gives heat transfer by :

(a) radiation

(b) convection

(c) conduction

(d) radiation and conduction.

(vii) Air conditioning means control of :

(a) temperature and humidity.

(b) temperature alone.

(c) humidity.

(d) temp., humidity, cleanliness and air motion.

(viii) In crossflow heat exchanger, the direction of flow of hot and cold fluid is :

(a) at right angles.

(b) same.

(c) opposite.

(d) all of the above.

(ix) Which is not a method of improving volumetric efficiency ?

(a) Providing small clearance.

(b) Maintaining low pressure ratio.

(c) Heating during compression .

(d) Reducing pressure drops.

(x) Which of the following types of compressor is used in Room Air conditioner ?

(a) Axial compressor.

(b) Centrifugal compressor.

(c) Screw compressor

(d) Hermetic compressor.

(xi) For handling refrigerants that require large displacements and operate at low condensing pressure, which type of compressor is recommended ?

(a) Reciprocating type.

(b) Centrifugal type.

(c) Rotary type.

(d) Screw type.

(xii) What should be the optimum inside temperature for summer air - conditioning?

(a) 24°C to 26°C

(b) 22°C to 23°C

(c) 23°C to 24°C

(d) 24°C to 25°C

(xiii) Centrifugal compressor serves refrigeration system in the range of :

(a) 50kW to 500kW

(b) 500kW to 1000kW

(c) 200kW to 10,000kW

(d) 1000kW to 2000kW

(xiv) Wilson plot technique is used in relation to :

(a) heat engine

(b) centrifugal fan

(c) heat exchanger

(d) none of the above

2. Answer **any two** of the following : **2+2+3**

(a) (i) Define air conditioning.

(ii) Write few applications of air conditioning.

(iii) Write short notes on summer air conditioning.

(b) What is the difference between heat engine and heat pump ? What is cop ? Write a short note on refrigerating capacity. 3+2+2

(c) Write chemical and physical properties of a good refrigerant. 7

3. Answer **any two** of the following :

(a) (i) Explain briefly conduction, convection and radiation transfer process

(ii) State Newton's law of cooling for convection.

(iii) What is the unit of thermal conductivity ? 3+3+1

(b) (i) Classify water cooled condensers

(ii) With the help of a sketch, explain how evaporation condenser works ? 3+4

(c) (i) Define Sensible heat factor. 2+2+3

(ii) What is Bypass factor ?

(iii) What are the differences between heating and dehumidifying process and cooling and humidifying process?

4. Answer **any two** of the following : 2+2+3

(a) (i) Explain how preventive maintenance of a refrigeration plant helps ?

(ii) What important rules should be observed for trouble - shooting ?

(b) (i) Mention in short about importance of air filter in an air conditioning plant.

3+2+2

(ii) Write short notes on any two of the following.

- Cooling effect.
- Drinking water cooler.
- Domestic refrigerator.

(c) (i) How are fans classified. 2+3+2

(ii) State fan laws.

(iii) What are the types of fans available ?

5. Answer **any two** of the following :

(a) Write the important aspects pertaining to clean rooms. 7

(b) (i) What are the factors that affect solar heat gain through ordinary glass ? 3+4

(ii) Discuss internal heat gains for a conditional space.

(c) Write short notes on **any two** : 2+3+2

(i) Evaporating cooling.

(ii) Parallel flow heat exchanger.

(iii) Insulating materials.

(iv) Thermostatic expansion valve.

(v) Finned evaporator.