

**DIPLOMA IN MECHANICAL ENGINEERING  
(DME) / ADVANCED LEVEL CERTIFICATE  
COURSE IN MECHANICAL ENGINEERING  
(DMEVI / ACMEVI)**

**Term-End Examination**

**00553 December, 2018**

**BME-032 : REFRIGERATION AND  
AIR-CONDITIONING**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : Answer any **five** questions in all. Question no. 1 is **compulsory**. Use of scientific calculator is permitted.*

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1. Choose the correct answer from the given options in the questions below :  $7 \times 2 = 14$
- (a) One ton of refrigeration corresponds to
- (i) 50 kcal/min
  - (ii) 50 kcal/hr
  - (iii) 80 kcal/min
  - (iv) 80 kcal/hr
- (b) The moisture in a refrigerant is removed by
- (i) evaporator
  - (ii) safety relief valve
  - (iii) dehumidifier
  - (iv) driers

- (c) The refrigerant for a refrigerator should have
- (i) high sensible heat
  - (ii) high total heat
  - (iii) high latent heat
  - (iv) low latent heat
- (d) Efficiency of a Carnot engine is given as 80%. If the cycle is reversed, what will be the value of COP of the reversed Carnot cycle ?
- (i) 1.25
  - (ii) 0.8
  - (iii) 0.5
  - (iv) 0.25
- (e) In a refrigeration cycle, the flow of refrigerant is controlled by
- (i) compressor
  - (ii) expansion valve
  - (iii) condenser
  - (iv) evaporator
- (f) The air temperature at which vapour in the air starts condensing is known as
- (i) dry bulb temperature
  - (ii) wet bulb temperature
  - (iii) saturation temperature
  - (iv) dew point temperature

- (g) Sensible heat is the heat needed to
- (i) vaporise water into steam and vice versa
  - (ii) change the temperature of a liquid or vapour
  - (iii) convert water into steam and superheat it
  - (iv) measure dew point temperature
2. (a) Explain with the help of neat diagram, an air refrigerator working on a reversed Carnot cycle. Derive expression for its COP.
- (b) Discuss the merits and demerits of 'vapour compression system' over 'air refrigeration system'. 7+7
3. (a) What are the different types of evaporators ? Explain any one type of evaporator.
- (b) What are the different types of condensers used in refrigeration ? Explain the working of evaporative condenser. 7+7
4. (a) Describe an 'air conditioning system' with the help of neat diagram. Name its basic elements.
- (b) Distinguish between summer and winter air conditioning systems. Why is motion of air important from human comfort viewpoint ? 7+7

5. (a) Describe the causes of ozone layer depletion and global warming.
- (b) Draw the psychrometric chart and show the different constant property lines on it. 7+7
6. Write short notes on the following :  $4 \times 3 \frac{1}{2} = 14$
- (a) Multistage Refrigeration System
- (b) Freeze Drying
- (c) Marine Refrigeration
- (d) Factors and Causes of Spoilage of Food
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