

**MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR**  
**SEMESTER END THEORY EXAMINATION, B. TECH. (D.T.) DEGREE COURSE 2018-19**

Semester : III (V Dean)

Academic Year : 2018-2019

Course No. : DE-308

Course Title : Refrigeration & Air Conditioning

Credits : 2+1 3

Total Marks : 50

Day & Date : Monday, 14/01/2019

Time : 15.00 to 17.00 Hrs.

- Note :**
- 1) All questions from **Section 'A'** are compulsory.
  - 2) Solve **Any Three** questions from **Section 'B'**.
  - 3) Draw neat and well labelled diagram wherever necessary.

**SECTION – 'A'**

Q. 1 A) Choose the most appropriate answer from the options given below. (05)

- i) Which element of CFC refrigerants is harmful for ozone layer?
  - a) Chlorine
  - b) Fluorine
  - c) Carbon
  - d) All of these
- ii) Wet bulb temperature is obtained by following which line on psychometric chart .....
  - a) Relative humidity
  - b) Humid volume
  - c) Specific humidity
  - d) Enthalpy
- iii) Capillary tube is a device of .....
  - a) Variable restriction
  - b) Constant restriction
  - c) Both a) and b)
  - d) None of these
- iv) The chemical name of refrigerant R-764 is .....
  - a) Ammonia
  - b) Sulphur dioxide
  - c) Oxygen
  - d) Carbon dioxide
- v) The temperature at which condensation occurs is called .....
  - a) Wet bulb
  - b) Dry bulb
  - c) Dew point
  - d) Boiling point

B) Do as directed. (05)

- i) Expansion valve is used before which component in a refrigeration system?
- ii) Condensation takes place on which line?
- iii) Why oil separator in refrigeration line is used?
- iv) State the chemical name of Freon refrigerant.
- v) R-22 represents which refrigerant?

Q. 2 A) Give the values of the following. (05)

- i) C.O.P. of reversed Carnot cycle.
- ii) 1 ton of refrigeration.
- iii) Boiling point of ammonia at normal atmospheric pressure.
- iv) 1 BTU ..... calorie.
- v) Boiling point of CO<sub>2</sub> at normal atmospheric pressure.

(P.T.O.)

- B) State whether the following statements are True or False. If False, rewrite the statement after making necessary corrections. (05)
- i) Thawing is slower than freezing process.
  - ii) Compression of the refrigerant in compression takes place at constant enthalpy.
  - iii) The rotary compressor is a positive displacement machine.
  - iv) During all humidification processes, wet bulb temperature increases.
  - v) In general, secondary refrigerants are costly than primary refrigerant.

### SECTION – 'B'

- Q. 3. Write the chemical formula of following refrigerant. (05)
- A) R-113, R-22, R-1150, R-764 and R-13B1.
  - B) Discuss the different types of condensers in details. (05)
- Q. 4. A) Describe thermostatic expansion valve in detail with a neat diagram. (05)
- B) Write short notes on the following. (05)
- i) Reciprocating compressor.
  - ii) Evaporative condenser.
- Q. 5. A) What is the effect of super heating the refrigerant? (05)
- B) What is the effect of sub cooling the liquid? (05)
- Q. 6. A) Write short note on bypass factor of a coil. (03)
- B) Describe properties of refrigerant. (03)
- C) Discuss the insulating materials used in milk cold room construction. (04)
- Q. 7. A) What are the factors for effectiveness of evaporative condenser? (05)
- B) A mixture of dry air and water vapour is at a temperature of 21°C and dew point temperature of 15°C. Calculate: (05)
- i) Relative humidity
  - ii) Specific humidity
  - iii) Enthalpy
  - iv) Specific volume

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## ANSWER KEY

DE-308 (2+1=3)

### Refrigeration & Air Conditioning (V Dean)

#### SECTION - 'A'

Q. 1 A) Choose the most appropriate answer from the options given below.

- i) b) : Fluorine
- ii) a) : Relative humidity
- iii) b) : Constant restriction
- iv) b) : Sulphur dioxide
- v) c) : Dew point

B) Do as directed.

- i) Evaporator
- ii) Saturation line
- iii) To separate the oil mixed in the refrigerant
- iv) Dichlorodifluoromethane
- v) HCFC used in air conditioning

Q. 2 A) Give the values of the following.

- i) 5.16
- ii) 3.5 kW
- iii)  $-33^{\circ}\text{C}$
- iv) 252 calorie
- v)  $-75^{\circ}\text{C}$

B) State whether the following statements are True or False. If False, rewrite the statement after making necessary corrections.

- i) True
- ii) False : Compression of the refrigerant in compression takes place at constant entropy.
- iii) True
- iv) False : During all humidification processes, wet bulb temperature decreases.
- v) False : In general, secondary refrigerants are cheaper than primary refrigerant.

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