Q.P. Code: 16ME325 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech IV Year I Semester Regular & Supplementary Examinations Feb-2021

REFRIGERATION & AIR CONDITIONING

(Common to AGE & ME)

Use of Steam Table & Refrigeration Table Permitted

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 A refrigerator working on Bell Coleman cycle operates between pressure limits of 1.05 bar and 8.5 bar. Air is drawn from the cold chamber at 10 ° C, compressed and then it is cooled to 30 ° C before entering the expansion cylinder. The expansion and compression follows the law PV 1.3= constant. Determine the theoretical C.O.P of the system. **12M**

OR

2 **a** Explain the working of Bell-Coleman cycle air refrigeration with P-v and T-S diagrams. **6M**

b With neat sketch Explain the working of Simple air refrigeration system. **6M**

UNIT-II

3 A vapour compression refrigeration plant works between pressure limits of 5.3 bar and 2.1 bar. The vapour is super-heated at the end of compression, its temperature being 37 ° C .The vapour is super-heated by 5 ° C before entering the compressor. **12M**

If the specific heat of super-heated vapour is 0.63 kj / kg k, find the coefficient of performance of the plant. Use the data given below:

Pressure (Bar)	Temperature ° C	Liquid Heat (kj /kg)	Latent Heat (kj/kg)
5.3	15.5	56.15	144.9
2.1	-14	25.12	158.7

OR

4 a Sketch and explain a two-stage cascade refrigeration system. **6M**

b What are the advantages of vapour compression refrigeration system over air refrigeration system? **6M**

UNIT-III

5 **a** Explain thermo-electric refrigeration system with sketch. **6M**

b Describe the working of Vortex tube with a neat sketch and its merits and demerits. **6M**

OR

6 **a** Illuminate the working principal of Electrolux refrigeration system. **6M**

b Differentiate between vapour absorption and vapour compression refrigeration systems. **6M**

UNIT-IV

7 **a** With help of psychrometric chart, Explain the following processes (i).Sensible hearting (ii) Sensible cooling. **6M**

b Explain the concept of effective room sensible heat factor with neat diagram. **6M**

OR

8 Atmospheric air at 0.965 bar enters the adiabatic saturator. The wet bulb temperature is 20 ° C and dry bulb temperature is 31 ° C during adiabatic saturation process. Determine (i) humidity ratio of the entering air (ii) vapour pressure and relative humidity at 31 ° C and (iii) dew point temperature. **12M**

UNIT-V

9 **a** Explain winter air conditioning system with sketch. **6M**

b Derive an expression for continuity equation in ducts. **6M**

OR

10 The main air supply duct of an air conditioning system is 800 mm X 600 mm in cross section and carries 300 m^3 / min of standard air. It branches into two ducts of cross section 600 mm X 500 mm and 600 mm X 400 mm. If the mean velocity in the larger branch is 480 m / min. Find (i) Mean velocity in the main duct and the smaller branch (ii) mean velocity pressure in each duct. **12M**

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