**Rajasthan Institute of Engineering & Technology, Jaipur.**

**Department of Mechanical Engineering**

**I Mid Term examination**

**Session: 2018-19**

**Semester: VII SET: B Branch: Mechanical Engineering**

**Subject: RAC (7ME2A)**

Time: 2 hrs. M.M.:20

**Instruction for students:**

1. No provision for supplementary answer book

Q.01 Prove that the performance of a Bell-Coleman cycle refrigeration system is given by COP = .

OR

Q.01 A vapour compression refrigerator works between the pressure limits of 60 bar and 25 bar. The working fluid is just dry at the end of compression and there is no undercooling of the liquid before the expansion valve. Determine: (a) COP of the cycle (b) Capacity of the refrigerator. If the fluid flow is at the rate of 5kg/min

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pressure (Bar) | Saturation Temperature (K) | Enthalpy | | Entropy | |
| Liquid | Vapour | Liquid | Vapour |
| 60  25 | 295  261 | 151.96  56.32 | 293.29  322.58 | 0.554  0.226 | 1.0332  1.2464 |

Q.02 What do you mean by Refrigeration? Define the unit of Refrigeration and coefficient of performance of a Refrigerator. Also state the II law of thermodynamics.

OR

Q.02 The capacity of a refrigerator is 200 TR when working between -60C and 250C. Determine the mass of ice produced per day from water at 250C. Also find the power required to drive the unit. Assume that cycle operates on reverse Carnot cycle and the latent heat of ice is 335 KJ/Kg.

Q.03 How does an actual vapour compression cycle differ from that of a theoretical cycle?

OR

Q.03. State the function of the following parts of a simple vapor compression system:

1. Compressor
2. Expansion valve

Q.04. Describe a simple vapor compression cycle giving clearly its flow diagram.

OR

Q.04 Sketch the T-S and PH diagram for the vapour compression cycles, when the vapor compression is in-

(i) Dry saturated (ii) Wet saturated