Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

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| **Code :** | **14ME2051** | **Duration :** | **3hrs** |
| **Sub. Name :** | **REFRIGERATION AND AIRCONDITIONING** | **Max. marks :** | **100** |

*Use of Refrigeration Tables and Steam Tables are permitted*

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | An air refrigeration used for food storage provides 25 TR. The temperature of air entering the compressor is 7ºC and the temperature of the air at the exit of cooler is 27ºC. Find the coefficient of performance of the cycle, power required by the compressor per ton of refrigeration produced. Assume the quantity of air circulated in the system is 3000 kg/h and the compression and expansion both follows the law pv1.3 = constant. | CO1 | 10 |
| b. | Explain the salient features of a two stage compression system with liquid intercooler. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | A simple ammonia vapour compression system is operating between the pressure limits of 12 bar and 2.5 bar. The liquid is sub-cooled to 20ºC and the temperature of the vapour leaving the compressor is 100ºC. Plot the processes on a temperature-entropy, pressure-enthalpy diagram and determine the coefficient of performance of the system. | CO1 | 10 |
| b. | Plot the temperature-entropy diagram of a theoretical and actual vapour compression cycle and comment on them. | CO1 | 10 |
| 3. |  | Write short notes on any four types of condensers. | CO2 | 20 |
| (OR) | | | | |
| 4. |  | Describe the properties of various inorganic refrigerants. | CO1 | 20 |
| 5. | a. | Differentiate between water-lithium bromide and ammonia-water absorption systems. | CO2 | 10 |
|  | b. | Define wet bulb temperature, wet bulb depression, dew point temperature, specific humidity and relative humidity. | CO3 | 10 |
| (OR) | | | | |
| 6. |  | The humidity ratio of atmospheric air at 28ºC dry bulb temperature and 760 mm of mercury is 0.016 kg/kg of dry air. Determine the partial pressure of water vapour, relative humidity, dew point temperature, specific enthalpy and vapour density using empirical relations and steam tables. | CO3 | 20 |
| 7. | a. | An air-conditioning plant is required to supply 60 m3 of air per minute at 21ºC dry bulb temperature and 55% RH. The outside air is at 28ºC DBT and 60% RH. Determine the mass of water drained and the capacity of the cooling coil. Assume that the air-conditioning plant first dehumidify and then cools the air. | CO5 | 10 |
|  | b. | State the factors that affect the optimum effective temperature. | CO5 | 10 |
| (OR) | | | | |
| 8. |  | A hall is to be maintained at 24ºC DBT and 60% RH under the following conditions:  Outside design conditions = 38ºC DBT, 28ºC WBT  Sensible heat load in the room = 46.4 kW  Latent heat load in the room = 11.6 kW  Infiltrated air = 1200 m3/h  Apparatus dew point temperature = 10ºC  Quantity of recirculated air from the hall = 60%  If the quantity of recirculated air is mixed with the conditioned air after the cooling coil, find the condition of air leaving the cooling coil, condition of air before entering the hall, quantity of air entering the cooling coil, quantity of air passing through the hall and the refrigeration load on the cooling coil in tonnes. | CO4 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss the applications of air-conditioning system in cargo ships. | CO5 | 10 |
|  | b. | Explain how refrigeration is employed in dairy industry. | CO5 | 10 |

ALL THE BEST