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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**Supplementary Examination – June – 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. | With neat sketch, explain the methods of improving the coefficient of performance of a conventional vapour compression cycle. | CO1 | 10 |
| b. | Explain the salient features of a cascade system. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | In a 15 TR ammonia refrigeration plant, the condensing and evaporating temperatrures are 25ºC and -10ºC respectively.The refrigerant ammonia is subcooled by 5ºC before it enters the expansion device. The vapour leaving the evaporator is 0.97 dry. Plot the processes on a temperature-entropy, pressure-enthalpy diagram and determine the power required to drive the compressor and the coefficient of performance of the plant. | CO1 | 10 |
| b. | Describe the construction and working of a boot strap cycle. | CO1 | 10 |
| 3. |  | Write short notes on any four types of evaporators. | CO2 | 20 |
| (OR) | | | | |
| 4. |  | List out the desirable properties of an ideal refrigerant | CO1 | 20 |
| 5. | a. | With a neat sketch describe the working principle of an aqua-ammonia absorption system. | CO2 | 10 |
|  | b. | A quantity of air having a volume of 300 m3 at 30ºC dry bulb temperature and 25ºC wet bulb temperature is heated to 40ºC dry bulb temperature. Estimate the amount of heat added, final relative humidity and wet bulb temperature. | CO3 | 10 |
| (OR) | | | | |
| 6. |  | A sling psychrometer reads 30ºC dry bulb temperature and 20ºC wet bulb temperature. The barometer shows a reading of 740 mm of mercury. Determine dew point temperature, relative humidity, specific humidity, degree of saturation, vapour density and enthalpy of mixture per kg of dry air using empirical relations and steam tables. | CO3 | 20 |
| 7. | a. | Briefly discuss about the winter air-conditioning system with neat sketches. | CO5 | 10 |
|  | b. | Sketch the comfort chart and show on it the comfort zone. | CO5 | 10 |
| (OR) | | | | |
| 8. |  | An air-conditioning system is to be designed for a restaurant with the following data:  Outside design conditions = 40ºC DBT, 28ºC WBT  Inside design conditions = 25ºC DBT, 50% RH  Solar heat gain through walls, roof and floor = 5.87 kW  Solar heat gain through glass = 5.52 kW  Occupants = 25  Sensible heat gain per person = 58 W  Latent heat gain per person = 58 W  Internal lighting load = 15 lamps of 100 W each and 10 fluorescent tubes of 80 W each  Sensible heat gain from other sources = 11630 W  Infiltrated air = 15 m3/min  If 25% of fresh air and 75% of recirculated air is mixed before the cooling coil, find the amount of total air required in m3/h, dew point temperature of the coil, conditions of the supply air to the room and the capacity of the plant. Assume a by-pass factor of 20%. | CO4 | 20 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss the applications of refrigeration system in producing dry ice. | CO4 | 10 |
|  | b. | Explain how air-conditioning system finds its applications in automobiles. | CO4 | 10 |

ALL THE BEST