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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech IV Year I Semester Regular Examinations February-2022
REFRIGERATION & AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|--|----|----|
| 1 | a Define the term Heat Engine. | L1 | 2M |
| | b What are the functions of compressor in vapour compression Refrigeration system? | L1 | 2M |
| | c What is the function of dehydrator in vapour absorption refrigeration system. | L1 | 2M |
| | d Define term air conditioning. | L1 | 2M |
| | e Write continuity equation in ducts. | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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| 2 | a Describe with a neat sketch a Reduced ambient air refrigeration system. | L1 | 5M |
| | b What is the Necessity of refrigeration? | L1 | 5M |

OR

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| 3 | An air refrigerator working on Bell Coleman cycle takes the air into the compressor at 1 bar and -7°C and is compressed isentropically to 5.5 bar and it is further cooled to 18°C at the same pressure. Find the C.O.P of the system if i) The expansion is isentropic ii) The expansion follows the law $PV^{1.25} = \text{constant}$. Take $\gamma = 1.4$ and $C_p = 1 \text{ KJ/Kg K}$. | L4 | 10M |
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UNIT-II

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| 4 | a State the desirable properties of refrigerants. | L1 | 5M |
| | b Name the different refrigerants generally used. | L1 | 5M |

OR

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| 5 | a Sketch and explain a two-stage cascade refrigeration system. | L1 | 5M |
| | b With a neat sketch, explain the working principle of vapour compression refrigeration system. | L5 | 5M |

UNIT-III

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| 6 | a Comparison between two fluid VAR system and three fluid VAR system | L4 | 5M |
| | b Define the terms nozzle efficiency and entrainment efficiency in steam jet refrigeration system. | L1 | 5M |

OR

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| 7 | Describe the working of Vortex tube with a neat sketch and its merits and demerits | L1 | 10M |
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UNIT-IV

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| 8 | A room has a sensible heat gain of 24 KW and a latent heat gain of 5.2 KW and it has to be maintained at 26°C DBT and 50 % RH. 180 m ³ / min of air is delivered to the room. Determine the state of supply of air. | L5 | 10M |
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OR

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| 9 | Define the following terms (i) Infiltration (ii) Natural ventilation (iii) | L1 | 10M |
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Forced ventilation

UNIT-V

- 10 a** The main air supply duct of an air conditioning system is 800 mm X 600 mm in cross section and carries $300 \text{ m}^3 / \text{min}$ 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. **L5 5M**
- b** Derive an expression for continuity equation in ducts. **L4 5M**
- OR**
- 11 a** Explain the working of domestic refrigerator with a neat sketch. **L2 5M**
- b** Explain year round air conditioning system with sketch. **L2 5M**

*****END*****