Code No: 07A72405 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,November 2010
AUTO AIR CONDITIONING
Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. A ton cooling unit is used to dehumidify 0.2 m^3/s from $T_{db} = 28^0C$ and $T_{wb} = 25^0C$ to specific humidity level of $w_2 = 0.08$ kg/kg of dry air.
Determine T_{db2} and T_{dp2} of air at exit condition and Take $C_{pam} = 1.026$ KJ/kg of da. [16]

2. What is the need of compressor and mention the various problems occurred in the compressor ? [16]

3. (a) What are the various considerations to be adopted in the selection and location of Outlets ?
(b) Differentiate between ceiling diffuser outlets and perforated ceiling panels. [8+8]

4. Although Ammonia Refrigerant is toxic, but it is the most widely used refrigerant, explain the reasons for not phasing out? [16]

5. (a) Explain about humidifying and De - humidifying processes as applied to air conditioning.
(b) Describe the purpose of automatic control used in air conditioning unit. [8+8]

6. Explain the working principle of an automatic expansion valve, its Performance under varying loads and its applications? [16]

7. A simple saturation cycle using Freon 22 is designed for a load of 100 TR.
The saturation suction and discharge temperatures are 5^0 C and 40^0 C respectively.
Calculate:
(a) The mass flow rate of refrigerant.
(b) The COP and isentropic horse power.
(c) The heat rejected in the condenser.

t 0^0C	p bar	h_f kJ/kg	h_g kJ/kg	s_f kJ(kg.K)	s_g kJ(kg.K)	v_g m^3/kg
5	5.836	205.9	407.1	1.02115	1.7447	0.0404
40	15.331	249.53	416.4	1.16659	1.69953	0.0404

Specific heat of vapor is 0.65 kJ/ (kg.K). [16]

8. What are the situations at which, the pressure regulating valves, relief valves be serviced or replaced ? [16]

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Code No: 07A72405 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,November 2010
AUTO AIR CONDITIONING
Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) Describe shell and coil type evaporator.
   (b) Draw schematic of a double pipe type evaporator and describe it. [8+8]
2. (a) Derive an expression for the drop in total pressure for the flow of air through a duct.
   (b) What are the various factors to be considered for the pressure drop in the ducts. [8+8]
3. (a) Why we call vapour compression refrigeration systems as mechanical refrigeration systems.
   (b) Draw schematic diagram of a standard vapour compression refrigeration system and draw the refrigeration cycle in T-S plane and P-V plane and derive the expression for cop of the same. [8+8]
4. How frequently the piping system, ducts and fans to be attended to eliminate friction, velocity and pressure losses ? [16]
5. (a) Write short note on cooling and dehumidification.
   (b) The moist air at 30^0C dry bulb temperature and 50% relative humidity enters cooling coil at rate of 300 m^3/min leaves the coil at 10^0C in just saturated state .Find the amount of moisture deleted and tons of refrigeration required. [8+8]
6. Describe the properties of thermodynamics and thermo-physical properties of Refrigerants. [16]
7. (a) What are the advantages and effects of ventilation in the automobiles ?
   (b) Differentiate between infiltration and ventilation. [8+8]
8. (a) What problems will be created due to gas choking and gas leakage ?
   (b) What are the reasons for gas choking and how can it be rectified ? [8+8]

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Code No: 07A72405 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,November 2010
AUTO AIR CONDITIONING
Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain performance aspects of centrifugal compressor.
   (b) Explain the phenomenon of surging. [8+8]
2. (a) Explain the difference between regular maintenance and repair of air conditioning systems.
   (b) What are the general problems occurred in heating elements? [8+8]
3. (a) Differentiate between reheat system of air conditioning methods.
   (b) Describe the importance of return air fan, preheat coil, and filters which are used in air conditioning system. [8+8]
4. (a) Write short note on heating and humidification
   (b) Moist air saturated at 1.75^0C enters the heating coil at rate of 600m^3/min. Air leaves the coil at 37.8^0C . Find the amount of heat addition per hour. [16]
5. An ideal refrigeration cycle operates with R134a as the working fluid. The Temperature of refrigerant in the condenser and evaporator are 40^0C and - 20^0C respectively. The mass flow rate of refrigerant is 0.1 kg/s. Determine the cooling Capacity and COP of the plant. [16]
6. Derive an expression for the following:
   (a) Infiltration load.
   (b) Ventilation load.
   (c) Product load. [6+5+5]
7. What are the problems created if the dust is collected on various coils of the aircraft system and how can it be removed. [16]
8. (a) Sketch and explain the performance of backward and forward curved blade centrifugal blower.
   (b) What are the effects of blower speed on discharge, BHP and total pressure? [8+8]

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Code No: 07A72405 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,November 2010
AUTO AIR CONDITIONING
Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the working principle of thermostatic expansion valve, its performance under varying loads?
   (b) What are the advantages and disadvantages of TEV? [8+8]
2. (a) Write the procedure for heat gain due to miscellaneous sources?
   (b) What are the factors affecting on the air conditioning load? [8+8]
3. (a) On a particular day the weather forecast states that the dry bulb temperature is 37^0 C, while the relative humidity is 50% and the barometric pressure is 101.325 kPa.Find the humidity ratio, dew point temperature and enthalpy of moist air on this day.
   (b) Will the moisture in the above air condense when it comes in contact with a cold surface whose surface temperature is 24^0 C? [8+8]
4. How the blocks in the pipes be detected and explain frequent servicing procedures to avoid pressure and temperature losses ? [16]
5. (a) What are the various advantages of laminar flow clean room aircraft system ?
   (b) Differentiate between down flow and cross flow laminar movement clean room air craft system. [8+8]
6. Draw the schematic diagram of two stage compression system with
   (a) Flash gas remover, water and flash inter cooling.
   (b) Draw the thermodynamic cycles for the above system. [8+8]
7. What problems will be occurred if perfect degassification is not done before filling of gas in aircraft systems ? [16]
8. Explain with a neat sketch the automatically controlled air condition and heater systems. [16]

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