Code No.: 9A03604/R09

B.Tech. III Year II Semester Regular & Supplementary Examinations

Set-4

April/May - 2013

REFRIGERATION AND AIR CONDITIONING

(Mechanical Engineering)

Time: 3 Hours | Max. Marks: 70

*Answer any **FIVE** Questions*

*All Questions carry **equal** marks*

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1. (a) Differentiate between simple air refrigeration system and boot strap air refrigeration system.

   (b) List the names of three evaporative coolants that can be used in an aircraft refrigeration system at an attitude of 15000 m. How will you estimate the amount of the coolant required for a given flight of aircraft?

2. (a) Discuss the effect of the following on the performance of a vapor compression system:
   (i) Suction pressure
   (ii) Discharge pressure
   (iii) Superheating
   (iv) Sub-cooling.

   (b) Describe the mechanism of a simple vapor compression refrigeration system.

3. (a) Write down the chemical formula for the following refrigerants R_{11}, R_{12}, R_{22}, R_{717}, R_{113}, R_{502}, $R5_{503}$.

   (b) What is meant by green house affect? What are the measures to control?

4. (a) Why the actual C.O.P of an absorption system is much less than the ideal value?

   (b) Prove the equation of maximum C.O.P of a vapor absorption system with usual notations.

5. In a steam jet refrigeration system, the motive vapor is saturated at 150°.3°C, and the chilled water temperature is 6°C. The mass ratio of the motive vapour to refrigerant vapour is 2.5. Find the saturated dicharge temperature of the ejector. Assume the nozzle, entrainment and diffuser efficiencies as 0.85, 0.65 and 0.8 respectively.

6. (a) Prove that the enthalpy of the humid air remains constant along a wet bulb temperature line on the pyschrometric chart.

   (b) Write a short note on by-pass factor for cooling coils.

7. (a) What are the advantages and disadvantages of viscous filter over dry filters?

   (b) Explain the use of heat pump for heating and cooling cycle with a neat diagram.

8. Differentiate between central, district and unitary air-conditioning systems with suitable examples.