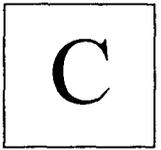


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***B.Tech. Degree VI Semester Examination in  
Marine Engineering June 2014***

**MRE 605 MARINE REFRIGERATION AND AIR CONDITIONING**

Time : 3 Hours

Maximum Marks :100

(All questions carry *EQUAL* marks)

(5 x 20 =100)

- I. (a) Why multi staging is employed in compressors? Explain the advantages and disadvantages of multi stage compression. (8)
- (b) Write short notes on the following: (4 x 3 = 12)
- (i) Condition for minimum work input and perfect inter cooling.
- (ii) Effect of clearance volume on volumetric efficiency of a compressor
- (iii) Ideal cycle compressors.
- OR**
- II. (a) Derive an expression for the work transferred in a single stage compressor without clearance volume, with the help of PV diagram. (10)
- (b) Derive an expression for the intermediate pressure for minimum shaft works of a two stage compressor with perfect inter cooling. (10)
- III. (a) Explain the importance of Montreal protocol. (8)
- (b) What is the effect of under charge in refrigeration system? (6)
- (c) Briefly explain the different types of refrigeration system used onboard. (6)
- OR**
- IV. (a) Sketch and explain a typical multi stage evaporator system of refrigeration used onboard a ship. (12)
- (b) Explain the following terms: (3+3+2=8)
- (i) Differential pressure cut out
- (ii) H.P. cut out
- (iii) L.P. cut out
- V. (a) Sketch and describe a thermostatic expansion valve used in a refrigeration circuit. (12)
- (b) Explain the purpose and procedure for carrying out defrosting in a domestic refrigeration system used in a ship. (8)
- OR**
- VI. (a) Explain different methods used for charging the refrigerant. (10)
- (b) What are the different control and safety equipments used in a refrigeration system? (10)
- VII. (a) Explain the properties of mixtures of gases using Dalton's law and Amagat's law. (10)
- (b) Briefly discuss about different insulating materials and their application in refrigeration plants. (10)
- OR**
- VIII. (a) What is gas constant? Explain the advanced problems on adiabatic mixing. (10)
- (b) The DBT and WBT of air are 35°C and 25°C respectively when barometer reads 74.5cm of Hg. Find: (i) Relative humidity (ii) Specific humidity (iii) DPT (iv) Density (v) Enthalpy (10)
- IX. (a) Explain the importance of air purification in A/C system and with a neat sketch explain HEPA filters used for air conditioning of clean rooms. (10)
- (b) Describe in detail about the psychometric properties of air comfort conditions. (10)
- OR**
- X. (a) Sketch and describe a double duct system of air conditioning. (10)
- (b) Describe in detail how heat load calculation of an air conditioning plant is done. (10)