

B.Tech Degree VI Semester Examination in Marine Engineering July 2010

MRE 605 MARINE REFRIGERATION AND AIR CONDITIONING

Time : 3 Hours

Maximum Marks : 100

- I. (a) Describe the ideal cycle for air compressors. (8)
 (b) What is the work done in a single stage compressor with clearance volume? (12)
- OR**
- II. (a) Explain in detail the advantages of multistage compression and find out the conditions for minimum work input and perfect inter cooling. (12)
 (b) A single stage single acting compressor delivers 14m^3 of free air per minute from 1 bar to 7 bar. The speed of compressor is 310 rpm. Assuming that compression and expansion follow the law $PV^{1.35} = \text{constant}$ and clearance is 5% of swept volume, find the diameter and stroke of compressor. Take $L = 1.5D$. The temperature and pressure of air at suction are the same at atmospheric air. (8)
- III. (a) Describe coefficient of performance and the methods used for improving the same. (10)
 (b) What are the different refrigerants used on board and explain their properties. (10)
- OR**
- IV. Write short notes on :
 (i) Montreal protocol (5)
 (ii) Refrigeration in liquefied gas carrier (8)
 (iii) Refrigeration effect and cooling capacity (7)
- V. Describe the different types of compressors used in the refrigeration system along with their advantages and disadvantages. (20)
- OR**
- VI. Write short notes on :
 (i) Control and safety equipments used in the refrigeration system. (7)
 (ii) Operation and maintenance of refrigeration plants (7)
 (iii) Methods of air circulation in cargo holes (6)
- VII. (a) Explain the properties of mixtures of gases using Dalton's Law and Amagat's law. (8)
 (b) What is gas constant? Explain the advanced problems on adiabatic mixing. (12)
- OR**
- VIII. Write short notes on :
 (i) Specific humidity and relative humidity (6)
 (ii) Specific volume and specific heat (6)
 (iii) Molecular weight (4)
 (iv) Gibb-Dalton's Law (4)
- IX. (a) Explain the psychometric properties of air and air comfort conditions. (10)
 (b) Describe the balancing system used in A/C plants. (10)
- OR**
- X. (a) What are the parameters dealt with in the air conditioning system? (8)
 (b) Sketch and describe a single duct type air conditioning system used on board a cargo ship. (12)