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***B.Tech. Degree VI Semester Examination in Marine Engineering
May 2019***

**MRE 1605 MARINE REFRIGERATION AND AIR CONDITIONING
(2013 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Explain the terms critical temperature and critical pressure as applied to gases. What are their significances in a vapour compression type of refrigeration system? (12)
- (b) Describe the working of a simple vapour compression refrigeration system with the aid of a simple schematic diagram. (8)
- OR**
- II. (a) How do changes in suction and delivery pressures affect the performance of a refrigeration system of vapour compression type? (10)
- (b) Explain subcooling and superheating in a vapour compression type of refrigeration plant. (10)
- III. Describe the domestic fridge installed on a ship giving details of the system and arrangement of chambers for food carried for the crew. Use sketches where ever possible. (20)
- OR**
- IV. (a) What are the desired physical, chemical and thermodynamic properties of refrigerants? Explain. (10)
- (b) Explain the procedure for heat load calculation for a refrigeration plant. (10)
- V. (a) Explain with the aid of sketches the different parts of a reciprocating compressor used in a refrigeration system. (12)
- (b) What is the purpose of unloading a refrigeration compressor? Also explain the different types of unloaders generally used. (8)
- OR**
- VI. (a) Explain a secondary refrigerant used in a cargo refrigeration system and show the arrangement of the same in refrigerated cargo hold. (12)
- (b) Explain with the aid of sketches the insulation arrangement of a refrigerated cargo hold. (8)
- VII. Write short notes on:
- (a) Dalton's law of partial pressures. (5)
- (b) Amagat's law of partial volume. (5)
- (c) Specific volume and Specific heat. (5)
- (d) Molar heat capacity. (5)
- OR**
- VIII. (a) What is the function of a cooling tower? List and explain different types of cooling towers generally used. (12)
- (b) Explain the terms specific humidity and relative humidity. (8)

(P.T.O.)

- IX. (a) Explain cooling and dehumidification with the help of a psychrometric plot. (6)
 (b) What are the essential qualities of air circulated in the crew accommodation of a vessel and how are these qualities achieved? (6)
 (c) What are the statutory requirements of a ship's accommodation air-conditioning system? (8)

OR

- X. (a) Explain with the aid of sketches: (2 × 5 = 10)
 (i) Pump room ventilation in an oil tanker.
 (ii) Battery room ventilation in a ship.
 (b) What are the factors that need to be considered while calculating the capacity of engine room ventilation system? (10)
