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***B.Tech. Degree VI Semester Examination in  
Marine Engineering June 2016***

**MRE 1605 MARINE REFRIGERATION AND AIR CONDITIONING**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Explain with the aid of a simple sketch Reverse Carnot Cycle as used in a refrigeration system. What are the practical limitations in the temperature requirements in this cycle? (10)
- (b) What is coefficient of performance of a refrigeration system? What are the ways for maximizing coefficient of performance? (10)

OR

- II. (a) What are the different uses of refrigeration on board a ship? Briefly explain them. (12)
- (b) Write short notes on:  
(i) Ammonia as a refrigerant. (4)  
(ii) Insulation in a refrigeration plant. (4)

- III. (a) Define and explain 'Heat Pump' and describe the different applications of it. (12)
- (b) Describe the desirable properties of a refrigerant. (8)

OR

- IV. Write short notes on:  
(a) Montreal protocol. (6)  
(b) Heat load on refrigeration plant. (8)  
(c) Secondary refrigerant. (6)

- V. (a) Explain with the aid of a sketch a thermostatic expansion valve. (10)
- (b) Describe the differences between internally equalized TEV and externally equalized TEV and compare their performances. (10)

OR

- VI. (a) Describe the materials and methods of insulation of a refrigerated cargo hold. (10)
- (b) What is the function of a vapour barrier? What are the normal vapour barriers used and how do you install them? (10)

- VII. (a) State and explain Dalton's Law and Amagat's Law. What are their significances in the process of refrigeration? (12)
- (b) Write short notes on the following with reference to gas mixtures.  
(i) Gas constant. (4)  
(ii) Molar Heat capacity. (4)

OR

- VIII. (a) Explain the purposes and procedures of volumetric and gravimetric analysis of gas mixtures. (10)
- (b) Describe with the aid of simple sketches, the different types of cooling towers used in HVAC systems. (10)

(P.T.O.)

- IX. (a) Sketch and explain an Air-conditioning system installed in a ship's accommodation, using zone control. (10)
- (b) Write short notes on:
- (i) Comfort conditions with respect to air-conditioning. (5)
  - (ii) Internal air quality. (5)

**OR**

- X. (a) What are the different purposes of Engine room ventilation? Explain such a system with the aid of simple sketches. (8)
- (b) Write short notes on:
- (i) Pump Room ventilation. (4)
  - (ii) CO<sub>2</sub> room ventilation. (4)
  - (iii) Ventilation ducts (4)

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