UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 5 Examination in Engineering: August 2015

Module Number: ME 5326 Module Name: Marine Engineering Knowledge (O/C)

[Three Hours]

[Answer **all questions**, each question carries **10** marks,
Clearly labelled sketches will be given credit]

Q1. Reverse osmosis is the modern alternative for shipboard production of drinking water.

a) Explain briefly the difference between Osmotic and Reverse Osmotic pressure.

[01 mark]

b) Describe using simple diagrams as necessary, the operation principle a reverse osmosis system.

[04 marks]

c) Sketch and describe a double effect boiling type evaporator integrated with a salinometer and a three way dump valve.

[04 marks]

d) Distinguish the difference between boiling and flash evaporation.

[01 mark]

Q2. With reference to oily water separators;

a) Sketch a Turbo Oily Water Separator handling large quantities of contaminated water and explain how it operates.

[05 marks]

b) Describe the automatic oil discharge system integrated with the above separator.

[03 marks]

c) Why does oil carry over with water?

[02 marks]

Q3. a) Sketch and describe the operation of a foster wheeler D-type bent tube water tube boiler.

[04 marks]

b) State the functions of following mountings fitted to a Marine boiler.

i) Safety valve
ii) Main steam stop valve
iii) Water gauge
iv) Feed check valve
v) Auxiliary steam stop valve
vi) Salinometer cock

[03 marks]

c) State the gauge glass blow down procedure applied to a boiler?

[03 marks]

Q4. With reference to refrigeration system installed onboard ship;

a) Draw a detailed diagram of a Vapour-Compression Cycle and explain it with necessary thermodynamic processes.

[03 marks]

b) With reference to the location of evaporator and type of cargo that it preserves; state the methods of cooling with clear labeled sketches.

[02 marks]

c) Sketch a diagrammatic arrangement of a fully automatic refrigeration system which supplies a number of cold compartments and explain its operation.

[05 marks]

Q5. a) State with classifying all the pumps used in marine practice.

[02 marks]

b) Sketch and describe the operation and construction of a Positive Displacement double screw pump used in a pumping system.

[04 marks]

c) Describe the necessity of a relief valve installed on a pump.

[01 mark]

d) Prepare a list of mechanical related problems caused in a centrifugal pump.

[03 marks]