



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 5 Examination in Engineering: July 2016

Module Number: ME5312

Module Name: Marine Engineering Knowledge

[Three Hours]

[Answer all questions, all questions carry equal marks]

Sketches should be clearly labelled

- Q1 With reference to oily water separators:
- a) Sketch, an oily water separator handling large quantities of contaminated water in order to give 100 ppm of product and explain its operation. [5 Marks]
 - b) Demonstrate with a suitable sketch and explain the automatic oil and water discharge arrangement of the separator. [3.5 Marks]
 - c) Explain the construction and operation of a double pass shell and tube type heat exchanger. [3.5 Marks]
- Q2
- a) Sketch and describe Four Stage Flash Type Evaporation plant using steam as the heating medium. [5 Marks]
 - b) With reference to low pressure evaporators write short notes on followings:
 - (i) Boiling Type Evaporators
 - (ii) Educator Condenser
 - (iii) Dump Valve and Salino-meter Assembly. [2 Mark]
 - c) Explain briefly the operation of a Reverse Osmosis system used onboard ships with a suitable sketch. [5 Marks]
- Q3
- a) Classify the pumps used onboard ships according to type, function and mode of driving. [3 Marks]
 - b) Sketch and describe the operation of a double screw rotary displacement pump [6 Marks]
 - c) Discuss about mechanical related problems caused with pumps. [3 Marks]

- Q4 a) With reference to heat exchangers explain;
- (i) Parallel Flow heat transfer process
 - (ii) Counter Flow heat transfer process
 - (iii) Cross Flow heat transfer process.
- [3 Marks]
- b) Explain the construction and operation of a shell and tube type heat exchanger.
- [3 Marks]
- c) Illustrate the type of baffles used with tube section of a heat exchanger.
- [3 Marks]
- d) Sketch type of headers fitted to a shell of a heat exchanger.
- [3 Marks]
- Q5 a) Sketch and describe the operation and construction of a Double Pass Composite Cochran boiler.
- [5 Marks]
- b) Arrange a list of mountings (out fittings) attached to a Scotch boiler.
- [2 Marks]
- c) Why the water level of a boiler is critical? Explain the operation of a tubular type water level gauge glass using a suitable sketch.
- [5 Marks]