



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 3 Examination in Engineering: March 2023

Module Number: MN3202

Module Name: Fundamentals of Marine Engineering

[Three Hours]

[Answer any Five questions]

Instructions:

1. Drawings and sketches should be clear, neat and in approximate proportion.
 2. Use marine colour code for sketches and plans. Red colour is allowed only for sketches.
 3. Clear labelled sketches will be given credits.
 4. Start your answers to each question on a fresh page.
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- Q1. (a) Define the following parts of a Vessel with suitable sketches. Hull, shell plating, keel, frames, double bottom, bulkheads, superstructure and rudder. [06 Marks]
- (b) The distances from the fore part of the hull to the after part of the hull, taken at the upper side of the continuous deck are known as LOA, LBP, LWL and vertical heights T and f. Explain these parameters and mark on sketches illustrating sections through centre and midship of the ship. [06 Marks]
- (c) Lines plan is a 2-D scaled representation of the 3-D complex form of the ship through descriptive geometry. Draw the following views to represent the hull of a ship. [08 Marks]
- (i) Profile
 - (ii) body plan
 - (iii) Half breadth plan
- Q2. (a) Explain scavenging methods applicable to marine diesel engines. [05 Marks]
- (b) Draw valve timing diagrams for both 2 stroke and 4 stroke cycle marine diesel engines. [05 Marks]

- (c) Explain methods used in turbocharging [05 Marks]
- (d) Explain the piston cooling process of a marine diesel engine [05 Marks]
- Q4. (a) Sketch and describe the operation and construction of a Gear pump used in a pumping system. [06 Marks]
- (b) Describe the necessity of a relief installed on a pump. [04 Marks]
- (c) Classify the pumps used onboard ship according to type, function and mode of driving. [04 Marks]
- (d) Make a line diagram of a ballast pumping system for a dry cargo ship and explain its principal of operation. [06 Marks]
- Q5. (a) With reference to acceptance of bunkering a ship, explain
- i. Sounding and ullage [04 Marks]
- ii. State the pre-bunkering check list. [04 Marks]
- (b) Because of its importance, the Chief Engineer is directly in charge of the fuel. Explain the role of the Chief engineer while accepting bunker onboard. [06 Marks]
- (c) State the importance of SOPEP locker and make a list of equipment placed in it. [06 Marks]
- Q6. (a) Sketch and describe a double effect boiling type evaporation plant using main engine jacket water as the heating medium. [08 Marks]
- (b) Distinguish the difference between boiling and flash evaporation. [02 Marks]
- (c) What are the advantages of a multiple effect boiling type evaporator over that of a multi stage flash type? [04 Marks]

(d) With reference to the Layout of Engine Room bottom platform, state the pumps, and tanks available for service. [06 Marks]

Q7. (a) Explain the construction and operation of a double pass shell and tube type heat exchanger. [06 Marks]

(b) Explain the back flush system used with plate type configuration. [08 Marks]

(c) Sketch the type of baffles used with shell and tube type construction and explain the necessity of the same. [06 Marks]