



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 4 Examination in Engineering: December 2022

Module Number: MN4304 Module Name: Marine Engineering Knowledge

[Three Hours]

[Answer FIVE questions The maximum marks carries 100]

Instructions to Candidates:

- Answer any FIVE questions.
- This question paper contains SIX questions and four pages including this page.
- The maximum marks allocated for each section of a question are shown.
- Drawings and sketches should be clear, neat and in approximate proportion.
- Use marine colour code for sketches and plans.
- Start your answers to each question on a fresh page.
- All questions carry equal marks.
- Clear labelled sketches will be given full marks.

- Q1 a) State the intended purposes in using main air compressors onboard the ship.
[02 marks]
- b) With reference to Marine air compressors installed on ships, categorize their types according to mode of driving, method of cooling, lubrication and service pressure.
[04 marks]
- c) State the unloading procedure of an air compressor and reasons to unload.
[02 marks]
- d) With reference to double stage reciprocating air compressors, explain
- i) Construction with a detailed sketch
 - ii) Its operation
 - iii) Maintenance procedures
 - iv) Troubleshooting of it.
- [12 marks]
- Q2 a) Sketch and describe the operation of a non-follow up steering gear system.
[08 marks]
- b) Sketch and describe a marine tele-motor transmitter, receiver and associated piping.
[08 marks]
- c) Sketch and explain the operation and safety arrangement of local control arrangement.
[04 marks]
- Q3 a) With reference to transmission line of a ship explain the following,
- i) The Shafting line is angled and the lubricating oil tank is left open to the shaft even at stay.
- [02 marks]

- ii) Plummer blocks are of different designs according to their location. [02 marks]
- b) Sketch a water lubricated stern tube and explain its operation. [08 marks]
- c) Draw a sketch to show types of cavitation caused on a propeller. [06 marks]
- d) State the advantage of built in propellers over solid type propellers. [02 marks]
- Q4 a) State classes of fires and methods of combating them. [04 marks]
- b) Sketch and describe a Chemical Foam type portable fire extinguisher giving suitable Chemical reactions caused during operation, indicating operating time, area of coverage and recharging after use. [08 marks]
- c) State causes of fires onboard a ship. [04 marks]
- d) Discuss about the preventive measures to be taken on Class A and Class B fires. [04 marks]
- Q5 a) With reference to General cargo ships explain the arrangements taken for bilge and Ballast systems. [04 marks]
- b) Draw a detailed diagram of a Bilge and ballast system and explain all kinds of steps taken for continuous operation of the system even in case of emergency. [06 marks]
- c) Explain the function of the lubrication system of a Marine diesel engine. [02 marks]
- d) Discuss the operation of a diesel/heavy fuel oil supply system for two stroke marine diesel engines operating at slow speed, by giving a suitable sketch.

Q6 a) The vessel on which you are serving has been subjected to port state control. The procedures for port state control apply to ships which come under the provision of certain international conventions and protocols. State the list of functions of the Port state Control.

[06 marks]

b) Give definition for the Flag state control.

[02 marks]

c) Describe the role of the Flag state.

[06 marks]

d) Explain the operation and construction of a globe valve used in pumping systems with the aid of a suitable sketch.

[06 marks]