



# UNIVERSITY OF RUHUNA

## Faculty of Engineering

End-Semester 5 Examination in Engineering: May 2023

Module Number: MN 5301

Module Name: Engineering Knowledge (General) I

[Three Hours]

[Answer Five Questions only, each question carries 20 marks]

### Instructions:

1. Start your answers to each question on a fresh page.

Q1 (a) Sketch a longitudinal cross section of a tube type heat exchanger showing the provisions made for allow the expansion of the tube stack.

[08 Marks]

(b) Explain two advantages and two disadvantages of tube type heat exchangers.

[08 Marks]

(c) State two onboard applications of the above type of cooler.

[04 Marks]

Q2 (a) Draw a cross sectional drawing of a centrifugal pump and label all components.

[08 Marks]

(b) Explain the thrusts acting on a centrifugal pump.

[08 Marks]

(c) State one remedy to minimize each thrust mentioned in Q2 (b) above.

[04 Marks]

Q3 (a) Define four types of stresses applied on materials onboard.

[14 Marks]

(b) Draw the stress - strain curve and show.

i. Yield Point.

[02 Marks]

ii. Elastic point.

[02 Marks]

iii. Limit of proportionality.

[02 Marks]

Q4 (a) Sketch a submerge tube evaporator type fresh water generator and label all components.

[08 Marks]

(b) Explain the working principle of a fresh water generator sketched in Q4 (a) above.

[04 Marks]

(c) State why the water produced from the evaporator sketched in Q4 (a) above requires to be treated to render it potable.

[04 Marks]

(d) Explain two types of water treatment carried out onboard.

[04 Marks]

Q5 (a) Sketch a double stage air compressor and label all components.

[08 Marks]

(b) Explain the power saved by the inter cooler with the aid of a P-V graph.

[04 Marks]

(c) State and describe four safety devices fitted to an air reservoir.

[08 Marks]

Q6 (a) Describe in detail two methods of priming system used onboard a marine vessel for centrifugal pumps.

[12 Marks]

(b) List two advantages of each system described above in Q6 (a).

[08 Marks]