



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 5 Examination in Engineering: May 2023

Module Number: MN 5302

Module Name: Engineering Knowledge (Motor) 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) Explain the combustion process in a diesel engine including the three phases of combustion.

[05 Marks]

(b) Efficient combustion of the fuel depends upon proper atomisation, penetration and turbulence. Describe atomisation, penetration and turbulence.

[10 Marks]

(c) Explain the factors affecting the combustion process in a diesel engine.

[05 Marks]

Q2 (a) Explain the function of a fuel injector.

[05 Marks]

(b) With reference to a large bore two stroke diesel engine, draw and name the parts of a fuel injector.

[10 Marks]

(c) Describe the purpose of injector cooling.

[05 Marks]

Q3 (a) With the aid of a simple sketch explain the arrangement of essential structural components (bed plate, cylinder block, cylinder cover, tie bolts, 'A' frame) of a large bore two stroke diesel engine.

[10 Marks]

(b) Explain the important functions of a bedplate.

[05 Marks]

(c) Describe the forces acting on a bedplate.

[05 Marks]

Q4 (a) Draw a line diagram of a simple distillation process indicating the flow of various oil fractioned off.

[06 Marks]

(b) Explain the reasons for the deterioration in the quality of residual fuel supplied by the refinery for shipboard use.

[04 Marks]

(c) Explain the likely problems you will encounter when handling marine fuel oil.

[05 Marks]

(d) Define catalytic fines and explain the likely consequences on the engine when operating with fuel containing these particles.

[05 Marks]

Q5 (a) What are the possible causes leading to an explosion in the crankcase of a diesel engine?

[05 Marks]

(b) Explain the mechanics of crankcase explosion.

[05 Marks]

(c) Describe, with the aid of a sketch, the operation of an oil mist detector.

[10 Marks]

Q6 (a) Explain the main factors contributing to scavenge fires.

[06 Marks]

(b) Explain the indication and steps to be taken in the event of scavenge fires.

[06 Marks]

(c) Describe the firefighting appliances available to fight scavenge fire.

[08 Marks]