CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
JULY 2025 SEMESTER SESSION

SUBJECT CODE	:	**LMB23003**
SUBJECT TITLE	:	**MARINE DIESEL ENGINE 1**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**BACHELOR OF MARINE ENGINEERING TECHNOLOGY WITH HONOURS**
TIME / DURATION	:	**09.00 AM - 11.30 AM (2 HOURS 30 MINUTES)**
DATE	:	**19 DECEMBER 2025**

INSTRUCTIONS TO CANDIDATES

1. Please read **CAREFULLY** the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **ONE (1)** section ONLY.
4. Consist of FIVE (5) questions. Answer **FOUR (4)** questions in **ONLY**.
5. Please write your answers on this answer booklet provided.
6. Answer **ALL** questions in English language **ONLY**.

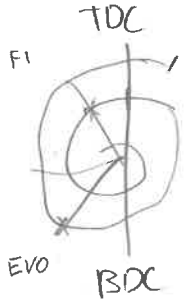
THERE ARE 3 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

INSTRUCTION: Answer FOUR (4) questions ONLY. **(Total: 100 marks)**

Please use the answer booklet provided.

Question 1

With reference to diesel engine principles:



a) Sketch and label a four-stroke cycle timing diagram. (6 marks)

b) Explain the operation cycle of your diagram in (a) (14 marks)

1-2 Intake
2-3 Compressio
3-4 Power
4-1 exhaust

c) Discuss 2 benefits of understanding an engine timing diagram. (5 marks)

Question 2

With reference to engine analysis:

a) State FOUR (4) of the importance of measuring compression pressure for marine engines:
(4 marks)

b) Sketch a 2-stroke marine engine P-V diagram and label the sequence of valve and port operations during one complete cycle of a 2-stroke marine diesel engine
(8 marks)

c) Sketch a compression diagram of a marine diesel engine and discuss the factors that influence its shape and pressure values
(8 marks)

d) Sketch and label a light spring diagram
(5 marks)

Question 3

With reference to marine 2-stroke engine components:

a) Sketch a cross section of a marine 2-stroke diesel engine and label its component.
(14 marks)

b) Analyze how the operation of a charge air cooler affects the combustion efficiency and overall performance of a marine diesel engine.
(6 marks)

c) Discuss the effect of combustion and engine performance due to piston rings leakage
(5 marks)

Question 4

With reference to engine performance:

A ship driven by a two-stroke diesel engine has an average fuel consumption of 72 tons per day of heavy fuel oil (HFO) with a higher calorific value of 41.9 MJ/kg. In this condition, it runs at 95 rpm with a torque reading of 1525.6 kN·m and an indicated power of 3350.8 kW per cylinder. If the engine has 6 cylinders, calculate:

a) Brake power

(4 marks)

b) Friction power

(4 marks)

c) Indicated thermal efficiency

(4 marks)

d) Break thermal efficiency

(4 marks)

e) Mechanical efficiency

(4 marks)

f) Sketch and label the typical Sankey Diagram

(5 marks)

Question 5

With reference to turbocharging for low-speed diesel engines:

a) Discuss THREE (3) advantages of turbocharging in marine engines.

(9 marks)

b) Sketch a cross-section of an Axial Flow Turbocharger and label THREE (3) components

(6 marks)

c) Analyze the use of turbocharging in increasing the power output of a marine diesel engine

(5 marks)

d) Analyze the use of turbocharging for reducing harmful emissions in marine diesel engines.

(5 marks)

END OF EXAMINATION PAPER