



UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
FEBRUARY 2025 SEMESTER SESSION

SUBJECT CODE : LMD25503

SUBJECT TITLE : MARINE PROPULSION DIESEL ENGINE

PROGRAMME NAME : DIPLOMA OF ENGINEERING TECHNOLOGY IN
(FOR MPU: PROGRAMME LEVEL) MARINE ENGINEERING

TIME / DURATION : 2.00 PM - 4.30 PM
(2 HOURS 30 MINUTES)

DATE : 21 JUNE 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 **TWO (2)** sections; Section A and Section B.
 4. Answer **ALL** question in Section A, and **TWO (2)** questions **ONLY** in Section B.
 5. Please write your answers on this answer booklet provided.
 6. Answer **ALL** questions in English language **ONLY**.
 7. Answer should be written in blue or black ink except for sketching, graphic and illustration.
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THERE ARE 5 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

With reference to the ship's main propulsion machinery:

- (a) Sketch 2-stroke engine crankcase relief valve with FOUR (4) labels. (8 marks)
- (b) Explain TWO (2) function of sketch in 1(a). (4 marks)
- (c) Describe FOUR (4) areas of inspection for marine diesel engine crankcase (8 marks)

Question 2

With reference to marine diesel engine lubrication system:

- (a) Sketch and labels FOUR (4) in cross section to show the lubrication oil flow for 4-stroke diesel engine internal parts (8 marks)
- (b) Explain FOUR (4) types of lubrication functions based on the following: (8 marks)
- i – Hydrodynamic lubrication
 - ii – Hydrostatic lubrication
 - iii – Boundary lubrication
 - iv – Elastohydrodynamic lubrication
- (c) Discover FOUR (4) components in marine diesel engine that rely on lubricating its parts (4 marks)

Question 3

With reference to engine performance and power:

A ship installed with an engine built under this RTA96C series has 12-cylinder, 960 mm bore and a 2600mm stroke with a uniflow-scavenged system. Its mean indicated pressure and torque measured by an engine indicator and a torsionmeter at 102 RPM is 20.5 bar and 7,494 kNm respectively. In a voyage from Rotterdam to Penang ship used a heavy residual fuel oil with a daily consumption at an average of 398 ton/day. The caloric value of the fuel is 42,000 kJ/kg Calculate (in S.I units) based on formula given:

(a) Indicated power (8 marks)

$$i) \quad IP = \frac{P_m \times L \times A \times N \times C}{60}$$

$$ii) \quad Area = \frac{\pi D^2}{4}$$

(b) Shaft (brake) power (6 marks)

$$S.P = 2\pi NT$$

(c) Shaft (brake) thermal efficiency (6 marks)

$$(\eta_s) = \frac{3600 BP}{m_f \times C.V}$$

SECTION B (Total: 40 marks)

INSTRUCTION: Answer ONLY TWO (2) questions.

Please use the answer booklet provided.

Question 4

With reference to the main engine starting air system onboard ship:

- (a) Sketch and label FOUR (4) the schematic diagram. (8 marks)
- (b) Explain the operation principle in 4(a) (8 marks)
- (c) Describe TWO (2) importance of interlock and blocking devices provided for the system (4 marks)

Question 5

With reference to marine diesel engine efficiency:

- (a) Sketch and labels SEVEN (7) typical Sankey diagram (11 marks)
- (b) Explain THREE (3) energy losses from the internal combustion engine based on above 5(a). (9 marks)

Question 6

With reference to out of phase diagram for low-speed marine diesel engine:

(a) Sketch and labels FIVE (5) early and late ignition diagram (10 marks)

(b) Identify FIVE (5) causes of early and late ignition (10 marks)

END OF EXAMINATION PAPER
