CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION

JULY 2025 SEMESTER SESSION

SUBJECT CODE	:	**LMD26903**
SUBJECT TITLE	:	**MARINE DIESEL ENGINE**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**DET IN MARINE ENGINEERING**
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 **TWO (2)** sections. Section A and section B.
4. Answer **ALL** in questions section A. Section B only **TWO (2)** questions **ONLY**.
5. Answer should be written in blue or black ink except for sketching, graphic and illustration.
6. Please write your answers on this answer booklet provided.
7. Answer **ALL** questions in English language **ONLY**.

THERE ARE 4 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 marine 2 Stroke diesel engine:

(a) Sketch and labels **EIGHT (8)** of the timing diagram (8 marks)

(b) Explain **SIX (6)** of the cycle process for the engine stated in Diagram in 1(a) (12 marks)

Question 2

With reference to the marine diesel engine fuel oils system:

(a) Explain the fuel specifications listed. (10 marks)

i. Specific gravity or relative density
ii. Viscosity
iii. Ignition quality
iv. Sulphur content
v. Calorific value

(a) Describe **TWO (2)** factors of high temperature corrosion occur during the combustion process. (5 marks)

(b) Describe **TWO (2)** causes of this abnormal situation when noticed that the exhaust seats were pitted. (5 marks)

Question 3

With reference to marine engine performance system:

In an Internal combustion engine the calculation of Indicated Horse Power is based on Pressure and Volume diagram. Engine with a 6 cylinder 2–stroke engine where the pressure of spring constant is 186 Kpa, the engine stroke and bore is 1100 mm and 410 mm respectively and it's operating at 120 rev/min, the mid ordinates the average height of power card obtained is 9 mm. Calculate:

(a) Indicated power.

i) $Pm = Si \times Ai$ (9 marks)

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

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

(b) Shaft (brake) power if the shaft torque 102kNm and 120 rpm.

(6 marks)

$S.P = 2\pi NT$

(c) The shaft (brake) thermal efficiency, if mass of fuel used per day is 7000kg and fuel calorific value is 36 000 kJ/kg

(5 marks)

$Th\eta = \frac{3600\ N}{mf \times C.V}$

SECTION B (Total: 40 marks)

INSTRUCTION: Answer ONLY TWO (2) questions.

Please use the answer booklet provided.

Question 4

With reference to marine diesel engine turbocharger system:

(a) Sketch and label **FIVE (5)** main components of the system

(10 marks)

(b) Describe **FOUR (4)** process of turbocharger suction air flow directed from atmosphere to the engine unit combustion chambers

(8 marks)

(c) Define the function of intercooler effect on scavenge air system

(2 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 your diagram in 5(a).

(9 marks)

Question 6

With reference to marine diesel engine lubrication oil analysis:

(a) Describe **FOUR (4)** procedure to retrieve sample from main engine sump tank

(8 marks)

(b) Describe **THREE (3)** onboard general lubrication analyses that can be carried out.

(9 marks)

(c) List **THREE (3)** machinery that requires lubrication oil sample for analysis

(3 marks)

END OF EXAMINATION PAPER