CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
FEBRUARY 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	:	**30 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 **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 4 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 a four-stroke cycle marine diesel engine construction:

(a) Sketch and label SEVEN (7) main components of engine.

(12 marks)

b) Sketch and label the engine timing diagram cycle.

(5 marks)

c) Explain the principle of engine timing diagram. (Refer to Q1(b)

(8 marks)

Question 2

A ship installed with a Sulzer RTA 84C series engine which is a typical modern slow-speed, two-stroke, crosshead type, long stroke diesel engine. It has 9 cylinders, a bore of 840 mm and a stroke of 2500 mm and an operating speed of 102 rpm. It mean indicated pressure and torque measured by an engine indicator and a torsionmeter at 102 rpm is 18.5 bar and 3,085 kNm respectively.

Calculate the following performance specifications of the above engine (in S.I. units):

(a) Indicated power

(8 marks)

(b) Shaft (brake) power

(7 marks)

(c) Friction Power

(4 marks)

(d) Mechanical efficiency

(6 marks)

Question 3

With reference to 2-stroke marine diesel engine performance:

a) Sketch and label Indicator power and draw card. (6 marks)

b) Explain their function; based on question (a) (3 marks)

c) With the aid of skecthing, explain the following diagram;

i. Power card (4 marks)

ii. Compression diagram (4 marks)

iii. Out of phase diagram (4 marks)

iv. Light or Weak spring diagram (4 marks)

Question 4

With reference to marine diesel engine safety:

(a) Explain the THREE (3) faults that will cause immediate shut down of the main propulsion diesel engine. (6 marks)

(b) Discuss the possible causes of the following:

i. High LO temperature (5 marks)

ii. High cooling water temperature (4 marks)

iii. High exhaust temperature (3 marks)

(c) Explain necessary for the engine to slow down in case of a 'high oil mist'. (7 marks)

Question 5

With reference to turbocharging and supercharging for a large 2-stroke marine diesel engine:

(a) State the main pollutants produced from the combustion of marine diesel fuel. (5 marks)

(b) Describe THREE (3) fuel-related properties that influence the environmental impact. (5 marks)

(c) With the aid of sketch, describe a radial flow turbocharger system that improves combustion efficiency and reduces emissions. (9 marks)

(d) Discuss technical and regulatory solutions implemented in the marine industry to reduce engine emissions. (6 marks)

END OF QUESTION