



**UNIVERSITI KUALA LUMPUR**  
**MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY**

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**FINAL EXAMINATION**  
**JANUARY 2017 SEMESTER**

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<b>COURSE CODE</b>	<b>: LMB20403</b>
<b>COURSE NAME</b>	<b>: FUELS AND LUBRICANTS</b>
<b>PROGRAMME NAME</b> (FOR MPU: PROGRAMME LEVEL)	<b>: BACHELOR OF ENGINEERING TECHNOLOGY (HONS)</b> <b>IN MARINE ENGINEERING</b>
<b>DATE</b>	<b>: 06/07/2017 THU</b>
<b>TIME</b>	<b>: 02.00 PM - 04.30 PM</b>
<b>DURATION</b>	<b>: 2 HOURS 30 MINUTES</b>

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read **CAREFULLY** the instructions given in the question paper.
  2. This question paper has information printed on both sides.
  3. This question paper consists of **FIVE (5)** questions. Answer **FOUR (4)** questions only.
  4. Please write yours answers on the answer booklet provided.
  5. Write your answers only in **BLACK** or **BLUE** ink.
  6. Answer all questions in English.
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**THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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**INSTRUCTION: Answer only 4 (FOUR) questions.  
Please use the answer booklet provided.**

**Question 1**

With reference to **fuel oil properties** on board a merchant ship,

Determine 5 ( FIVE ) properties or constituents that may be found in heavy fuel oil having a high viscosity and a high carbon content and explain how each properties or constituents above may cause problem in engine.

(25 marks)

**Question 2**

With reference to **cylinder liner wear** of a large marine diesel engine.

- a) Examine the 3 (THREE) types of wear imparted on cylinder liner. (6 marks)
- b) Explain the reasons for maximum wear rate at top of piston. (10 marks)
- c) Illustrate the wear pattern as a result of using improper Total Base Number (TNB) lubricating oil. (9 marks)

**Question 3**

With reference to an **oil purifier** on board ship,

- a) Explain with aid of sketches the essential differences between a purifier and a clarifier. (10 marks)
- b) Illustrate with aid of sketches how a **self-cleaning** purifier sliding bowl operate. (15 marks)

**Question 4**

With reference to **fuel oil and lubricating oil** onboard ship,

- a) Describe the term microbial degradation. (4 marks)
- b) Explain how lubricating oil degradation (due to microbial growth) be noticed and describe its effects. (7 marks)
- c) Explain how microbial degradation of fuel oil manifest itself. (7 marks)
- d) Explain how microbial degradation of distillate fuels and lubricating oil be prevented. (7 marks)

**Question 5**

With reference to a **Large 2-Stroke Slow Speed** diesel engine,

- a) Examine the 4 FOUR) phases of combustion that take place in engine cylinder of a diesel engine. (16 marks)
- b) With reference to **combustion of fuel** of a large marine diesel engine, explain 3 (THREE) **effect** of the following,
  - i. Late combustion (3 marks)
  - ii. Early combustion (3 marks)
  - iii. Low cetane number. (3 marks)

**Question 6**

a) With aid of sketches, compare the different between **boundary** lubrication and a **hydrodynamic** lubrication. (20 marks)

b) Examine 5 (FIVE) characteristic of hydrodynamic lubrication.

(5marks)

**END OF QUESTION**