



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

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**FINAL EXAMINATION**  
**SEPTEMBER 2016 SEMESTER**

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**COURSE CODE** : LEB 20603

**COURSE NAME** : MARINE ELECTRICAL CODE OF PRACTICE

**PROGRAMME NAME** : BACHELOR OF MARINE ELECTRICAL ELECTRONICS  
(FOR MPU: PROGRAMME LEVEL) TECHNOLOGY

**DATE** : 13 JANUARY 2017

**TIME** : 3 PM

**DURATION** : 2 HOURS 30 MINUTES

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**INSTRUCTIONS TO CANDIDATES**

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1. Please **CAREFULLY** read 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** sections, Section A and Section B.
4. Answer **ALL** questions in Section A. For Section B, answer **THREE (3)** questions only.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English language **ONLY**.

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**THERE ARE 7 PAGES OF QUESTIONS, INCLUDING THIS PAGE.**

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**SECTION A (Total 40 marks)**

**INSTRUCTION: Answer ALL questions.**  
**Please use the answer booklet provided.**

**Question 1 (CLO 1)**

- (a) i. Explain the importance of communication system onboard ship.  
ii. Name TWO (2) types of communication system/equipment fitted onboard. (4 marks)
- (b) Define condition monitoring maintenance. (3 marks)
- (c) Specify TWO (2) disadvantages of corrective maintenance (4 marks)
- (d) Define refit. (3 marks)
- (e) Explain the processes of planning or preparation to send a ship for refit. Your answer must be in the form of a flow chart. (6 marks)

**Question 2**

- (a) i. Describe the importance of ship's electrical diagram.  
ii. Explain any TWO (2) types of electrical diagram. **CLO 1** (6 marks)

- (b) i. Describe the importance of 'Classification Societies'.  
ii. List three (3) types of Classification Societies. **CLO 1**  
(5 marks)
- (c) Elaborate MCB in terms of its construction, rating, breaking capacity and usage.  
**CLO 2**  
(4 marks)
- (d) Name the type of instrument or tester that are used to check; **CLO 5**  
i. Small current  
ii. High current  
iii. Insulation resistance  
(3 marks)
- (e) State the importance of measuring insulation resistance (IR). **CLO 5**  
(2 marks)

**SECTION B (Total 60 marks)****INSTRUCTION: Answer THREE questions ONLY.****Please use the answer booklet provided.****Question 3**

- (a) i. Describe the function of circuit breaker.  
ii. How does feeder and distribution circuits are protected. **CLO 2**  
(3 marks)
- (b) Explain ship electrical distribution system. **CLO 2**  
(8 marks)
- (c) Main switchboard is divided into sections. **CLO 3**  
i. Identify any THREE (3) sections at the main switchboard  
ii. Explain the functions of these sections.  
(9 marks)

**Question 4**

- (a) Elaborate the operation of continuous UPS dc supported supply system. **CLO 5**  
(5 marks)
- (b) TWO (2) generators are load sharing in parallel: **CLO 4**  
Generator 1 delivers 1000 kW at 0.8 power factor lag and Generator 2 delivers 800 kW and 600 kVAR lag.  
Calculate:  
i. The reactive power loading of Generator 1

- ii. The p.f. of Generator 2
- iii. The total bus-bar loading in kW, kVAR and power factor
- iv. The total apparent power.

(15 marks)

#### Question 5

- (a) Distribution systems at high voltages usually have their neutral points earthed through a resistor (NER) or earthing transformer to the ship's hull. **CLO 2**

- i. State the main function of NER
- ii. Sketch and label the neutral earthing in HV system

(8 marks)

- (b) An insulated distribution system is adopted for most marine electrical system. From your view why this system is more favourable than earth distribution system. **CLO 2**

(3 marks)

- (c) With the aid of diagram explain clearly how you conduct insulation resistance testing on fresh water pump motor. **CLO 5**

(9 marks)

#### Question 6 (CLO 4)

(a) You are an electrical engineer serving onboard KL DUGONG. Your ship is on passage to Pu. Pisang. You just finished your dinner when suddenly everyone realized that the air conditioning system trip. The senior electrical supervisor report to you that the ACU motor burnt. You and your staff carry out further investigation (diagnose) on the defect and found that the stator winding of the motor is burnt. You realized that this type of defect cannot be repaired onboard.

As a young and dedicated engineer, explain clearly the procedure or means of tackling this defect. If the defect is classified as BER (beyond economic repair) explain how you are going to overcome the problem. Your answer must be complete with the flow chart

(10 marks)

- (b). Sketch and label the general layout of a typical ship electrical system based on the following data:

Generator sets ( 4 nos) 660 V, 60 Hz

Emergency Generator 440 V, 60 Hz

Main Switchboard 660 V

Emergency Switchboard 440 V

Auxiliary Switchboard 440 V

660 V / 440 V Transformer

660 V motors (2 nos)

440 V motors (2 nos)

(10 marks)

END OF EXAMINATION PAPER