



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

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

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<b>COURSE CODE</b>	<b>: LMB 20203</b>
<b>COURSE NAME</b>	<b>: MARINE ELECTRICAL &amp; ELECTRONIC</b>
<b>PROGRAMME NAME</b> (FOR MPU: PROGRAMME LEVEL)	<b>: BACHELOR OF ENGINEERING TECHNOLOGY IN MARINE ENGINEERING</b>
<b>DATE</b>	<b>: 19<sup>TH</sup> JANUARY 2017</b>
<b>TIME</b>	<b>: 02.00 PM – 05.00 PM</b>
<b>DURATION</b>	<b>: 3 HOURS</b>

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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 **FIVE(5)** questions
4. Answer **FOUR(4)** 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 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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Total marks: 100

**INSTRUCTION: Answer only FOUR (4) questions.**

**Please use the answer booklet provide**

**Question 1**

- a. Discuss atomic structure including using diagram based on Bohr atom concept  
(8 marks)
  
- b. An extrinsic semiconductor an improved intrinsic semiconductor with a small amount of impurities. Discuss the properties of the **TWO (2)** categories of extrinsic semiconductor including their diagrams.  
(10 marks)
  
- c. There are two types of semiconductor which are n-type and p-type. Explain the application of n-type and p-type in electronic devices.  
(7 marks)

**Question 2**

- a. Branch circuit in a small boat wiring system are parallel circuit. A toaster, a coffee maker and a frying pan are plugged into a cabin circuit across a 110 V. The current through toaster is 8.3A, through the coffee maker is 8.3A and through the frying pan is 9.6A. calculate :
- i. The total current from the main line. (2 marks)
  - ii. The voltage across each appliance. (2 marks)
  - iii. The total resistance of the circuit. (2 marks)
- b. Resistor is a device which provides resistance in an electrical circuit. The resistance value can be determined by a colour code. Determine the nominal resistance and the possible range of actual resistance values corresponding to each of the following colour codes:
- a. Green , Violet , Orange , Silver (2 marks)
  - b. Blue , Black , red , Gold (2 marks)
  - c. Brown , Grey, Black ,Gold (2 marks)
  - d. Orange , Blue, Gold, Gold (2 marks)

- c. Series and parallel electrical circuits are two basic ways of wiring components..  
 Analyze figure 1 by using KVL method calculate the value of  $I_1$ ,  $I_2$ , and  $I_3$ :

(11 marks)

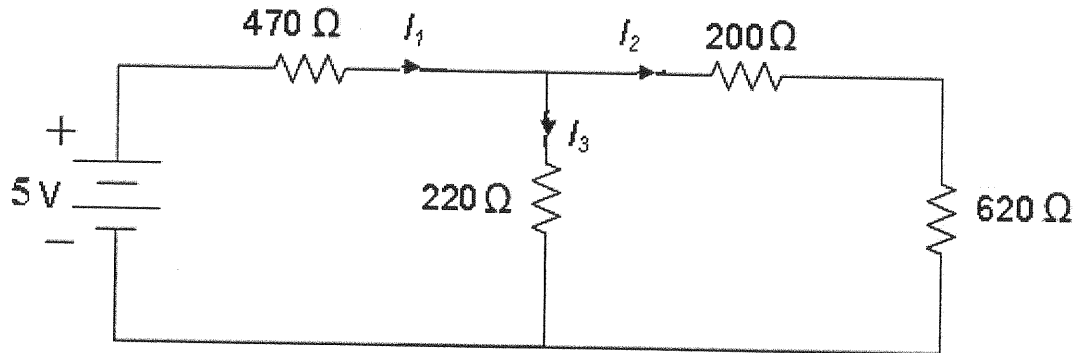


Figure 1

**Question 3**

- a. Important part in electrical system on board ship is wiring system. Explain a each part of cable structure using diagrams

(6 marks)

- b. Explain the factors that cause the failure of an underground cable on board ship.

(8 marks)

- c. A voltaic cell is a combination of materials used to convert chemical energy into electric energy. The cell consists of two type which is disposable and rechargeable. You are required to compare this disposable and rechargeable together with characteristic and an example

(11 marks)

**Question 4**

a. Discuss the :

- i. Faraday first and second laws of electromagnetic induction
- ii. Lenz law
- iii. Electromagnetism

(8 marks)

b. A coil has an mmf of 500 At ,a reluctance of  $2 \times 10^6$  At/Wb, a cross sectional area of  $1\text{cm}^2$  and relative permeability  $\mu_r$  of 100. Determine :

i. The total flux.

(2 marks)

ii. The length of coil.

(3 marks)

c. A choke is an inductance coil with a very low resistance. The ac voltage drop across  $R$  is very low. That is all the ac voltage drop is across  $L$ . If  $X_L = 10\Omega \times R$ . Determine the inductance value for a choke with a resistance of  $100\Omega$  when the frequency of the circuit is

i. 5 kHz

(2 marks)

ii. 5MHz

(2 marks)

iii. 50MHz

(2 marks)

iv. Calculate a voltage across the choke(L) and resistance (R ) if  $V_T = 200\text{V}$

(6 marks)

**Question 5**

- a. Sketch **FOUR (4)** equivalent circuit type of dc generators on board ship and label all important components.

(13 marks)

- b. The terminal voltage of a separately excited DC generator can be controlled by changing the internal generated voltage  $E_A$  of the machine.

$$V_T = E_A - I_A R_A$$

A ship was equipped with a separately-excited. It develops a no-load e.m.f of 150V at an armature speed of 1200 rpm and a flux per pole of 0.10Wb. Determine the generator when:

- i. The speed increase to 1500 rpm and the pole flux remains unchanged  
(4 marks)
- ii. The speed remains 1200 rpm and the pole flux is decreased to 0.08Wb.  
(4 marks)
- iii. The speed increase to 1440 rpm and the pole flux is decreased to 0.07Wb  
(4 marks)

**.END OF QUESTION**