



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE	: LMB 20203
COURSE NAME	: MARINE ELECTRICAL ELECTRONICS
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	: BACHELOR MARINE ENGINEERING TECHNOLOGY
DATE	: 20 MAY 2016
TIME	: 08.00 AM – 11.00 AM
DURATION	: 3 HOURS

INSTRUCTIONS TO CANDIDATES

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

THERE ARE 8 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

Electrical is a necessity on board ship. Most ship have electrical power generation. Future ship will have more electrical consumption. Therefore basic knowledge in electrical and electronic are very important for mariners.

- (a) Define atom?
(2 marks)
- (b) State the element in an ATOM?
(2 marks)
- (c) State TWO (2) types of conductive materials?
(2 marks)
- (d) Define resistance?
(2 marks)
- (e) Using the circuit symbols, draw a schematic circuit containing an element force, conductors, a means of control and a load. Label the diagram carefully.
(4 marks)
- (f) Draw the symbol for air core transformer and voltmeter?
(2 marks)
- (g) List FOUR (4) types of diagram available in the Electrical Field or Work that are commonly used?
(4 marks)
- (e) Describe how electron flow in the electron current configuration.
(2 marks)

Question 2

Power Generation very important onboard ship. The current and voltage generated and consumed must be calculated precisely so that the generator is not overloaded.

- (a) Generators are the main electrical source onboard ship. Calculate the power delivered to a circuit by a 240-V generator that supplies 20 A to the circuit?
(3 marks)
- (b) Protection of circuit is very important in electrical generation and distribution. Explain the function and protection provided by a Fuse.
(2 marks)
- (c) State Ohm's law?
(2 marks)
- (d) Calculate R when $V = 220\text{V}$ and $I = 11\text{ A}$?
(3 marks)
- (e) Analyze the circuit in Figure 1 and calculate for Total Resistance R_T between the 2 open terminal?

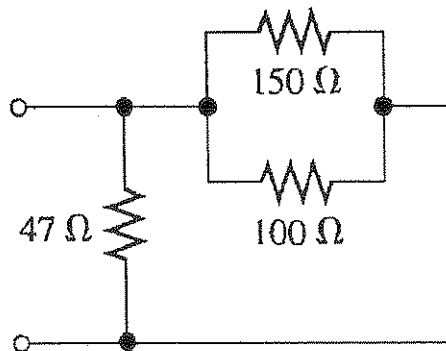


Figure 1

- (3 marks)
- (f) List the voltage range supplied on board ship for domestic lighting and bow thruster?
(2 marks)
- (g) Voltmeter and ammeter are very important instrument for measuring voltage and current. Explain how voltmeter and ammeter is connected circuit to be measured.
(2 marks)

- (h) Calculate and solve current I_4 for the circuit shown in Figure 2.

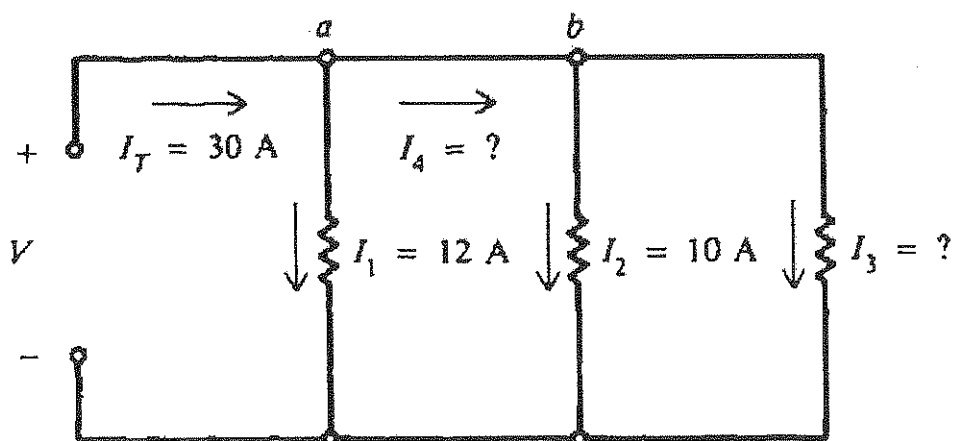


Figure 2

(3 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer THREE (3) questions.

Please use the answer booklet provided.

Question 3

Electricity is very important on board ship. Calculation using KIRCHOFF voltage and current law is very popular. Cable capacity and cable loads are calculated using this method.

- (a) Given $V_A = 58\text{ V}$, $V_B = 10\text{ V}$, $R_1 = 4\ \Omega$, $R_2 = 3\ \Omega$, and $R_3 = 2\ \Omega$ as in Figure 3. Calculate and solve ALL mesh currents and voltage drops across R_1 , R_2 and R_3 in the circuit?

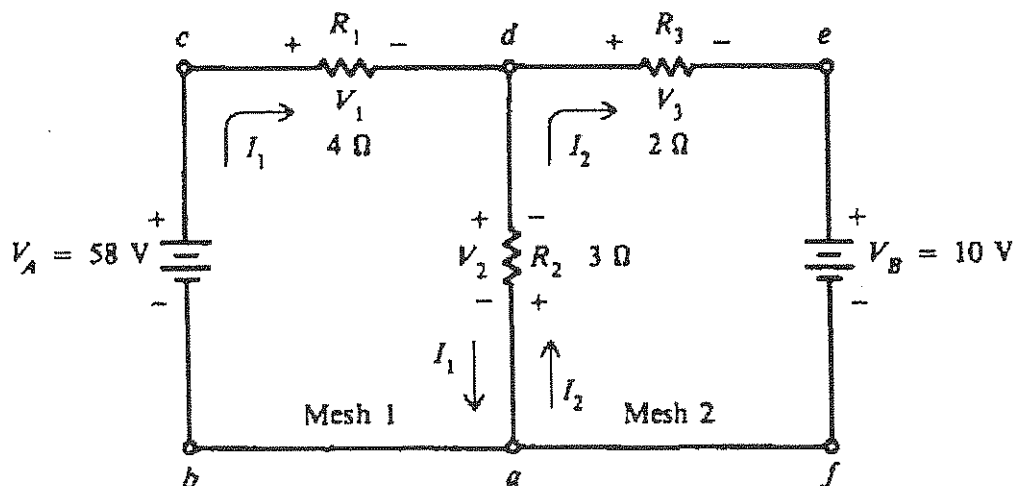


Figure 3

(20 marks)

Question 4

Magnetic fields are very important in motors and generators. It can be used to control simple electric circuit.

- (a) Apply Faraday's law to find the induced voltage across a coil with 500 turns that is located in a magnetic field that is changing at a rate of $8000\ \mu\text{Wb/s}$. Calculate and solve the voltage induced of the coil.

(3 marks)

- (b) State the principle of a motor?

(2 marks)

- (c) Analyze and determine the magnetic polarity A and B of the pictured electromagnets in Figure 4 by the right-hand rule?

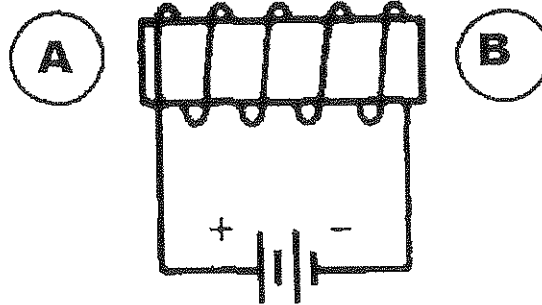


Figure 4

(2 marks)

- (d) Magnetic or Nonmagnetic can be classified into 3 groups. State the 3 group of material classification?

(3 marks)

- (e) State the common application of Electromagnets?

(2 marks)

- (f) Analyze the Figure 5. Applying Fleming Left Hand Rule, draw the direction of magnetic field of the magnet and determine force on the conductor whether it goes up or down.

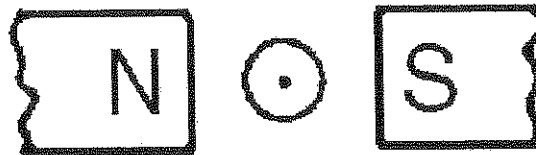


Figure 5

(4 marks)

- (g) Calculate and solve the field intensity H of a 40 turn, 10-cm-long coil with 3 A flowing in it as in Figure 6?

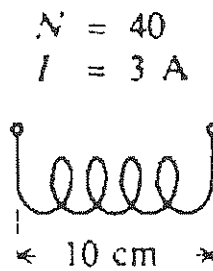


Figure 6

(4 marks)

Question 5

Generators are the main supply of power onboard. Battery are also an important power supply is very important for Emergency supply backup.

- (a) A lead-acid battery is rated at **200Ah**. Based on an 8-h discharge, what average load Current can this battery supply?
(3 marks)
- (b) DC generators take their names from the type of field excitation used. State and list down **THREE (3)** types of Direct Current (DC) Field Generator?
(3 marks)
- (c) Draw and label Direct Current (DC) Series Field Generator?
(4 marks)
- (g) List the **FOUR (4)** types of three-phase source/load configurations?
(4 marks)
- (e) At what velocity must a conductor 75 mm long cut a magnetic field of flux density 0.6 T if an e.m.f. of 9 V is to be induced in it? Assume the conductor, the field and the direction of motion are mutually perpendicular?
(4 marks)
- (f) There are **THREE (3)** factor that determined the Voltage induced in Faraday Law of Induced Voltage. List **ONLY TWO (2)** of the factors?
(2 marks)

Question 6

- (a) Calculate and solve all missing values of current, voltage and resistance in a high voltage regulator circuit in a color television receiver as in Figure 7. The voltage drop across each resistor is used to supply voltage in other parts of the receiver?

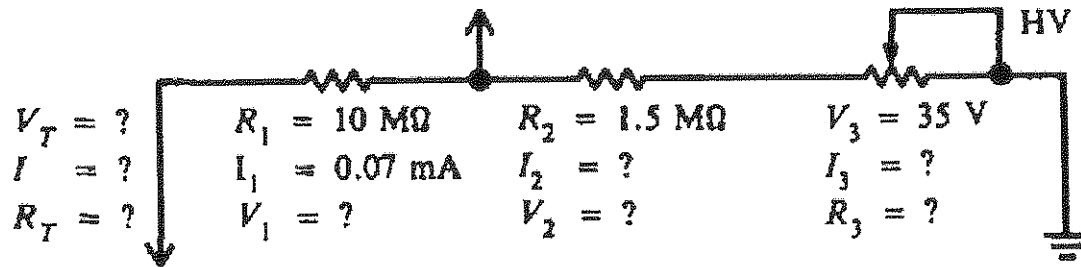


Figure 7

(18 marks)

- (b) State the purpose of cable sheath?

(2 marks)

END OF EXAMINATION PAPER

