UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2017 SEMESTER

COURSE CODE	: LMB20203
COURSE NAME	: MARINE ELECTRICAL AND ELECTRONICS
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	: BACHELOR OF ENGINEERING TECHNOLOGY (HONS) IN MARINE ENGINEERING
DATE	: 07/07/2017 FRI
TIME	: 9.00 AM - 11.30 PM
DURATION	: 2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

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.

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

Total marks: 100

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

Question 1

a. A semiconductor is a material that has intermediate conductivity between a conductor and an insulator. Explain the properties of the **TWO (2)** categories semiconductor including their diagrams.

(14 marks)

b. There are two types of semiconductor which are n-type and p-type. Compare the n-type and p-type including their diagram.

(11marks)

Question 2

a. Branch circuit in a small boat wiring system are parallel circuit. A toasted, 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.

(3 marks)

ii. The voltage across each appliance.

(3marks)

iii. The total resistance of the circuit.

(3 marks)

b. Figure 1 show the series and parallel electrical circuits are two basic ways of wiring components. Calculate:

i. The total resistance

(12 marks)

ii. The total current

(2 marks)

iii. The total power absorbed

(2 marks)

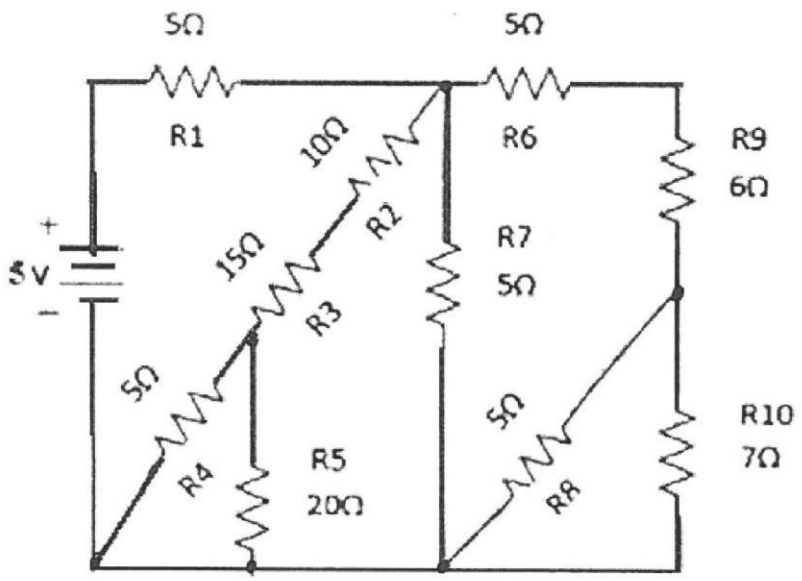

Figure 1: series parallel circuit

Question 3

a. Every ship is to be provided with a main source of electrical power with sufficient capacity to meet the requirements. Explain the process to start emergency generator when power failure occurs.

(10 marks)

b. A voltaic cell is a combination of materials used to convert chemical energy into electric energy. The chemical cell consists of two electrodes and produces a battery when two or more cells are connected. Compares the type of cells which is included the characteristic and example.

(15 marks)

Question 4

a. A cord of resistance 100Ω is palace in a magnetic field of 1mWb. The coil has 100 turn and galvanometer of 400Ω resistance is connected in series as shown at figure 2. Determine:

i. The average e.m.f

(6 marks)

ii. The current if the coil is moved in 1/10th second from the given field to a field of 0.2mWb.

(4 marks)

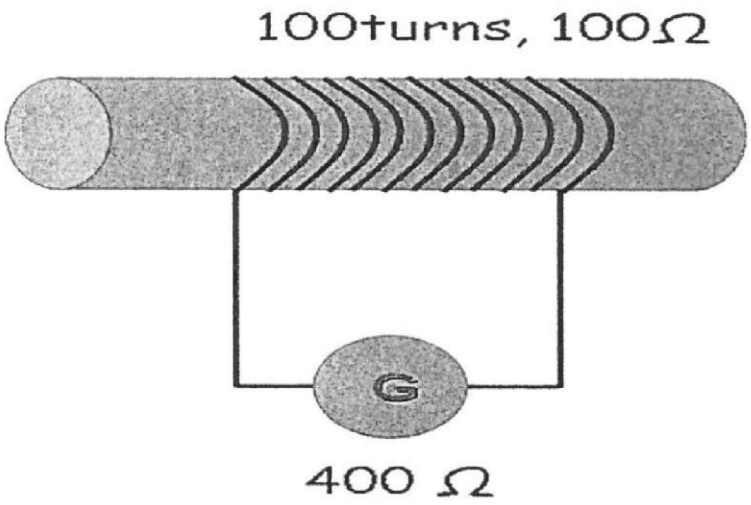

Figure 2: cord resistance

b. Electrical power on cargo ship is commonly generate at 440V. Using the figure 3 with a $R_1 = 10\Omega$, $XL = 15\Omega$, $XC = 12.5\Omega$ and ω = 150. Calculate the:

i. The frequency of the circuit

(3 marks)

ii. The value of inductor L

(3 marks)

iii. The value of capacitor C

(3 marks)

iv. The total current flows in the circuit

(3 marks)

v. Power factor

(3 marks)

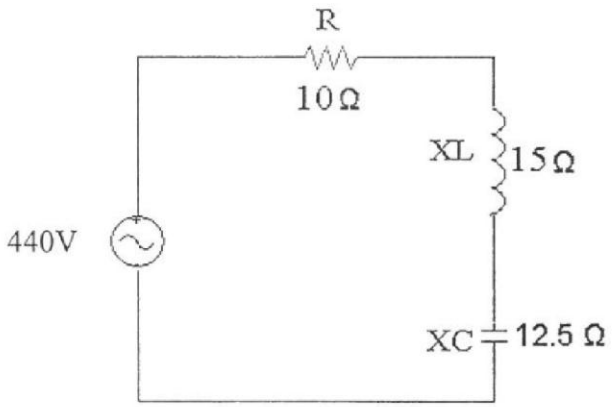

Figure 3: R-L-C circuit

Question 5

a. Explain **FOUR (4)** major types of dc generators on board ship and sketch their equivalent circuit each types including label such as voltage source, field winding, armature winding, armature resistance and etc.

(12 marks)

b. A 12kW, 240V, 1200rpm, separately excited DC generator on ship has armature and field winding resistances of 0.20Ω and 200Ω respectively. At no load the terminal voltage is 240V, the field current is 1.2A and the machine runs at 1200rpm. When the generator delivers rated current to a load at 240V. Calculate:

i. the generated voltage at no load.

(6 marks)

ii. the field circuit voltage.

(3 marks)

iii. the developed torque. (4 marks)

END OF EXAMINATION PAPER