UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE	:	LMD11003
COURSE NAME	:	MARINE ELECTRO-TECHNIQUE 1
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	DIPLOMA OF ENGINEERING TECHNOLOGY IN MARINE ENGINEERING
DATE	:	27 MAY 2016
TIME	:	03.00 PM – 05.30 PM
DURATION	:	2 HOURS 30 MINUTES

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 (2) sections; Section A and Section B.

4. Answer ALL questions in Section A. For Section B, answer TWO (2) questions only.

5. Please write your answers on the answer booklet provided.

6. Answer all questions in English language ONLY.

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

PART A(Total: 60 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

(a)   Electric shock is one of a deadly outcome of faulty electrical installation on board ship. Normally electric shock occur in TWO (2) conditions. Explain these TWO (2) conditions.

(10 marks)

(b)   Resistor is a device which provides resistance in an on board 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:

      i.   Green , Violet , Orange , Silver

([2 marks)

      ii.   Blue , Black , red , Gold

([2 marks)

      iii. Brown , Grey, Black ,Gold

(2 marks)

      iv.   Orange , Blue, Gold, Gold

(2 marks)

      v.   Violet, Orange Green , Silver

(2 marks)

Question 2

(a)   Electric circuit is interconnection between components or electrical devices for the purpose of communicating or transferring energy from one point to another. State definition of:

    i.   Voltage
    ii.   Current
    iii.   Power
    iv.   Resistance
    v.   Ohm laws

(10 marks)

(b)   Series and parallel electrical circuits are two basic ways of wiring components on board ship. Series circuit is one that has a single path for current flow through all of its elements and parallel circuit is one that requires more than one path for current flow in order to reach all of the circuit elements. Analyze figure 1 to calculate:

    i.   Total resistance

    ii.   Total current

    iii.   Power absorbed at 47KΩ and 1.4KΩ

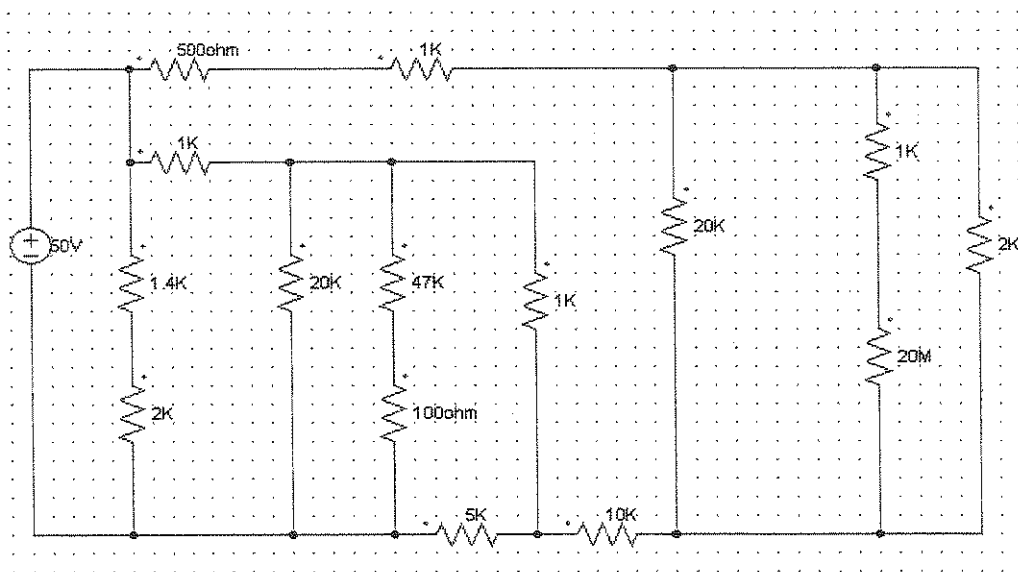   iv.   Total power

(10 marks)

Figure 1

Question 3

(a)   The sine wave is important in electrical system because it retains its wave shape when added to another sine wave of the same frequency and arbitrary phase. Referring to the figure 2, an alternating voltages has the equation $v(t) = 100 \sin 377t V$.

Determine the:

   i.   Frequency

                                                                    ([2 marks)

   ii. Period

                                                                    (2 marks)

   iii. Peak value

                                                                    (2marks)

   iv. Root means square (Vrms,)

                                                                    (2 marks)

   v.   Average value

                                                                    (2 marks)
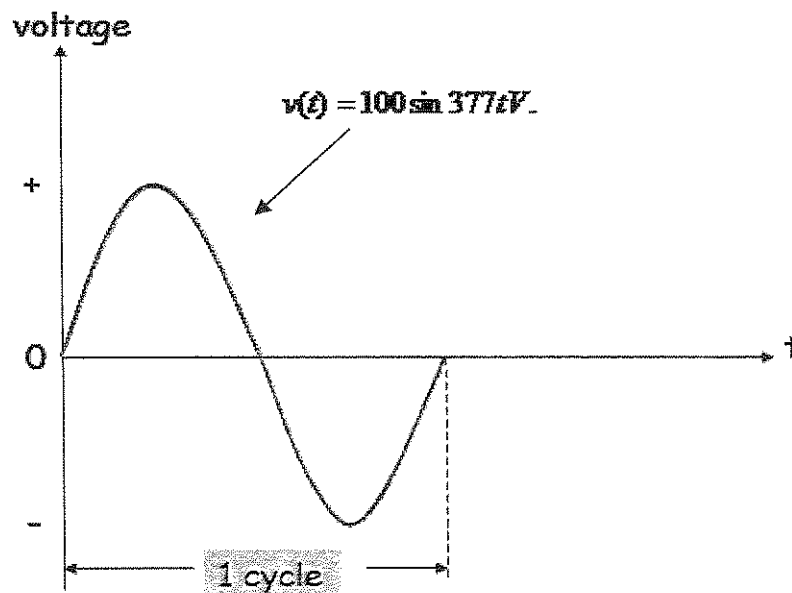

Figure 2

(b)   Electrical power on cargo ship is commonly generate at 110V. Figure 3 is a series RLC. Calculate the:

   i.   Reactance (X)

(4 marks)

   ii.   Impedance (Z)

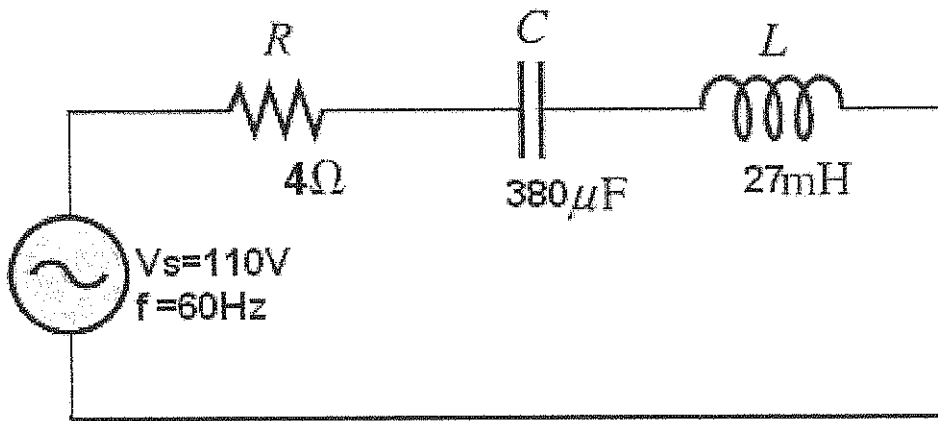(3 marks)

   iii. Current (I)

(3 marks)

Figure 3

PART B (Total: 40 marks)

INSTRUCTION: Answer only TWO (2) questions.
Please use the answer booklet provided.

Question 4

(a) Batteries is emergency source of electrical power in passenger ship, cargo ship and to starting arrangement for emergency generating set. Explain the consideration (advantages and disadvantages) connecting batteries in series and parallel as shown in figure 4(a) and 4(b).
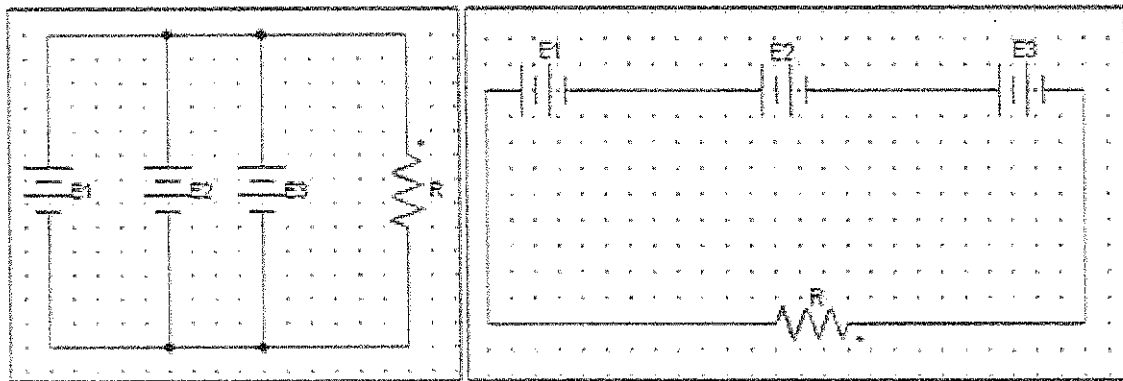
(6 marks)

Figure 4 (a)   Figure 4(b)

(b) A copper-made (resistivity p =1.6 x $10^{-8}\Omega m$), single-phase transmission line, has a length of 25km and is used to provide, at its end, a power P=10000kW. With a power factor equal to 1. We assume the joule losses to be equal to 7% of the power P. the inductance and capacitance of the line being neglected. Determine the cross-section of the line for input voltage 20KV

(14marks)

Question 5

(a)   Define magnetic flux, magnetic field and electromagnetism.

([6 marks)

(b)   State FOUR (4) characteristics of line magnetic flux.

(4 marks)

(c)   A toroidal ring core is used to create an inductor by having a coil of 400 turns wrapped around it. The toroid has a cross section of 25 cm^2 a circumferential length of 160mm and a relative permeability of 120. The coil carries a current of 1.2 A. Determine :

  i.   the MMF of the coil

  ii.   the magnitude of the magnetizing field intensity in the core

  iii. the magnitude flux density in the core

  iv.   the total flux in the core

  v.   the reluctance of the core

(10 marks)

Question 6

(a)   A shunt generator require 50 hp input from its prime mover when it delivers 150A at 240V. Determine the efficiency of the generator.

(6 marks)

(b)   The counter emf of a shunt motor is 218V, the field resistance is 150Ω and the field current is 1.5A. The line current is 36.5A. Calculate :

  i.   The armature resistance

(6 marks)

  ii.   If the line current during start up must be limited to 55A, find the starter resistance in series with armature.

(4 marks)

  iii. The horsepower developed by the motor if the iron losses total 550W.

(4 marks)

END OF QUESTIONS