TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

DIPLOMA IN MARINE ENGINEERING (DMAE I)

EMR 2102
MARINE ELECTRICAL II

END OF SEMESTER EXAMINATIONS

YEAR 1 SEMESTER 2

SERIES: DECEMBER, 2013

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. You should have the following for this examination:
   - Answer Booklet

2. This paper consists of **FIVE** Questions.
3. Answer **ANY THREE** Questions.
4. **This paper consists of *FOUR* printed pages.**

Question ONE

(a) (i) State any **TWO** methods used for providing fire protection of cables. **(2 marks)**

(ii) Outline the procedure for choosing correct cable thickness before carrying out any ship or boat's electrical installation. **(3 marks)**

(b) Describe the **THREE** main factors that determine the construction and materials used for making cables. **(3 marks)**

(c) Describe the **SIX** main types of cable insulation materials that are commonly used in electrical materials. **(12 marks)**

Question TWO

(a) (i) Give **TWO** reasons for tinning copper wires in marine cables. **(2 marks)**

(ii) With aid of a diagram, show the **FIVE** main parts of an armoured power cable consisting of several flexible conductor wires. **(5 marks)**

(b) List any **THREE** types of hazards associated with running marine diesel engines or any mechanical equipments. **(3 marks)**

(c) State any **TEN** general safety measures associated with electric power tools. **(10 marks)**

Question THREE

(a) State:

(i) Kirchoff's Voltage Law (KVL)
(ii) Kirchoff's Current Law (KCL)

(2 marks)

(b) For the circuit of Figure 1, use the KCL and KVL laws described in a(i) and (ii), to determine the following:

(i) Currents through resistors, R_1, R_2, R_3 and R_4
(ii) Power dissipated by each resistor in the circuit

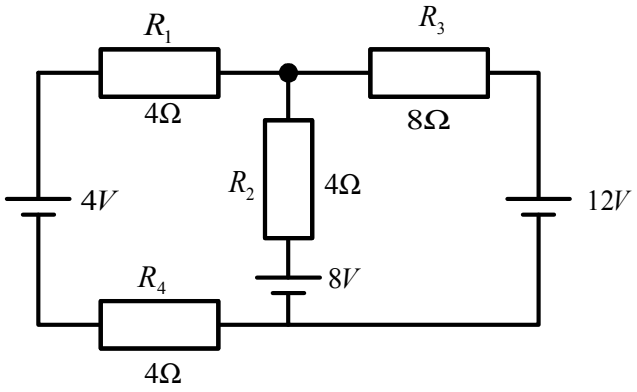

Fig. 1

(18 marks)

Question FOUR

(a) State the following Theorems:

(i) Thevenin's Theorem
(ii) Norton's Theorem

(4 marks)

(b) Two electrical motors having resistances, R_1 and R_2 of 4Ω and 2Ω respectively are connected via two different d.c. power sources of 24V and 12V respectively as shown in Figure 2 below.

If R_3 is the load resistance; use Thevenin's theorem to determine:

(i) The current flowing through the load, R_3
(ii) Power dissipated by the load Resistor, R_3

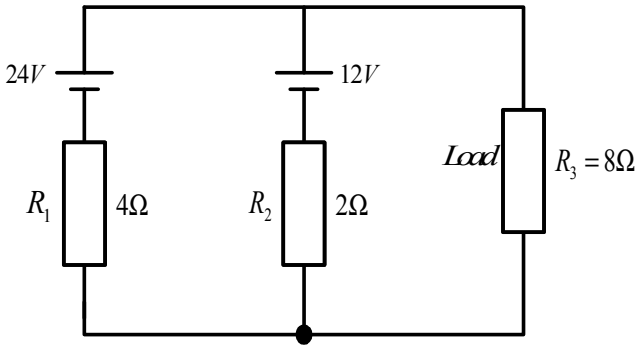

Fig. 2

(16 marks)

Question FIVE

(a) With the aid of diagrams, briefly describe the following types of workshop tools, stating their intended purposes:

(i) Screw drivers
(ii) Adjustable wrench
(iii) Diagonal cutters

(6 marks)

(b) Describe the main classes of fire and the different types of fire extinguishers that are commonly used in engineering working environments. **(14 marks)**