



UNIVERSITI KUALA LUMPUR  
Malaysian Institute of Marine Engineering Technology

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FINAL EXAMINATION

JAN 2016 SESSION

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SUBJECT CODE : LEB 40803  
SUBJECT TITLE : SHIP ELECTRICAL POWER SYSTEM  
LEVEL : BACHELOR  
TIME / DURATION : 2½ HOURS  
DATE :

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INSTRUCTIONS TO CANDIDATES

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1. Please read the instructions given in the question paper CAREFULLY.
  2. This question paper is printed on both sides of the paper.
  3. Please write your answers on the answer booklet provided.
  4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
  5. This question paper consists of FIVE (5) questions. Answer FOUR (4) questions only.
  6. Answer all questions in English.
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THERE ARE 7 PAGES OF QUESTION PAPER INCLUDING THIS PAGE.

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**INSTRUCTION: Answer FOUR questions only.**

**Please use the answer booklet provided.**

**Question 1**

(a) Explain why the measurement of the insulation resistance of a machine is necessary to be made while the machine is hot.

(3 marks)

(b) Explain what should be done if difficulties arise in locating a fault on an item of equipment and only a wiring diagram is available.

(3 marks)

(c) i. With the aid of the diagram sketch and label all the sections of the main switchboard

(10 marks)

ii. Discuss any THREE (3) of the sections of the main switchboard

(9 marks)



**Question 2**

- (a) Explain the power generation onboard ship  
(6 marks)
- (b) State the THREE (3) types of circuit faults.  
(3 marks)
- (c) Discuss the effect of *earth fault* on the 'earth distribution system' and 'insulated distribution system'.  
(8 marks)
- (d) Explain the earthing system for the shipboard high voltage system. Your answer must be completed with a diagram  
(8 marks)



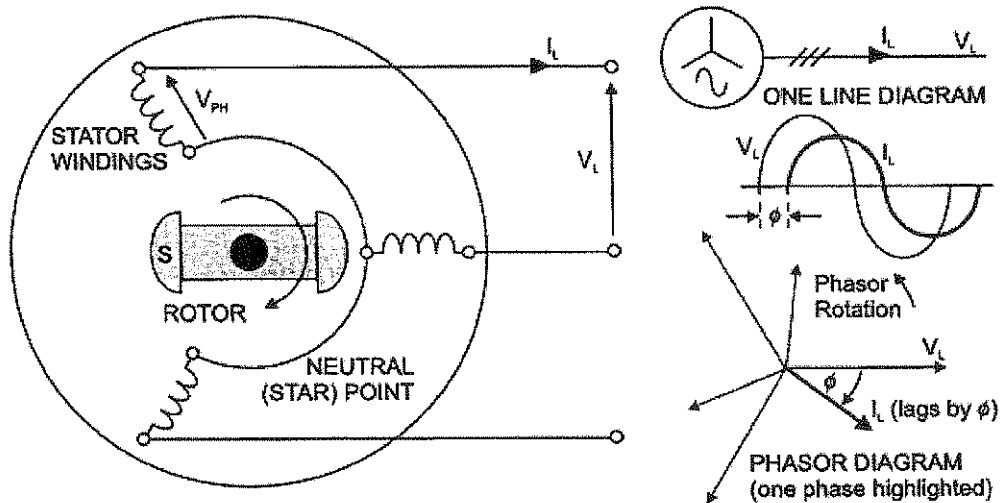
**Question 3**

(a) Enumerate any TWO (2) types of electrical hazards (6 marks)

(b) Safety at the working places or location is very essential. As an electrical engineer you must ensure that all personnel fully comply the safe work practices. Elaborate any THREE (3) of safe work practices (procedures) at the working place. (5 marks)

(c) Define:  
 i. Line voltage  
 ii. Phase voltage (4 marks)

(d) Analyze the **Figure 1** below regarding the principle of generator operation.



**Figure 1**

(10 marks)





**Question 4**

(a) A 10 motor operates from a 220 V insulated system. The supply cables have a total impedance of  $0.01 \Omega$ . Determine the value of current flow through the circuit in each following case:

- i. An open-circuit fault
- ii. An earth fault, and
- iii. A short-circuit

(9 marks)

(b) Determine the ohmic value of a neutral earthing resistor (NER) to limit the earth fault current to the full load rating of a 2 MW, 0.8 pf, 3.3 kV, three-phase AC generator?

(6 marks)

(c) Determine the indication of clampmeter if it clipped around a 3 core cable that is known to be carrying 100AC to a motor.

(4 marks)

(d) State THREE (3) reasons why protection equipment is essential in an electric distribution system.

(6 marks)



Question 5

- (a) The Figure 2 had shown the Azipod drive unit on modern ships.
  - i. Describe the advantages of the Azipod drive unit system.
  - ii. Specify the components of Label A, B, C, D, E, F and G

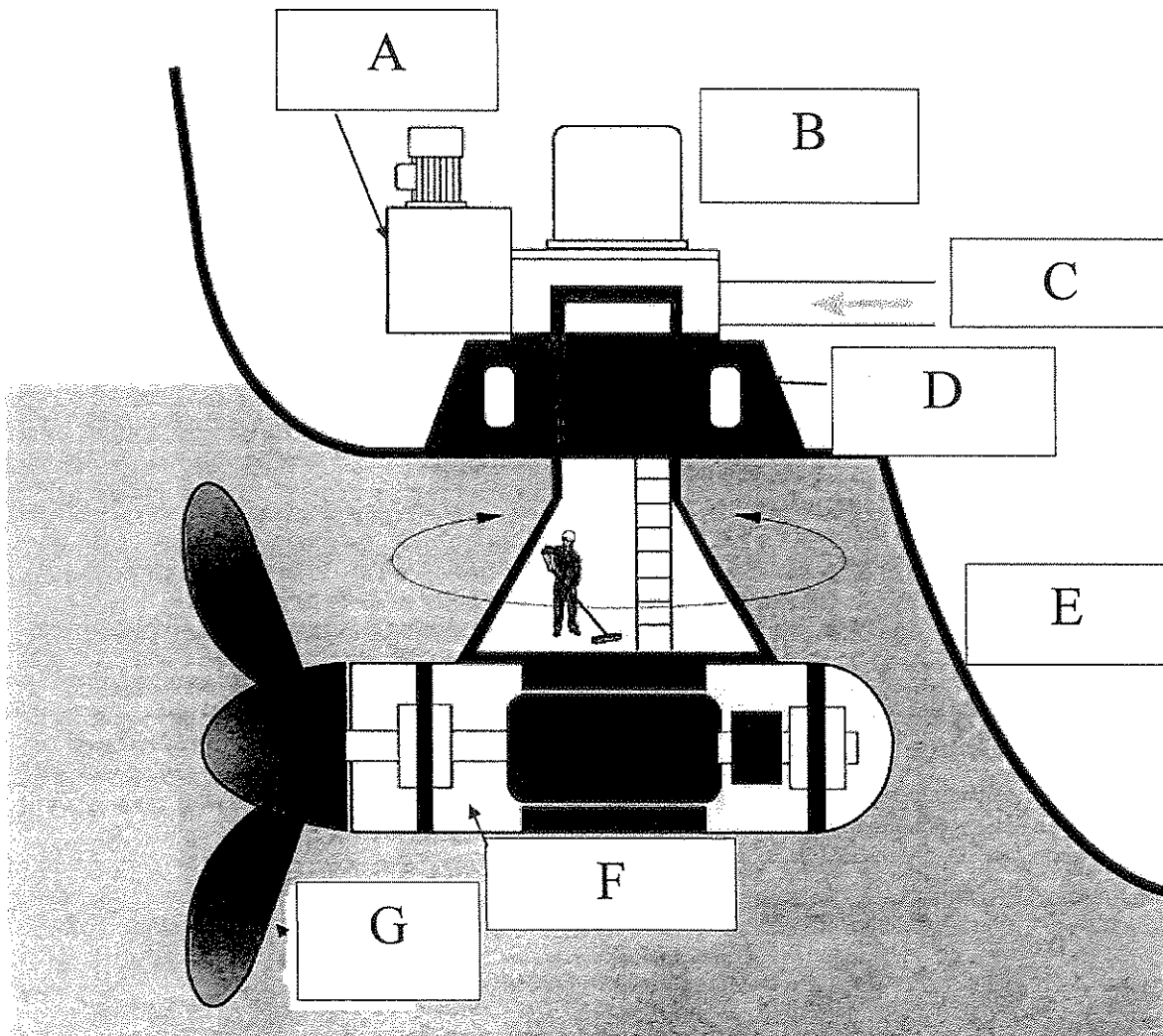


Figure 2

(14 marks)



- (b) Sketch and label the following three phase transformer.
- i. Wye-Delta connection
  - ii. Delta-Wye connection

(6 marks)

- (c) Maintenance need to be carried out on the electrical equipment/system. Explain clearly how you carry out maintenance on the three phase transformer.

(5 marks)

**END OF QUESTION PAPER**

