Indian Maritime University

(A Central University, Govt of India)

Supplementary Examinations – March/April 2024

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4405

Subject Name: Electro Technology

Date: 20.03.2024	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted.
(ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. What is the purpose of grounding electrical systems?
   a) To provide a path for current to flow
   b) To protect against electric shocks
   c) To reduce electrical resistance
   d) To increase energy efficiency

2. When shore power is being connected to a ship in dry dock, _____.

   a) the ship's generators are paralleled with the shore power to provide continuous power
   b) proper phase sequence must be established
   c) exactly 450 volts must be supplied from the shore
   d) exactly 60 Hz must be provided by the terminal

3. What does the term "overloading" mean in electrical safety?
   a) Using too many electrical devices simultaneously
   b) Using energy-efficient appliances
   c) Overcharging a battery
   d) Insulating electrical wires

4. The shipboard general alarm system must receive its main source of power from _____.

a) a storage battery
b) the emergency generator
c) an auxiliary generator
d) the ship's service generator

5. Any electric motor can be constructed to be
a) short proof
b) ground proof
c) explosion proof
d) overload proof

6. Moisture damage, as a result of condensation occurring inside of the cargo winch master switches, can be reduced by

a) installing a light bulb in the pedestal stand
b) coating the switch box internals with epoxy sealer
c) venting the switch box regularly
d) using strip heaters inside the switch box

7. "Open the shore supply breaker at the main switchboard" is the action to take at that point, _____.

a) when shore supply connected to vessel
b) when shore supply needs to be disconnected
c) when main supply needs to be disconnected
d) when emergency supply needs to be connected

8. A suspected "open" in a motor field can be tested by using a/an
a) potentiometer
b) megger
c) wattmeter
d) ammeter

9. When choosing a battery for a particular application, major consideration should be given to the battery's _____.
a) amp-hour capacity
b) terminal polarity
c) stability under charge
d) ambient temperature rise

10. If the excitation of an alternator operating in parallel with other alternators decreased, its

a) Power factor becomes more leading
b) Output KW will change
c) Power factor becomes more lagging
d) Power factor becomes unity

Section B

Five Questions of 02 Marks each

11. Explain the danger associated with the spaces in the vicinity of bus bars.
12. Explain the meaning of the term flame retardant.
13. What is the purpose of an emergency power supply onboard ship?
14. Why high-voltage systems are normally earthed via a resistor?
15. Explain the basic purpose of Safety switches, circuit breakers and fuse.

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. a) Explain protection provided on motors against temperature rise? [6]
b) Explain the basic differences between the following electrical diagrams
1. block diagram
2. system diagram
3. circuit diagram
4. wiring diagram [1+1+1+1]

17. a) Explain the safety and emergency procedures are documented in the ship's safety management system. [5]

b) What are the requirements of emergency power? Explain the automatic starting arrangement for the emergency generator. [5]

18. a) Explain how the presence of earth faults is indicated in a high-voltage system with an earthed neutral. [5]

b) What is the requirement to AVR? Explain the working of AVR with neat and clean block diagram. [5]

19. What are the conditions for Parallel Operation of Alternator? Explain general procedure for paralleling alternators. Enlist the advantages of parallel operating alternators. [10]

20. (a) Describe briefly the principle of the various types of closing mechanism of circuit breakers. [5]

(b) Sketch the layout of a typical ships electrical distribution system, indicating the function of the main parts. [5]

21. What is the topping up procedure for batteries? Explain, how batteries are recharged and the periods during which gassing takes place? [10]

22. How and why high-voltage installations are used on board ships. Explain special characteristics and features of high-voltage installations in comparison with less than 1,000 V.

[10]

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