

Indian Maritime University
(A Central University, Govt of India)

Supplementary Examinations – September/October 2024

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4405

Subject Name: Electro Technology

Date: 07.10.2024	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. Which of the following electrical diagrams are commonly used in industrial control systems to represent the logical relationships between inputs and outputs?
 - a. Block diagram
 - b. Wiring diagram
 - c. System diagram
 - d. Ladder diagram
4. Any electric motor can be constructed to be
 - a. short proof
 - b. ground proof
 - c. explosion proof
 - d. overload proof
5. Electrical leads and insulation on a motor should be painted with

- a. heat-resisting acrylic
 - b. heat-resisting aluminium
 - c. insulating varnish
 - d. insulating white lead
6. The ships with 3-phase, 3-wire, 440 V have their neutral points
- a. isolated from ship's hull
 - b. connected to ship's hull through neutral earthing resistor
 - c. connected to ship's hull using a solid wire
 - d. connected to ship's hull through a coil
7. In the brushless excitation of the alternators, the pilot exciter is _____ and the main exciter is _____.
- a. permanent magnet generator, ac generator
 - b. ac generator, permanent magnet generator
 - c. dc shunt generator, ac generator
 - d. ac generator, dc shunt generator
8. 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
9. A suspected "open" in a motor field can be tested by using a/an
- a. potentiometer
 - b. megger
 - c. wattmeter
 - d. ammeter
10. When four 12 V, 100 Ah batteries are connected in parallel, you will get _____ battery system.
- a. 48 V, 400 Ah
 - b. 48 V, 100 Ah
 - c. 12 V, 400 Ah
 - d. 12 V, 100 Ah

Section B

Five Questions of 02 Marks each

- 11. Define the terms Insulation resistance and dielectric strength.
- 12. Why high-voltage systems are normally earthed via a resistor?
- 13. Explain the meaning of the term flame retardant.
- 14. What do you mean by "Hazardous" and "normally safe" space on tankers?
- 15. Explain the Ingress Protection Rating. What does "IP56" mean?

Section C

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

16. a) State the safety procedures to be adopted on-board when working on electrical Installations. Also discuss the effect of electric shock on human body. [4 + 3 Marks]
b) Why is it vital to determine whether the phase sequence of the incoming shore supply is "correct"? What is the procedure for correcting an improper phase sequence? [3]
17. a) What is isolated neutral system? Give its advantages and disadvantages [5]
b) Explain kW and kVAR load sharing of two alternators running parallelly? [5]
18. a) Explain how the presence of earth faults is indicated in a high-voltage system with an earthed neutral. [5]
b) What are the requirements of emergency power? Explain the automatic starting arrangement for the emergency generator. [5]
19. 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]
20. What is the topping up procedure for batteries? Explain, how batteries are recharged and the periods during which gassing takes place? [10]
21. a) Discuss the working principle of preferential trip using a neat sketch. [6]
b) Explain Vacuum circuit breaker with neat diagram. [4]
22. a) What is the need to AVR. Explain the operation of AVR with neat and clean block diagram. [6]
b) Compare HV system and LV system on board ship. [4]
