

**Indian Maritime University**

**(A Central University, Govt. of India)**

**End Semester Examinations – December 2023**

**Programme Name: B Tech (ME)**

**Semester: VI**

**Subject Code: UG11T3603**

**Subject Name: Marine Electrical Technology**

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Date: 15.11.2023

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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**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 of 01 Mark each – Choose the correct answer as applicable.**

1. Shipboard Generators are normally connected in winding configuration;
  - A) Star
  - B) Delta
  - C) Star - Delta
  - D) Delta – Stator
2. Name the generation and distribution systems that are applicable to all tankers;
  - A) AC single-phase, 2- wire, insulated
  - B) AC 3 – Phase, 3 - wire, insulated
  - C) AC 3 – Phase, 3 - wire, neutral earthed
  - D) DC 2 – Wire, insulated
3. As per International Maritime Regulations (SOLAS), the minimum number of generators for a ship's main electric power system should be;
  - A) 4
  - B) 3
  - C) 2
  - D) 1
4. As per International Maritime Regulations (e.g. SOLAS), the minimum number of generators for a ship's main electric power system should be
  - A) 4

- B) 3
- C) 2
- D) 1

5. Which of the given statement is false with regard to A.C. onboard?
- A) A.C. generation is more expensive than D.C. generation
  - B) A.C. can easily be converted into D.C. with the help of rectifiers
  - C) Wide range of voltages are obtained by the use of transformer
  - D) A.C. has a better power-to-weight ratio
6. The direction of rotation of an Induction motor can be reversed by reversing;
- A) Current to the field winding
  - B) Supply phase sequence
  - C) Polarity of rotor poles
  - D) None of the above
7. The power-factor control during parallel operation of alternators is achieved by;
- A) speed governors
  - B) static capacitors
  - C) Automatic Voltage regulator
  - D) synchronous condenser
8. Enclosure protection for electrical equipment is defined in terms of its opposition to the ingress of;
- A) solid particles
  - B) gaseous particles
  - C) liquids
  - D) solid particles and liquids
9. An induction motor is identical to;
- A) D.C. Compound motor
  - B) D.C. Series motor
  - C) Synchronous motor
  - D) Asynchronous motor
10. In marine industries the high voltage is termed as;
- A) Less than 1000 voltage
  - B) 1000 voltage & above
  - C) 400 voltage & above
  - D) None of the above

### **Section B**

#### **Five Questions of 02 Marks each**

11. What are Navigational lights? Under what convention the Navigational lights are governed?

12. What is meant by Sequential Re-starting onboard ship?
13. Why NER is used in high voltage?
14. State any few advantages of Azipod system of electrical propulsion for ships.
15. What is I.P. Protection?

### Section C

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

- 16.a) What is P.I. Test on High voltage equipment? Justify its importance. (5)  
b) Enumerates the advantages of high voltage system. (5)
- 17.a) Discuss the maintenance checks on shipboard Lead – acid Battery set and battery room. (5)  
b) Draw the electrical power distribution system onboard ship and state the importance of Tie breaker interlock. (5)
18. Explain the working of a Brushless generator on board a ship with a neat sketch and highlight the importance of an AVR in the circuit. (10)
- 19.a) What are the necessary precautions to be observed while fault finding and repairs onboard. (5)  
b) A 10 Amp. Motor operates from a 220volts insulated system. The supply cables have a total impedance of  $0.01\Omega$ . If;  
i) an open circuit fault , ii) an earth fault , iii) a short –circuit fault occurred  
What circuit current would flow in each case? (5)
- 20.a) What would be the ohmic value of an NER to limit the earth fault current to the full load rating of a 2 MW, 0.8 P.F, 3.3 KV, 3 Phase A.C. Generator ? (5)  
b) State few High voltage safety rules and procedures, while working with high voltage equipment. (5)
21. With a neat sketch explain the operation of an EXI barrier unit. (10)
22. Draw a simple sketch and discuss about the ladder diagram importance. (10)

