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

Date: 15.11.2023	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 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 revered 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 0.01Ω. 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)