Indian Maritime University

(A Central University, Govt. of India)

End Semester Examinations –June 2023

Programme Name: B Tech (ME)

Semester: II

Subject Code: UG11T4206

Subject Name: Marine Electrical Power Generation and Distribution

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Date: 07.06.2023 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/Fill in the Blanks/ True or False(T/F) of 01 Mark each – Choose the correct answer for MCQ/Fill with correct answer/Mark (T/F), as applicable. All Questions compulsory.

1. The Desired Electrical supply specification of a Cargo ship is.

a) 415V 50Hz
b) 440V 50Hz
c) 415V 60Hz
d) 440V 60Hz

2. The Emergency Generator & Batteries drive _____ Ship Services.

a) Non-Essential
b) Essential
c) Navigational
d) All

3. The Fleming's Right hand rule is used to understand the principle of a _____.

a) Motor
b) Transformer
c) Relay
d) Generator

4. The _____ is not a part of a DC Generator.

a) Armature
b) Field
c) Commutator
d) Exciter

5. A 3-phase star connected output voltage is ___ times more than that of a single phase?

a) 2
b) 3
c) $\sqrt{3}$
d) $\sqrt{2}$

6. The ship board general alarm system must receive its main source of power

(a) A storage battery
(b) Emergency generator
(c) An auxiliary generator
(d) Ships main service generator

7. Ship's Transformers are _____ cooled.

a) Oil
b) Water
c) Air
d) None of these

8. Interlocks between ship's Main & Emergency generators is provided to avoid___

a) Parallel running
b) Series running
c) Meet less load
d) None of these

9. Which of the following 3-phase connection do not have a Neutral?

a) Star
b) Delta
c) Zigzag
d) None of these

10. In air circuit breaker, the medium employed for extinction of arc is

(a) Helium
(b) Air
(c) Nitrogen
(d) All of the above

Section B

Five Questions of 02 Marks each. All Questions compulsory.

11. Which system of Voltage is adopted for Electric Propulsion? List the Voltage ranges of such Voltages.

12. What are the types of AC Generators based on construction.

13. Describe how a generator is cooled.

14. What is the normal battery rating used in ships? Name the type of battery commonly used in ship.

15. Define Polarity of a Transformer.

Section C

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

16. a) Briefly describe the common sources of Electrical Power in Ships. (5)

b) Name the salient components of the Ship's Power Distribution System.

Why we require more power during Manoeuvring. (5)

17. Sketch a schematic arrangement of a three-phase alternator with star connection. Discuss how to identify various terminals showing a symbolic Terminal Box. (10)

18.

a) Sketch a diagram showing the arrangement of a simple Direct Current (DC) Generator marking the various parts. (5)

b) Explain the working principle of the DC Generator. (5)

19. Draw a neat system diagram of a Ship's Electrical distribution system and mark the parts. (10)

20. Show diagrammatically the connections between the main switchboard and the main distribution board through:

(i)

(a) Delta-delta transformers. (4)

(b) Delta-star transformers. (4)

(ii) What is the primary to secondary voltage ratio relations in both above cases? (2)

21. Explain briefly the following: -

(i) a Single line or one-line diagram. (5)

(ii) a Schematic or elementary diagram. (5)

22. (a) Explain the need for shore supply and with neat sketch explain shore supply connection box and procedures to be followed. (7)

(b)Write a note on pod type propulsion used in ships. (3)