

Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – June 2024

Programme Name: B.Tech(Marine Engineering)

Semester: II

Subject Code: UG11T4206

Subject Name: Marine Electrical Power Generation and Distribution

Date: 12.06.2024 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 of 01 Mark each – Choose the correct answer as applicable. (10x1 = 10 Marks)

1. A D.C. generator works on the principle of
 - (a). Lens's law
 - (b). Ohm's law
 - (c). Faraday's law of electromagnetic induction
 - (d). none of the above
2. If blackout happens, Emergency Switchboard will be fed from:
 - (a). Main Switchboard
 - (b). Emergency Generator
 - (c). Storage battery
 - (d). Shaft Generator
3. The main purpose of interlock between MSB and ESB is _____
 - (a). Disconnect main generator
 - (b). Disconnect emergency generator
 - (c). To connect only one generator at a time
 - (d). To connect both main and emergency generator

4. The phase displacement between any two windings of a three-phase alternator is _____
 - (a). 90°
 - (b). 120°
 - (c). 180°
 - (d). 360°

5. Which of the following 3-phase connection have a Neutral?
 - (a). Star
 - (b). Delta
 - (c). Zigzag
 - (d). None of these
6. Which material is used to construct armature core of alternator?
 - (a) Spring steel (b) Mild steel (c) Silicon Steel (d) Forged steel
7. Which is the condition for parallel operation of 3-phase alternator?
 - (a) Frequency must be same
 - (b) Voltage must be different
 - (c) Sequence must be different
 - (d) Polarity must be different
8. For the three phase transformer, which of the following statement is true?
 - a) True ratio = line voltage ratio
 - b) True ratio = phase voltage ratio
 - c) True ratio = $\sqrt{3}$ phase voltage ratio
 - d) True ratio = $\sqrt{3}$ lines voltage ratio
9. What is the location of Emergency generator room on board ship?
 - (a) Forward of forward collision bulkhead
 - (b) Above the upper continuous deck
 - (c) Inside the machinery space
 - (d) All of the above
10. When charging lead-acid batteries, you should reduce the charging rate as the battery nears its full charge capacity to.
 - (a) Prevent excessive gassing and overheating
 - (b) Allow equalization of cell voltages
 - (c) Reduce lead sulphate deposits
 - (d) Increase lead peroxide formation

Section B

- Five Questions of 02 Marks each (5x2=10)**
11. What is the importance of DC excitation system in alternator?
 12. List the equipments which get supply from emergency generator?
 13. What are the advantages of using High Voltage onboard ships?
 14. Describe how a generator is cooled.

15. Define phase sequence of a three-phase supply. When do we check it mostly?

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered. (5x10=50)

16. (a) Draw the electrical power distribution system onboard ship and state the importance of The breaker interlock. (5)
(b) What are different fault in Electrical? what are different Electrical maintenance? (5)
17. a) Derive the expression for RMS value of ac sinusoidal voltage in terms of peak value. (5)
b) With Suitable diagram describe the operation of shaft generator. (5)
18. Discuss in detail constructional features of a DC Generator with neat sketch and also label the essential parts. (10)
19. a) Compare Salient pole type and smooth cylindrical type rotor of Synchronous Generator. (5)
b) Compare core type and shell type transformer (5)
20. a) Explain the need for shore supply. With neat sketch explain shore supply connection box and procedures to be followed. (7)
b) Explain why heaters are fitted to a generator. (3)
21. Explain briefly the following: -
a) Single line or one-line diagram. (5)
b) Schematic or elementary diagram. (5)
22. (a) Discuss the maintenance checks on shipboard lead – acid Battery set and battery room. (5)
(b) Sketch a schematic arrangement of a three-phase alternator with star connection and highlight the Importance of an AVR in the circuit. (5)