

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations – December 2022**  
**Programme Name: B Tech (ME)**  
**Semester: II**  
**Subject Code: UG11T4206**

**Subject Name: Marine Electrical Power Generation and Distribution**

Date: 02.12.2022

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. In Fleming right hand rule is mainly used to find
  - (a) Direction of motion of conductor
  - (b) Direction of magnetic field
  - (c) Direction of induced emf
  - (d) All of the above
2. In a DC generator, commutator is mainly used to
  - (a) Convert alternating current to direct current
  - (b) Collect current generated in armature conductors
  - (c) Increase magnetic flux
  - (d) Increase ampere turns in the field winding
3. Which of the following is true about core type transformer compared to shell type transformer is INCORRECT
  - (a) Core surrounds considerable part of winding
  - (b) It is more suitable for high voltage
  - (c) The coil is form wound and are of cylindrical type
  - (d) The mean length of the coil is shorter
4. Transformer is rated in kVA instead of kW because
  - (a) Load Power factor not known
  - (b) Load takes only KVA power
  - (c) Losses depend only on KVA
  - (d) All of the above
5. Power factor of a DC circuit is always
  - (a) Zero
  - (b) Less than unity
  - (c) Unity
  - (d) Greater than unity

6. In a AC circuit, low value of kVAR compared to kW indicates
  - (a) Low efficiency
  - (b) High power factor
  - (c) High current
  - (d) Unity power factor
7. In ships AC system is preferred over DC system because
  - (a) Easy to generate
  - (b) High power to weight ratio
  - (c) Cheaper
  - (d) All of the above
8. 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
9. In air circuit breaker, the medium employed for extinction of arc is
  - (a) Helium
  - (b) Air
  - (c) Nitrogen
  - (d) All of the above
10. The Symbol given below represents



- (a) Generator
- (b) Motor
- (c) Transformer
- (d) Circuit breaker

### **Section B**

Five Questions of 02 Marks each

11. Write the advantages of Carbon brushes
12. What are the two types of Alternator based on construction?
13. Define transformer and state why its efficiency is high.
14. What is the normal battery rating used in ships? Name the type of battery commonly used in ship.
15. What is a circuit breaker? Name any one type of CB used in ship

### **Section C**

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

16. (a) What are the types of DC Generators – brief with suitable diagrams. (7marks)  
(b) Write the EMF expression of DC generator defining all terms (3marks)
17. (a) Derive the RMS value, average value, form factor and peak factor for ac sinusoidal voltage (10 Marks)
18. (a) Explain brushless excitation system for an alternator used in ship (7marks)  
(b) Why do generators need cooling? (3marks)
19. (a) Explain the working of star delta and delta delta transformer with suitable diagram. (7marks)  
(b) What are the types of transformers based on construction? (3marks)
20. (a) Explain Ships Electrical Power distribution system with a neat single line diagram. (10marks)
21. (a) Explain the working of a rotating field type three phase alternator with neat sketch. (7marks)  
(b) Write the expression for frequency of EMF generated in alternator. (3marks)
22. (a) Explain the need for shore supply and with neat sketch explain shore supply connection box and procedures to be followed. (7marks)  
(b) Write a note on pod type propulsion used in ships. (3marks)

