

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2023
Programme Name: B.Tech (ME)
Semester: II
Subject Code: UG11T4206

Subject Name: Marine Electrical Power Generation and Distribution

Date: 18.11.2023

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.
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Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

- Q1. In general, Supply Voltage and frequency of merchant ship is:
- a) 440 V Ac 3 Phase and 60 Hz
 - b) 110 V Ac 3 Phase and 60 Hz
 - c) 220 V AC 3 phase and 50 Hz
 - d) 220 V AC 1 phase and 50 Hz
- Q2. 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
- Q3. Minimum protections provided in breakers are:
- a) Overload and short circuit
 - b) Overload and open circuit
 - c) Short circuit and open circuit
 - d) Open circuit and earth fault

Q4. If blackout happens, Emergency Switchboard will be fed from:

- a) Main Switchboard
- b) Emergency Generator
- c) Storage battery
- d) Shaft Generator

Q5. The interlock between MSB and ESB ensures that:

- a) The MSB should not feed the ESB
- b) The ESB should not feed the MSB
- c) ESB should feed the MSB
- d) Main generator should feed directly to ESB

Q6. Safeties incorporated with MSB are:

- a) Reverse Power protection
- b) Preferential trips
- c) Under voltage protection
- d) All of the above

Q7. General faults in distribution system are:

- a) Earth fault
- b) Overload fault
- c) Short Circuit fault
- d) All of the above

Q8. The purpose of safety devices in distribution system is to:

- a) Automatically connect source with services during fault
- b) Automatically disconnect source with services during fault
- c) Display the readings of supply
- d) To manually switch on and off during fault

Q9. Advantage of AC supply over DC supply is:

- a) Can be stepped up
- b) Can be easily converted to mechanical power
- c) Can be stepped down
- d) All of the above

Q10. What principal does alternator follow, Select the correct option?

- a) Rotating field and fixed armature

- b) Rotating Armature and fixed field
- c) Rotating field and rotating armature
- d) Fixed field and fixed armature

Section B

Five Questions of 02 Marks each (5x2 marks=10 Marks)

- Q11. Name the 4 types of breakers as per arc extinction method.
- Q12. Define the term transformation ratio (K) of transformers
- Q13. What are the Advantages of High Voltages system?
- Q14. What is the importance of DC excitation system in alternator?
- Q15. Differentiate the wiring and schematic diagrams of electrical circuits.

Section C

Solve any 05 questions

Q.16

- a) Draw the Power Distribution arrangement on board showing Gens, breakers, main & emergency switchboard, transformers, Shore supply and storage battery. (7 marks)
- b) What is the importance of breaker interlock between Main and emergency switchboard. (3 marks)

Q.17

- a) Explain the working of star delta and delta delta transformer with suitable diagram. (8 marks)
- b) How is the efficiency of a transformer measured. (2 marks)

Q.18

- a) With a neat sketch, explain the working of an alternator. (6 marks)
- b) Write a short note on following: - (4 marks)
- 1) Stator 2) cylindrical & salient Rotor 3) Governor 4) Cooling arrangement

Q.19

- a) Describe the rotary and static exciters. (5 marks)

- b) Explain brushless excitation system for an alternator used in ship. (5 marks)

Q.20

- a) Make a drawing of DC generator showing rectangular coil, commutator and brushes explain the working of it. (7 marks)
- b) Derive an EMF equation of a DC generator. (3 marks)

Q21

- a) With suitable sketch explain the Shore supply box. (8 marks)
- b) What is the consequence if shore supply sequence is not matched? (2 marks)

Q22.

- a) What are the essential services fed from Emergency Switch board. (3 marks)
- b) Name any two methods by which emergency gen. is cranked. (1 mark)
- c) Give reasons for followings: - (6 marks)
- 1) EG & Emergency switch board are installed away from Engine room
 - 2) Kw rating of EG is smaller when compared with main Generators
 - 3) EG cannot be paralleled with main Generators.