

**Indian Maritime University**  
**(A Central University, Govt. of India)**

**End Semester Examinations – June 2023**

**Programme Name: B Tech (ME)**

**Semester: VI**

**Subject Code: UG11T3603**

**Subject Name: Marine Electrical Technology**

Date: 31.05.2023

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted.

Section A

**Ten MCQs of 01 Mark each – Choose the correct answer as applicable. (10 x 1 = 10 Marks)**

- 1) Emergency generator on board ship should come on load automatically after the failure of main power supply within:
  - A) 45 sec.
  - B) 40 sec.
  - C) 1 Min.
  - D) 50 sec.
- 2) Which of the following results in a symmetrical fault?
  - A) Single-phase-to earth
  - B) Phase-to-phase fault
  - C) All the three phases-to earth
  - D) Two phase-to earth
- 3) Circuit Breaker are used for
  - (A) Over Current
  - (B) Remote Operation
  - (C) Short Circuit
  - (D) NONE
- 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) In most cases, the output voltage of the emergency generator is;
  - A) half that of the main generator
  - B) double that of the main generator
  - C) 1.25 times that of the main generator
  - D) same as that of the main generator
- 6) If any two phases for an induction motor are inter-changed;
  - A) The motor will run in the reverse direction
  - B) The motor will continue to run in the same direction
  - C) The motor will stop
  - D) The motor will Burn
- 7) Which of the following medium is employed for extinction of arc in air circuit breaker?
  - A) Water
  - B) Oil
  - C) Air
  - D) Cooling gas
- 8) In marine industries the high voltage is termed as;
  - A) 660 voltage
  - B) 1kV voltage & above
  - C) 900 voltage
  - D) 440 voltage
- 9) Which of the following types of motor enclosure is safest;
  - A) Totally enclosed
  - B) Totally enclosed fan cooled
  - C) Open type
  - D) Semi closed
- 10) Identify the false statement with regard to shore-supply.
  - A) A shore supply is required so that the ships generators and their prime movers can be shut down for major overhaul during a dry dock period.
  - B) Ship generators are disconnected from the Main Switch Board before allowing shore supply.
  - C) The frequency and voltage of shore supply should match with the ship's electrical distribution system and in case of mismatch the V/F ratio is maintained.
  - D) The phase sequence of shore supply is checked after closing the circuit breaker between main switch board and a.c. shore supply.

Section B

21) A cage rotor type of induction motor got flooded with sea water. When measured, the insulation resistance found to be 200 ohms. What is to be done to put back the motor into service? Write in sequence. (10)

22) Draw a simple diagram of shore power supply connected to Emergency or Main switchboard with safety devices. And discuss about; (3+3+4)  
 a) Importance of Phase sequence  
 b) different voltage & frequency of shore power supply.

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(Each Question of 02 Marks) (5 x 2 = 10 Marks)

- 11) How the surveyor verifies the proper working operation of Navigation lights, during electrical survey?
- 12) Why protection equipment is essential in an electrical distribution system?
- 13) What precautions to be taken while testing the insulation of generator cables and wiring connected to an AVR unit?
- 14) Why the sequential starting operation on aboard ship is important?
- 15) What are the Electrical hazards associated with high voltage system?

Section C

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

- 16 a) Draw a suitable circuit diagram and explain the emergency battery set in charging operation and connected to Emergency lighting load, on loss of main power source. (5)  
 b) What is single phasing phenomena, in case of a 3-phase induction motor? And write the reasons of occurrence. (5)
- 17) Draw and explain the Rotary Excitation (with AC exciter) – Brushless excitation scheme diagram. What is likely to happen if one of the rotating diodes fails and becomes:  
 a) an open circuit?  
 b) a short-circuit? (3+3+2+2)
- 18) What are the major selection criteria's of motors (AC or DC) for electrical propulsion? (10)
- 19 a) State the hazards of High voltage and explain the safety precautions to be taken while working on high voltage system. (5)  
 b) What is duster test on high voltage equipment? And justify why it is necessary. (5)
- 20a) What would be the ohmic value of an NER to limit the earth fault current to the full load rating of a 4 MW, 0.8 P.F., 6.6 KV, 3 Phase AC generator? (5)  
 b) Define switchgear in electrical power system scheme. (5)