Indian Maritime University

(A Central Unive2rsity, Govt of India)

Sep/Oct'25 SE

Programme Name: B Tech (Marine Engineering)

Semester: V

Subject Code: UG11T4508

Subject Name: Marine Electrical Motors: Starters & Drive Controls

Date: 15.10.2025	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. (10x1=10 Marks)

1. Which of the following motors, on removal of load, will run at the highest speed?
A) Shunt motor
B) Series motor
C) Differential compound motor
D) Cumulative compound motor

2. Why starters are required in induction motor?
A) because of low starting torque
B) because they are not self-starting
C) because of the high starting torque
D) because of the high starting current

3. What is the difference between an overload and a short circuit?
A) An overload involves gradual current increase, while a short circuit is a sudden surge.
B) An overload occurs in faulty equipment, while a short circuit happens outside equipment.
C) An overload causes overheating, while a short circuit results in sparking.
D) All of the above.

4. Two stator winding of AC servomotors are oriented
A) 90^0 mechanical apart
B) 90^0 electrical apart
C) 180^0 mechanical apart

D) 180^0 electrical apart

5. The oscillations in a synchronous motor can be damped out by?
A) maintaining constant excitation
B) running the motor on leading power factors
C) providing damper bars in the rotor pole faces
D) oscillations cannot be damped

6. Windings of star-delta starter while starting and during running are connected in
A) Star, delta
B) Delta, delta
C) Star, star
D) Delta, star

7. Which is the following is not used for making variable frequency design drives?
A) Phase controller
B) Pulse-width modulation
C) Controlled Current source
D)Frequency controller

8. What is the remedy for damaged motor bearing
A) Wash it
B) Grease it
C) Repair it
D) Replace it

9. Which of the following thing must keep in mind during Plugging?
A) Change phase sequence - When motor reached near zero speed
B) Disconnect Supply - When the motor reached a synchronous speed
C) Change phase sequence - When the motor reached a synchronous speed
D) Disconnect Supply - When motor reached near zero speed

10. The starting torque of a three-phase induction motor can be increased by
A) increasing slip
B) increasing current
C) both (a) and (b)
D) none of the above

Section B

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

11. Explain what is meant by single phasing.
12. What are the main components of DC servomotor?
13. What is Motor Enclosure? State types of Motor Enclosures.
14. State factors determining the speed of dc motor.
15. What are the most common causes of failure insulations in electrical motors.

Section C

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

16. a) Explain the following motor enclosure, describing how cooling is achieved in each case: a) Drip-proof b) totally enclosed c) flameproof. [6]

    b) Describe in brief information displayed on motor nameplate. [4]

17. a) Draw & Explain Star Delta method of starting in ac motors. [5]

    b) Explain the principle of a variable – frequency motor with suitable diagram [5]

18. a) Draw & explain the principle of a thermal relay, including the means of its adjustment. [5]

    b) With suitable diagram describe Why Synchronous motor is not self-starting motor. [5]

19. a) Describe any 2 electrical braking methods of 3 phase induction motor. [5]

    b) Brief the principle of Ward-Leonard drive with suitable diagram. [5]

20. Describe the application of two-phase ac servomotor, explaining how its characteristics can be varied. [10]

21. a) With suitable diagram explain IGBT motor speed control by means of PWM method. [5]

    b) The armature and shunt field resistance of a four-pole, lap wound DC shunt motor is 0.05 ohm and 25 ohms respectively. If its armature contains 500 conductors, find the speed of the motor when it takes 120 A from a DC mains of 100 V supply. Flux per pole is $2 \times 10-2$ Wb. [5]

22. How important is the electrical motor overhauling on ships? Describe in brief procedure for motor overhauling. [10]