Indian Maritime University

(A Central University, Govt of India)

Supplementary Examinations – March/April 2024

Programme Name: B.Tech(Marine Engineering)

Semester: V

Subject Code: UG11T4508

Subject Name: Marine Electrical Motors: Starters & Drive Controls

Date: 04.04.2024	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. High inrush of current during a starting of a dc motor can efficiently be restricted to a safer value by increasing the _____ resistance.
   A) Shunt field
   B) Armature circuit
   C) Both a and b
   D) None of these

2. Induction motors normally
   A) The stator winding is connected to ac supply and the rotor winding is short-circuited
   B) The rotor winding is connected to ac supply and the stator winding is short-circuited
   C) Both the stator and rotor windings are connected to ac supply
   D) Stator winding is connected to ac supply and rotor winding to dc supply

3. The breaking current of a circuit breaker is
   A) Less than its making current
   B) More than its making current
   C) Equal to its making current
   D) None of the other options

4. What is the main component of a servo motor that allows it to control its position?
   A) The motor
   B) The controller
   C) The feedback sensor

D) The power supply

5. In regeneration breaking, the motor energy is
   A) Dissipated in armature heating
   B) Dissipated in windage losses
   C) Returned to the supply mains
   D) None of the above

6. On open circuiting the rotor of a squirrel cage induction motor, the rotor
   A) Makes noise
   B) Will overheat
   C) Does not run
   D) Runs at dangerously high speed

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. In which of the following region induction motor operation is stable?
   A) Low Slip region
   B) High slip region
   C) Any of the two
   D) None of the above

9. Which one of the following motors can be run under a wide range of both leading and lagging?
   A) 3-phase Induction motor
   B) Synchronous motor
   C) 1-phase Induction motor
   D) DC shunt motor

10. Ward Leonard speed control method provides speed control
   A) In one direction only
   B) In both direction
   C) Above rated speed
   D) Below rated speed

Section B

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

11. State the meaning of all the information displayed on motor name plate.
12. Give a brief on DC compound motor.
13. What is the Effect of varying frequency on A.C. motors?
14. State a few applications of ac servomotor.
15. Why are under-voltage trips necessary for induction motors?

Section C

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

16. a) Draw and explain Autotransformer Starting in AC motors. [5]

    b) What is Slip? Describe importance of slip in an Induction Motor. [5]

17. a) Explain what is meant by single phasing and its effect on motor performance. [5]

    b) With suitable diagram explain IGBT motor speed control. [5]

18. What is a Servomotor? Describe the working of an AC Servo motor using a neat diagram. List their advantages and disadvantages. [10]

19. a) Describe the principle of Ward-Leonard drive with suitable diagram. [5]

    b) Explain the different types of electrical faults developed in Motors. [5]

20. a) Describe the principle of thermal relay, including the means of its adjustment. [5]

    b) With suitable diagram describe how a Synchronous motor can be used as a Synchronous condenser. [5]

21. a) Describe the most common causes of failure of insulation. [3]

    b) Describe procedure to check insulation resistance of a 3-phase induction motor. [4]

    c) Explain the purpose of under voltage protection of generators and motors. [3]

22. a) How to carry out motor starter panel maintenance? [5]

    b) Give a brief procedure for motor overhauling. [5]