

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations – June 2023**  
**Programme Name: B Tech (NAOE)**  
**Semester: II**  
**Subject Code: UG12T2204**  
**Subject Name: Basic Electrical Engineering**

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Date: 02.06.2023

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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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. If the elements are connected in series, then \_\_\_\_\_ is same through each element.
2. The direction of current in armature conductors of DC Generator is found using \_\_\_\_\_ rule.
3. The Superposition theorem is applied to the network consisting of \_\_\_\_\_ sources. [1M]
4. The flux in a DC Shunt motor is \_\_\_\_\_.
5. The line current is \_\_\_\_\_ of phase current in a 3 $\Phi$  Delta Connected network.
6. At the starting of the 3 $\Phi$  Induction motor, the value of slip is equal to \_\_\_\_\_.
7. The starting torque of a slip ring induction motor is \_\_\_\_\_ than the squirrel cage induction motor.
8. Transformer core is laminated in order to reduce \_\_\_\_\_ losses.
9. The primary and secondary windings of the auto transformer are \_\_\_\_\_ isolated.
10. The transmission losses in distributed generation is \_\_\_\_\_ than that of the conventional generation.

### Section B

Five Questions of 02 Marks each

11. State Kirchhoff's Laws.
12. Draw the Speed-Torque Characteristics of DC Series Motor.
13. Draw the circuit diagram for measuring the power in a 3 $\Phi$  delta connected network using three wattmeter method.
14. Explain the advantages of having stationary armature in the alternators.
15. Differentiate between AC and DC transmission.

### Section C

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

16. Find the Power consumed by each resistor in the given circuit shown in Fig.1 using nodal analysis.

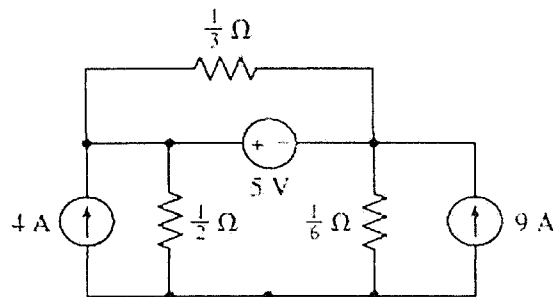


Fig. 1

17. (a) Derive the condition for the maximum power to be transferred to the load. (7 marks)  
(b) Derive the expression for maximum power (3 marks)
18. Explain the construction of DC machine in detail with a neat sketch.
19. Derive the expression for the Power in a 3 $\Phi$  network using two wattmeter method and also derive the expression for phase difference for the same.
20. A 4-pole, 440v, 50Hz, 3 $\Phi$  induction motor is running at 1440 rpm. Calculate, the synchronous speed, the slip speed, the slip in percentage, the slip at the starting in percentage and the rotor frequency.
21. Explain the OC Test and SC Test in a transformer in detail.
22. Explain the generation of hydroelectric power with neat sketch. What are the advantages and disadvantages of hydroelectric power plants?