

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations – June 2023**

**Programme Name: B Sc (NS)**

**Semester: II**

**Subject Code: UG21T5202**

**Subject Name: APPLIED PHYSICS & ELECTRICITY**

Date: 26.05.2023

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.
- (iii) Scientific Calculator is permitted.
- (iv) (Norrie's Table, Nautical Almanac, Hindship Hyd. Particulars, Weather coding booklet, Tide Tables, permitted as per the subject concerned)
- (v) (World Map, Tidal curve, Radar Plotting sheets, Charts, Illumination range curve chart will be supplied by the Examination Centre)

**Section A**

1. Thermistor has the property of

- a) no resistance
- b) positive temperature coefficient
- c) negative temperature coefficient
- d) zero temperature coefficient.

2. Which of the following states that an emf is induced whenever there is a change in the magnetic field linked with electric circuits?

- a. Lenz's Law
- b. Ohm's Law
- c. Faraday's Law of Electromagnetic Induction
- d. None of the above

3. What is the frequency of ac mains in India?

- a. 120 Hz
- b. 60 Hz

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- c. 50 Hz
- d. 30 Hz

4. In Alternating current, the direction and magnitude of the current varies

- a) Randomly
- b) Periodically
- c) exponentially
- d) do not vary.

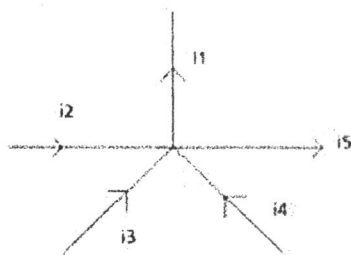
5. A bridge circuit is used for the measurement of which of the following components?

- a) Resistance, capacitance, and inductance
- b) Diode, triode, and thyristor
- c) Transistor, thermistor, and antenna
- d) LED, op amp, and transducer

6. What is applied to the two opposite junctions of a bridge circuit?

- a) source of voltage
- b) source of current
- c) source of power
- d) source of impedance

7. Relation between currents according to KCL is



- a)  $i_1 = i_2 = i_3 = i_4 = i_5$
- b)  $i_1 + i_4 + i_3 = i_5 + i_2$
- c)  $i_1 - i_5 = i_2 - i_3 - i_4$
- d)  $i_1 + i_5 = i_2 + i_3 + i_4$

8. The commutator segments are connected to the armature conductors by means of

- a) copper legs
- b) resistance wires
- c) insulation pads
- d) brazing.

9. Armature reaction in a generator results in

- a) Demagnetization of leading pole tip and magnetization of trailing pole tip
- b) Demagnetization of trailing pole tip and magnetization of leading pole tip
- c) Demagnetizing the center of all poles

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d) Magnetizing the center of all poles

10. In an experiment, it is found that the experimental value is very close to actual value, hence the experimental value can be called \_\_\_\_\_

- a) Accurate
- b) Precise
- c) Suitable
- d) Mean

### **Section B**

**5×2=10**

Five Questions of 02 Marks each

- 11. Define Coupling Coefficient.
- 12. Define quality factor of resonance in series RLC circuit.
- 13. Write any two applications of Wheatstone bridge.
- 14. What are the factors that cause heating effect of electric current?
- 15. Write any four types of temperature measurement sensors.

### **Section C**

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

- 16. (a) Explain Electromagnetic induction 7M  
(b) Explain Lenz's law 3M
- 17. (a) Compare AC and DC Voltages 5M  
(b) Write electrostatic precautions for "Electrostatic charge by petroleum" ship board application? 5M
- 18. (a) Explain Kirchhoff laws with a diagram? 5M  
(b) Explain active and passive elements in a network 5M
- 19. Explain principal of working of induction motor and its applications? 10M
- 20. Explain heating effect of current and uses of fuses? 10M
- 21. Explain with a diagram about Wheatstone bridge, its principal of operation, derivation for finding an unknown resistance. 10M
- 22. Write about the following (2.5 × 4 = 10)
  - A. Precision
  - B. Fluid flow
  - C. Thermistor
  - D. Sound level meter

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