Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2022

Programme Name: B Sc (NS)

Semester: II

Subject Code: UG21T5202

Subject Name: APPLIED PHYSICS & ELECTRICITY

Date: 28.11.2022	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.

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?

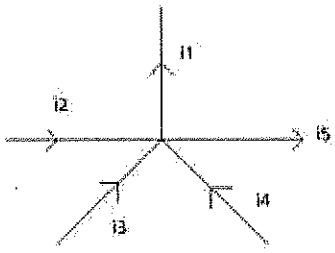
a. 120 Hz
b. 60 Hz
c. 50 Hz
d. 30 Hz

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

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

11. Define Electromagnetic induction.

12.Define Resonant frequency of series R-L-C circuit.

13. Write down the bridge balance condition of an a.c circuit.

14.State the Principle of AC generator.

15.Define Transducer.

Section C

Answer five out of seven questions.

16.a) Define Mutual induction. (3)

b) If a coil of 150 turns is linked with a flux of 0.01Wb when carrying a current of 10 A. calculate the inductance of the coil. If this current is uniformly reversed in 0.1 second. calculate the induced emf. If a second coil of 100 turns is uniformly wound over the first coil. Find the mutual inductance between the coils. (7)

17.a) Define Power factor of an ac circuit. (3)

b) The coil having a resistance of 10 ohm and an inductance of 0.2 H is connected to a 100 V -50 hz power supply. Calculate

i) impedance of the coil

ii) reactance of the coil. (7)

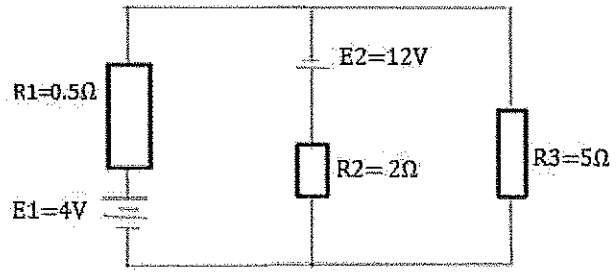
18. a) Define Quality factor of a coil. (3)

b) **Resistances** of the ratio arms of a Wheatstone bridge are 300 Ω and 30Ω. The fourth arm is connected to an unknown resistor. Find the value of the unknown resistance if the third arm has a resistance of 250Ω in a balanced condition? (7)

19. a) State the difference between an ac generator and Dc generator. (3)

b) Discuss in detail the working of series and shunt type DC motor. (7)

20. a) Determine using kirchoff's laws, each branch current for the given network (7)



b)State Kirchoff current law. (3)

21. a) Define Accuracy and precision. (3)

b) Explain with principle, how the venturi tube works with a neat diagram. (7)

22. Why does lightning push electricity through air, but common batteries do not? (10)