

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2023
Programme Name: B.Sc (NS)
Semester: II
Subject Code: UG21T5202
Subject Name: APPLIED PHYSICS & ELECTRICITY

Date: 14.11.2023

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.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. If a 24 V and a 10 V battery are series opposing, the total voltage is
 - a) 12 V
 - b) 10v
 - c) 24v
 - d) 34v
2. The SI unit of power is _____.
 - a) Joule
 - b) Ampere
 - c) Watt
 - d) Ohm
3. The instruments used for the measurement of pressure
 - a) Bellows
 - b) Diaphragms
 - c) Fiber optic pressure sensors
 - d) All of these
4. Which of the following represents Reynolds number for laminar flow?
 - a) Less than 2000
 - b) Greater than 4000
 - c) Infinite
 - d) None of the mentioned

5. What is the consequence of motor effect?
- a) Current
 - b) Voltage
 - c) Electromagnetic induction
 - d) EMF
6. What does emf stand for?
- a) Electronic magnetic force
 - b) Electromotive force
 - c) Electromagnetic force
 - d) Electromated force
7. The direction of induced e.m.f. can be found by
- a) Laplace's law
 - b) Lenz's law
 - c) Fleming's right hand rule
 - d) All of the above
8. The unit of frequency is
- a) Hertz
 - b) Hertz/cycle
 - c) Cycle
 - d) cycle/sec
9. In liquid in steel bulb thermometer, which liquid can be used for measuring temperature up to 6000°C ?
- a) Mercury
 - b) Ether
 - c) Water
 - d) None of the mentioned
10. Condition for resonant Frequency
- a) $X_L = X_C$
 - b) $X_L > X_C$
 - c) $X_L < X_C$
 - d) None

Section B

Five Questions of 02 Marks each

11. Define coefficient of coupling
12. Define Resonant frequency of series R-L-C circuit.
13. Write the Balance condition for the bridge
14. Define R.M.S. value of an AC
15. Define Power factor and quality factor

Section C

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

16. a) State the faraday's laws of electromagnetic induction (5 Marks)
b) Derive an expression for self and Mutual Inductance? (5 Marks)
17. a) Define form factor and peak factor of AC. (5 Marks)
b) A coil takes a current of 6 A when connected to a 24-V d.c. supply. To obtain the same current with a 50-Hz a.c. supply, the voltage required was 30 V. Calculate (i) the inductance of the coil (ii) the power factor of the coil. (5 Marks)
18. Explain with a neat sketch, principle, construction and working of AC generator.
(10 marks)
19. a) Explain Kirchhoff laws with a diagram? (5 Marks)
b) Explain active and passive elements in a network (5 Marks)
20. a) Write any two methods for temperature measurements (5 Marks)
b) Difference between series and shut type dc motor (5 Marks)
21. a) what is meant by static electricity? Explain the various causes of Static Electricity (5 Marks)
b) A series RLC circuit containing a resistance of 12Ω , an inductance of 0.15H and a capacitor of $100\mu\text{F}$ are connected in series across a 100V , 50Hz supply. Calculate the total circuit impedance, the circuit's current, power factor and draw the voltage phasor diagram. (5 Marks)

22. a) What is a thermistor? Discuss its application as a heat sensor with neat labelled diagram. (5 marks)

b) Define and explain accuracy and precision. State the difference between them. (5 Marks)

TAM