

SECTION B – (2 x 5 = 10 marks)

ANSWER ANY TWO QUESTIONS

16. Distinguish the advantages and disadvantages of Ultrasonic waves.
17. Illustrate the molecule theory of surface tension.
18. State and explain first law of thermodynamics.
19. Explain what circuit break with its merits is.
20. State and explain the De Morgan's Theorem.

SECTION C – (5 x 10 = 50 marks)

ANSWER ALL QUESTIONS

21. A Explain how the AC frequency is measured using sonometer.
OR
B Explain the applications of ultrasonic wave.
22. A Estimate the expression for bending moment.
OR
B Determination of Rigidity Modulus by Torsional Pendulum.
23. A Describe Linde's process of liquefying air.
OR
B Illustrate change of entropy in reversible and irreversible process.
24. A Explain the various types of switches.
OR
B Explain and state Biot-Savart's Law.
25. A Brief out the basic logic gates with neat diagram.
OR
B Elaborate about the Digital India.

Four Pages

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END SEMESTER EXAMINATION NOV/DEC-2023

First Semester

B.Sc MATHEMATICS

ELECTIVE COURSE I – ALLIED PHYSICS – I

Time: Three Hours

Maximum: 75 marks

SECTION A – (15 x 1 = 15 marks)

ANSWER ALL QUESTIONS

1. The frequency of ultrasonic sound is _____.
A <2,000 Hz B >2,000 Hz
C >20,000 Hz D <20,000 Hz
2. What is the speed of transverse waves on a rope of length 3 meters and mass 0.09 kg under a tension of 300 N?
A 101 ms^{-1} B 100 ms^{-1}
C 102 ms^{-1} D 103 ms^{-1}
3. Which one of the following statement is correct, when $n \propto 1/l$?
A When length and linear density is constant B When tension and linear density is constant
C When length and tension is constant D When length alone constant
4. What is the unit of stress?

- A Nm^{-2} B Nm^{-1}
 C Nm D Nm^{-3}

5. Which one of the following statement is correct for the bending of beam?

- A Whose length is smaller than its thickness B Whose length is greater than its thickness
 C Whose length is equal to thickness D Whose length is fixed constant

6. The unit for coefficient of viscosity is _____.

- A Pascal Second B Pascal
 C Newton D Newton Second

7. Which law states that if two systems are in thermal equilibrium separately with a third system, then they must be in thermal equilibrium with each other?

- A Zeroth law B First law
 C Second law D Third law

8. The unit of entropy is

- A Joules B JK^{-1}
 C Kelvin D J^{-1}K

9. In reversible cycle, the total change of entropy is _____ during a Carnot cycle.

- A Zero B constant
 C 1 D Not equal to zero

10. In Biot-Savart's law, the magnitude of the magnetic field induction is

- A indirectly proportional to current B indirectly proportional to length
 C directly proportional to current D indirectly proportional to the angle

11. The mean value of Alternating Current, $I_{\text{mean}} =$

- A $0.376 I_0$ B $0.637 I_0$
 C $0.472 I_0$ D $0.316 I_0$

12. In RMS value of AC, the square root of the average of I^2 during

- A $\frac{1}{2}$ cycle B $\frac{1}{4}$ cycle
 C $\frac{3}{4}$ cycle D Complete cycle

13. In Boolean algebra, the bar (-) sign indicates _____.

- A OR operation B NOT operation
 C AND operation D None of the above

14. Digital circuit can be made by the repeated use of _____.

- A AND gate B NOT gate
 C OR gate D NAND gate

15. According to De Morgan's Theorem: NAND =

- A Bubbled AND B Bubbled OR
 C Bubbled NOR D Bubbled XOR