

(6 pages)

Reg. No. :

Code No. : 20603 E Sub. Code : EEPH 11

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2025.

First Semester

Physics

Elective — ALLIED PHYSICS – I

(For those who joined in July 2023 only)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. In a simple harmonic motion, the acceleration is
 - (a) directly proportional to displacement
 - (b) constant
 - (c) inversely proportional to displacement
 - (d) none of the above

2. Intensity of sound is measured in
 - (a) Decibel
 - (b) Ohm
 - (c) Volts
 - (d) None of the above
3. The bending moment of a beam depends on
 - (a) Young's modulus
 - (b) Radius of curvature
 - (c) Moment of inertia
 - (d) All the above
4. With a rise of temperature, the viscosity of liquid
 - (a) increases
 - (b) decreases
 - (c) constant
 - (d) none of the above
5. The locus of all points at which the Joule-Kelvin coefficient is ——— the inversion curve.
 - (a) negative
 - (b) positive
 - (c) zero
 - (d) infinity
6. What is the unit of entropy?
 - (a) J mol^{-1}
 - (b) JK mol^{-1}
 - (c) $\text{J}^{-1}\text{K}^{-1}\text{mol}^{-1}$
 - (d) $\text{JK}^{-1}\text{mol}^{-1}$

7. The relation between current (I) and current density (J) is ————, (where A is the area of cross-section).

- (a) $J = \frac{I}{A}$ (b) $I = \frac{J}{A}$
 (c) $J = A^2 I$ (d) None

8. The relation connecting magnetic permeability (μ) and magnetic susceptibility (k) is ————.

- (a) $\mu = \mu_0(1 + k)$
 (b) $\mu = (1 + k) / \mu_0$
 (c) $\mu = 1 + k$
 (d) None

9. According to Boolean algebra $(A + AB)$ is equal to ————.

- (a) A (b) B
 (c) 0 (d) 1

10. $\overline{A + B} =$ ————.

- (a) $\bar{A} \cdot \bar{B}$ (b) $\bar{A} + \bar{B}$
 (c) $\bar{A} / \bar{B}$ (d) $\bar{B} \cdot \bar{A}$

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain about the SHM.

Or

- (b) Give the applications of ultrasonics.

12. (a) Obtain an expression for the bending moment.

Or

- (b) Explain the stream lined motion and turbulent motion of a liquid.

13. (a) Describe Joule-Kelvin effect.

Or

- (b) Give the importance of cryocoolers.

14. (a) Describe a method of measuring thermo emf using potentiometer.

Or

- (b) Discuss about the types of switches in household and factories.

15. (a) What is logic gates? Explain.

Or

- (b) State and prove De Morgan's theorems.
Give necessary truth table.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe the XY mode Lissajous figures.

Or

- (b) Explain about ultrasonography.

17. (a) Describe the experiment to find the rigidity modulus of wire using torsional pendulum.

Or

- (b) Derive the Poiseuille's formula for coefficient of viscosity of a liquid.

18. (a) Describe the Joule-Thomson porous plug experiment.

Or

- (b) State and explain law of thermodynamics.

19. (a) Derive an expression for the field along the axis of a circular coil carrying current.

Or

- (b) Derive an expression for the r.m.s. value and average value of an alternating current.

20. (a) Explain in detail about universal building blocks.

Or

- (b) Explain about EXOR logic gates.
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