

(6 pages)

Reg. No. :

Code No. : 30460 E Sub. Code : CAPH 11

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2024.

First/Third Semester

Physics – Allied

ALLIED PHYSICS – I

(For those who joined in July 2021 & 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Unit for stress is

- (a) Nm^2 (b) Nm^{-2}
(c) Nm (d) Nm^{-1}

2. In a given torsion pendulum

- (a) $\frac{l}{T} = \text{constant}$ (b) $\frac{l}{T^2} = \text{constant}$
(c) $\frac{l^2}{T} = \text{constant}$ (d) $\frac{l^2}{T^2} = \text{constant}$

3. Surface tension is the ratio of

- (a) $\frac{\text{Force}}{\text{Length}}$ (b) $\frac{\text{Force}}{\text{Volume}}$
(c) $\frac{\text{Length}}{\text{Force}}$ (d) $\frac{\text{Force}}{\text{Area}}$

4. The unit of co-efficient of viscosity is

- (a) Nsm^{-2} (b) Ns^2m^{-1}
(c) $\text{N}^{-1}\text{Sm}^{-2}$ (d) None

5. Decibel is the unit of

- (a) Sound intensity (b) Current
(c) Voltage (d) Light intensity

6. Time period of a simple harmonic motion is

- (a) $T = \frac{1}{2\pi} \sqrt{\frac{\text{Displacement}}{\text{Acceleration}}}$
(b) $T = 2\pi \sqrt{\frac{\text{Displacement}}{\text{Acceleration}}}$
(c) $T = \frac{1}{2\pi} \sqrt{\frac{\text{Acceleration}}{\text{Displacement}}}$
(d) $T = 2\pi \sqrt{\frac{\text{Acceleration}}{\text{Displacement}}}$

7. Wien's displacement law is

(a) $\lambda_m T = \text{constant}$ (b) $\frac{\lambda_m}{T} = \text{constant}$

(c) $\lambda_m T^2 = \text{constant}$ (d) None

8. The force of attraction between the same kind of molecule is

(a) Cohesive force (b) Adhesive force

(c) Force (d) None

9. In a Fraunhofer diffraction the light rays coming from the source are _____ each other.

(a) Perpendicular (b) Parallel

(c) Non-parallel (d) None

10. A quarter wave plate converts a plane polarised light into _____ polarised light.

(a) Elliptically (b) Circularly

(c) Plane (d) None

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Define the three elastic moduli and give the relation between them.

Or

(b) Derive the expression for work done in twisting a wire.

12. (a) Define surface tension and surface energy. Give their units.

Or

(b) Obtain the Stoke's formula for liquid flow.

13. (a) Write short note on damped vibrations.

Or

(b) Define loudness and intensity of sound.

14. (a) Define thermal conduction and co-efficient of thermal conductivity.

Or

(b) State and explain Newton's law of cooling.

15. (a) Define interference. Give the conditions for constructive and destructive interference.

Or

- (b) Write short note on double refraction.

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

16. (a) Derive the expression for bending moment of a beam.

Or

- (b) Explain the experimental determination of rigidity modulus of a wire using torsion pendulum.

17. (a) Define surface tension. Give the molecular interpretation of surface tension.

Or

- (b) Give the analogy between liquid flow and current flow.

18. (a) Derive an expression for the total energy in SHM.

Or

- (b) Describe Melde's experiment with theory.

19. (a) Define mean free path. Derive the expression for mean free path.

Or

- (b) Explain the determination of thermal conductivity of a bad conductor by Lee's disc method.

20. (a) Derive the expression for the thickness of thin wire in an air-wedge.

Or

- (b) Explain the determination of wave length of mercury spectrum using grating by normal incidence method.