

(6 pages)

Reg. No. : .....

Code No. : 20659 E      Sub. Code : EEPH 11

B.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2023.

First Semester

Physics

Elective – ALLIED PHYSICS – I

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ( $10 \times 1 = 10$  marks)

Answer ALL questions.

Choose the correct answer :

1. If the magnitude of displacement is equal to acceleration then the time period is
- (a)  $1\text{ s}$                       (b)  $\pi\text{ s}$
- (c)  $2\pi\text{ s}$                       (d)  $4\pi\text{ s}$

2. Lissajouse Figures depend upon
- (a) the amplitude
- (b) period of SHM
- (c) phase difference between them
- (d) all
3. The ratio of longitudinal stress to Longitudinal strain is
- (a) Young's modulus      (b) Bulk modulus
- (c) Strain                      (d) Stress
4. The unit of surface tension is
- (a) Nm                      (b)  $\text{m}^{-1}\text{N}$
- (c) N                          (d)  $\text{N}^{-1}\text{m}^{-1}$
5. At particular temperature the Joule Thomson effect changes sign is called
- (a) Latent heat
- (b) Temperature of Inversion
- (c) Thermal Capacity
- (d) Specific heat
6. Heat engines are used to convert heat into
- (a) Work done
- (b) Potential energy
- (c) Kinetic energy
- (d) Mechanical work

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7. The unit of magnetic induction is
- (a) testla (b) webm<sup>-2</sup>
- (c) both (a) and (b) (d) Henry
8. The average value of AC over one complete cycle is
- (a) One (b) Hundred
- (c) Zero (d) Ten
9. If only all the inputs are low the output will be high this is for
- (a) OR (b) NAND
- (c) NOR (d) NOT
10.  $AB + \overline{AC} =$
- (a)  $(A + B)(A + \overline{A})$
- (b)  $(A + C)(\overline{A} + B)$
- (c)  $(\overline{A} + B)(A + B)$
- (d)  $\overline{A}B$

PART B — (5 × 5 = 25 marks)  
 Answer ALL questions, choosing either (a) or (b).  
 Each answer should not exceed 250 words.

11. (a) Define simple harmonic motion. State its equation.  
 Or  
 (b) List the application of ultrasonic waves.
12. (a) Explain stress, strain and Hooke's Law.  
 Or  
 (b) Distinguish between streamlined and turbulent flow.
13. (a) Give the results of Joule Kelvin porous plug experiment.  
 Or  
 (b) State and explain second law of thermodynamics.
14. (a) State and explain Biot and Savart's Law.  
 Or  
 (b) Explain Power factor and Wattless current in an AC Circuit.
15. (a) Draw the circuit symbol of NOR gate and give the truth table of NOR gate.  
 Or  
 (b) Write short notes on Basic Logic gates with symbol and truth table.





PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Discuss with necessary theory the composition of Two simple harmonic motions of equal time periods at right angles to each other.

Or

- (b) Describe the piezo electric method of producing ultrasonic waves.

17. (a) Explain the three moduli of elasticity.

Or

- (b) Derive Poiseuille's formula for the rate of flow of a liquid through a capillary tube.

18. (a) Explain the porous plug experiment. Discuss the significance of the experiment in the liquefaction of gases.

Or

- (b) Explain the change of entropy in a Carnot's cycle.

19. (a) Obtain an expression for the field at the centre of a current carrying circular coil.

Or

- (b) Derive an expression for the RMS value of alternating voltage.

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20. (a) Explain how NAND gate can be used as OR, NOT and AND gates why is NAND gate called universal building block? Explain.

Or

- (b) Discuss about fundamentals of Boolean algebra.
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