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Reg. No. : _____

Code No. : 20305 E Sub. Code : CAPH 21

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

Second/Fourth Semester

Physics – Allied

ALLIED PHYSICS – II

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

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. According to ohm's law

- (a) $V = I/R$
- (b) $V = RI$
- (c) $V = IR$
- (d) $R = VI$

2. The relation between current (I) and current density (J) is _____ (A is the area of cross section)

- (a) $J = I/A$
- (b) $I = J/A$
- (c) $J = A^2 I$
- (d) None

3. 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

4. Soft iron can be easily

- (a) magnetized only
- (b) demagnetized only
- (c) convert into gas
- (d) magnetized and demagnetized

5. A zener diode is used as _____

- (a) an amplifier
- (b) a voltage regulator
- (c) a rectifier
- (d) a multivibrator

6. According to Boolean algebra $(A + AB)$ is equal to _____

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

7. One atomic mass unit (AMU) is equal to

- (a) 1.66×10^{-20} g (b) 1.66×10^{-22} g
(c) 1.66×10^{-24} g (d) 1.66×10^{-26} g

8. The _____ nucleus is the α - particle

- (a) hydrogen (b) helium
(c) electron (d) none

9. The path of the projectile is a _____

- (a) ellipse (b) parabola
(c) circle (d) straight line

10. The special theory of relativity was proposed by _____

- (a) Newton (b) Einstein
(c) Bhor (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) Write a note on color coding.

Or

(b) Draw and explain the I-V characteristics of a resistor.

12. (a) State and explain Faraday's law of induction.

Or

(b) Write a note on coefficient of coupling.

13. (a) Explain the working action of Zener Diode.

Or

(b) Draw a symbol and truth table for a NOR gate.

14. (a) Explain about the nuclear charge and nuclear density.

Or

(b) What are the properties of nuclear forces?

15. (a) Derive the expression for the horizontal range of a projectile.

Or

- (b) Write a note on time dilation.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) State and explain Kirchoff's first and second laws.

Or

- (b) Calculate the resistors in series and parallel circuits.

17. (a) List out the properties of Ferromagnetic materials.

Or

- (b) Obtain an expression for the self-inductance of a long solenoid.

18. (a) Explain the characteristics of a transistor connected in common emitter mode.

Or

- (b) State and explain De Morgan's theorems.

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19. (a) Define binding energy. Explain binding energy curve.

Or

- (b) Explain the basic laws of Radioactivity.

20. (a) What is a projectile? Derive the expression for the greatest height attained by the projectile.

Or

- (b) Derive the Lorentz transformation equations.
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