Code No. : 20450 E   Sub. Code : CAPH 21

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

Second/Fourth Semester

Physics — Allied

ALLIED PHYSICS — II

(For those who joined in July 2021–2022)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which type of a physical quantity is electric current?

   (a) Scalar quantity

   (b) Vector quantity

   (c) Bipolar quantity

   (d) Thermodynamic quantity

2. The dimensional formula of current density

   (a) $[MLT^{-2}]$ (b) $[M^0L^{-2}T^0I^1]$

   (c) $[ML^3T^0]$ (d) $[ML^2T^{-3}]$

3. The inductance of coil depends upon

   (a) Number of turns   (b) Type of core

   (c) Space   (d) All the above

4. Which of the following is ferromagnetic materials?

   (a) Tungsten   (b) Aluminium

   (c) Copper   (d) Nickel

5. Convert the following binary number to decimal number $(1010)_2$

   (a) 11   (b) 35

   (c) 15   (d) 10

6. The output of an EX-OR gate is 1. Which input combination is correct?

   (a) A = 1, B = 1   (b) A = 0, B = 1

   (c) A = 0, B = 0   (d) None of the above

7. _____ is usually expressed in a unit of nuclear binding energy.

   (a) MeV   (b) eV

   (c) keV   (d) Joules

8. The mean momentum of a nucleon in a nucleus with mass number A varies as

   (a) A   (b) $A^{-1/3}$

   (c) $A^{-2/3}$ (d) A^2

9. The path of projectile is called its

   (a) Curve   (b) Time of action

   (c) Orbit   (d) Trajectory

10. Special theory of relativity deals with

    (a) Non-inertial frames of reference

    (b) Inertial frames of reference

    (c) Space-time curvature

    (d) Singularity

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) State and explain Kirchoff's first and second law.

    Or

    (b) Describe the resistors in series and in parallel.

12. (a) Write the properties of dia magnetic materials.

    Or

    (b) Describe the coefficient of coupling.

13. (a) Explain the characteristics of a transistor in CE mode.

    Or

    (b) Briefly explain NAND, NOR as a universal gates.

14. (a) Write the properties of nuclear force.

    Or

    (b) Explain binding energy curve with diagram.

15. (a) Explain length contraction.

Or

(b) Write a detailed note on time dilation.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Describe the expression for the current density and hence verify Ohm's law.

Or

(b) Write the application of Kirchoff's law in Whetstone bridge.

17. (a) Explain determination of mutual induction using B.G.

Or

(b) Define self-induction and hence derive the expression for the self-inductance of a long solenoid.

18. (a) Explain the V-I characteristics of a zener diode.

Or

(b) Explain the working of AND, OR and NOT gate, giving its symbol, truth table and Boolean equation.

19. (a) Explain the general properties of nucleus.

Or

(b) State and explain the fundamental laws of radioactivity.

20. (a) Explain the projectile and time of flight.

Or

(b) Derive the Galilean transformation equations.

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