

Code No. : 20042 E Sub. Code : SAPH 21/
AAPH 21

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

Second/Fourth Semester

Physics — Allied

ALLIED PHYSICS — II

(For those who joined in July 2017-2020)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. 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) $J = A^2I$ (d) None

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

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

7. The nucleus of ${}_1\text{H}^2$ is _____ nucleus.

- (a) even – even (b) odd – odd
(c) odd – even (d) even – odd

8. In the nuclear reaction
 ${}_{80}\text{Hg}^{198} + X \rightarrow {}_{79}\text{Au}^{198} + {}_1\text{H}^1$, X stands for

- (a) proton (b) electron
(c) neutron (d) none

9. The path of the projectile is a _____.

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

10. The mass of the particle travelling with velocity of light will be _____.

- (a) 0 (b) infinity
(c) 100 kg (d) none

2. If two resistors (R_1, R_2) are connected in series, the resultant resistance (R) will be _____.

- (a) $1/R = 1/R_1 + 1/R_2$
(b) $R = R_1 + R_2$
(c) $R = R_1 - R_2$
(d) None

3. The relation connecting magnetic induction (B) and magnetic field intensity (H) is _____.

- (a) $\mu = B/H$ (b) $\mu = BH$
(c) $\mu = H/B$ (d) None

4. The self inductance of straight conductor is _____.

- (a) Infinity (b) 0
(c) 1000Ω (d) None

5. In the reverse bias of a diode, the resistance is _____.

- (a) very high (b) small
(c) 0 (d) none

Page 2 Code No. : 20042 E

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 Ohm's law.

Or

- (b) State and explain Kirchoff's First Law.

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

Or

- (b) State and explain Lenz's law.

13. (a) Explain the V-I characteristics of Junction diode.

Or

- (b) Draw the truth tables for AND and OR gates.

14. (a) Give the general properties of Nucleus.

Or

- (b) What are the properties of nuclear forces?

15. (a) Derive the expression for the time of flight of a projectile.

Or

- (b) What are the postulates of special theory of relativity?

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Explain the conversion of Galvanometer into an ammeter and a voltmeter.

Or

- (b) Derive the expression for the condition for bridge balance in a Wheatstone Bridge.

17. (a) Explain 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 DeMorgan's Theorems.

Page 5 Code No. : 20042 E

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

Or

- (b) State and explain Soddy-Fajan's displacement law.

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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Page 6 Code No. : 20042 E