PART C — (5 × 8 = 40 marks)

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

Answer should not exceed 600 words.

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

Or

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

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

Or

(b) Explain the determination of mutual inductance between a pair of coils using Ballistic Galvanometer.

18. (a) Explain the characteristics of zener diode. How it is used as a voltage regulator?

Or

(b) State and explain DeMorgan's theorems.

19. (a) What are nuclear forces? Give their properties.

Or

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

20. (a) Prove that the path of the projectile is a parabola.

Or

(b) Derive the Lorentz transformation equations.

Reg. No. : .....

Code No. : 30040 E **Sub. Code : JAPH 21/ SAPH 21/AAPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2022.

Second/Fourth Semester

Physics — Allied

PHYSICS – II

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The material through which electric charge can easily flow is _____.

(a) Quartz (b) Mica

(c) Germanium (d) Copper

2. If three 2Ω resistances are connected in series, the effective resistance will be

(a) 0 (b) 6Ω

(c) 8Ω (d) 2Ω

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 coefficient of mutual inductance between a pair of coils _____, if the number of turns is high.
   (a) high (b) small
   (c) 0 (d) none

5. In the reverse bias of a diode, the resistance is _____.
   (a) very high (b) small
   (c) 0 (d) none

6. The binary equivalent for the decimal number 7 is _____.
   (a) 110 (b) 101
   (c) 111 (d) 001

7. Isotopes have _____ atomic number and _____ mass number.
   (a) different-same (b) same-different
   (c) same-same (d) none

8. In the nuclear reaction ${}_{92}U^{234} + X \rightarrow {}_{92}U^{235} + \gamma$, X stands for
   (a) proton (b) electron
   (c) neutron (d) none

9. The horizontal distance covered by a projectile is large, if it is projected with an angle _____.
   (a) 30° (b) 60°
   (c) 45° (d) none

10. The mass of the particle travelling with velocity of light will be _____.
   (a) 0 (b) infinity
   (c) 100 kg (d) none

PART B — (5 × 5 = 25 marks)

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

Answer should not exceed 250 words.

11. (a) State and explain ohm's law.

Or

(b) Explain the conversion of galvanometer into a volt meter.

12. (a) What are diamagnetic materials? Give any three properties of them.

Or

(b) State and explain Lenz's law.

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

Or

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

14. (a) Define mass defect and binding energy.

Or

(b) What are the fundamental laws of radioactivity?

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

Or

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