

PART C — ( $5 \times 8 = 40$  marks)

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

Answer should not exceed 600 words.

- ) State and explain Kirchhoff's first and second laws.

Or

- ) Derive the expression for the condition for bridge balance in a Wheatstone Bridge.  
) Obtain an expression for the self inductance of a long solenoid.

Or

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

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

Or

- b) State and explain DeMorgan's theorems.  
(a) What are nuclear forces? Give their properties.

Or

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

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

Or

- (b) Derive the Lorentz transformation equations.

Page 4 Code No. : 30040 E

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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 — ( $10 \times 1 = 10$  marks)

Answer ALL questions.

Choose the correct answer :

- The material through which electric charge can easily flow is \_\_\_\_\_.  
(a) Quartz (b) Mica  
(c) Germanium (d) Copper
- If three  $2\Omega$  resistances are connected in series, the effective resistance will be  
(a) 0 (b)  $6\Omega$   
(c)  $8\Omega$  (d)  $2\Omega$
- 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  ${}_{92}\text{U}^{234} + \text{X} \rightarrow {}_{92}\text{U}^{235} + \gamma$ , 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)  $30^\circ$  (b)  $60^\circ$   
 (c)  $45^\circ$  (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 — ( $5 \times 5 = 25$  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?