

(6 pages)

Reg. No. :

Code No. : 20570 E Sub. Code : SNPH 4 A

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Fourth Semester

Physics

Non-Major Elective

BASIC PHYSICS — II

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer.

1. β -particles are _____.
(a) electrons (b) protons
(c) helium nuclei (d) hydrogen nuclei
2. Complete the equation $U_{92}^{235} + n_0^1$ _____.
(a) U_{93}^{236} (b) U_{92}^{235}
(c) U_{92}^{234} (d) U_{93}^{235}

3. In a diamagnetic material, the magnetic susceptibility χ_m is _____.
(a) small positive (b) large positive
(c) negative (d) none
4. Glass is a _____ material.
(a) crystalline (b) amorphous
(c) magnetic (d) none
5. The condition to achieve LASER action is
(a) absorption
(b) spontaneous emission
(c) population inversion
(d) none
6. In a He – Ne laser, He and Ne are mixed in the ratio _____.
(a) 1 : 10 (b) 10 : 1
(c) 1 : 1 (d) 10 : 10

7. If a body of length l_o moving with a velocity v , the new length is, $l =$ _____.

- (a) $\frac{l_0}{\sqrt{1-\frac{v^2}{c^2}}}$ (b) $l_o\sqrt{1-\frac{v^2}{c^2}}$
- (c) $\frac{l_0}{1-\frac{v^2}{c^2}}$ (d) none

8. The De-Broglie wavelength for a particle of mass m and moving with velocity v is, $\lambda =$ _____.

- (a) $\frac{mv}{h}$ (b) $\frac{h}{mv}$
- (c) $\frac{m}{hv}$ (d) none

9. The binary equivalent for the decimal number $(10)_{10}$, is _____.

- (a) $(1000)_2$ (b) $(1010)_2$
- (c) $(1001)_2$ (d) $(1100)_2$

10. The result of the addition of two binary numbers (101101_2) and $(100111)_2$ is _____.

- (a) 010100 (b) 1010100
- (c) 111110 (d) none

PART B — ($5 \times 5 = 25$ marks)

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

Answer should not exceed 250 words.

11. (a) What are nuclear forces? Give any three properties of nuclear forces.

Or

- (b) What are alpha particles? Give any three properties of alpha particles.

12. (a) What are conducting materials? Give any three properties.

Or

- (b) What are crystalline materials? Give any three properties of crystalline materials.

13. (a) Define stimulated emission. Give any three properties of stimulated emission.

Or

- (b) Explain the various parts in a general laser system.

14. (a) What are the postulates of special theory of relativity?

Or

- (b) Explain length contraction due to relativistic motion.

15. (a) Convert the binary number 1101100101110010_2 into hexadecimal number.

Or

- (b) Subtract 101101_2 from 100111_2 .

PART C — ($5 \times 8 = 40$ marks)

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

Answer should not exceed 600 words.

16. (a) Define nuclear fission. Explain with an example, how energy is released during nuclear fission.

Or

- (b) Explain the structure of nucleus.

17. (a) What are paramagnetic materials? Give their properties.

Or

- (b) What are superconductors? Explain any two properties of superconductors.

18. (a) Explain the construction and working of He-Ne laser.

Or

- (b) Explain in detail the applications of Lasers.

19. (a) Explain in detail about the dual nature of wave and radiation.

Or

- (b) Derive the expression for the wavelength of an electron accelerated by a potential V .

20. (a) Explain, with an example, the methods of conversion of decimal into binary and binary into decimal.

Or

- (b) Give the block diagrams and the truth tables of OR, AND and NOT gates.