(6 pages) **Reg. No. :** .....

Code No. : 10468 E **Sub. Code : CNPH 41**

U.G. (CBCS) DEGREE EXAMINATION,
APRIL 2024.

Fourth Semester

Physics

Non Major Elective — BASIC 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. The nucleus of an atom consists of
   (a) electrons and protons
   (b) electrons, protons and neutrons
   (c) electrons and neutrons
   (d) neutrons and protons

2. The density of atomic nucleus is independent of
   (a) radius (b) mass number
   (c) atomicity (d) none of the above

3. The expression for nuclear magneton is
   (a) $\frac{eh}{4\pi m}$ (b) $\frac{2\pi m}{eh}$
   (c) $\frac{e}{2mC}$ (d) $\frac{1}{2}\hbar$

4. According to Mosley's law, the characteristic physical and chemical properties of an element are determined by
   (a) atomic number
   (b) atomic weight
   (c) volume of the atom
   (d) the neutrons in the atom

5. Coherent photons have
   (a) high power (b) high amplitude
   (c) same intensity (d) same phase

6. We need ———— for laser action.
   (a) stimulated absorption
   (b) stimulated emission
   (c) spontaneous emission
   (d) none

7. One atomic mass unit (a.m.u.) is equivalent to the energy of

(a) 6.6 MeV (b) 1.6×10^{-19} MeV

(c) 9.1×10^{-31} MeV (d) 931 MeV

8. A particle of zero rest mass always travels with the speed of

(a) 3×10^{8} m/s (b) 3×10^{-8} m/s

(c) 5461 m/s (d) none of the above

9. The binary equivalent of decimal 11 is

(a) 1010 (b) 1100

(c) 1011 (d) 0111

10. The basic logic gate is

(a) NOR (b) NAND

(c) X-OR (d) OR

PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Discuss the general properties of nucleus.

Or

(b) What is Bohr magneton? Compute its value.

12. (a) Distinguish between dia, para and ferromagnetic materials.

Or

(b) Define conductors and insulators.

13. (a) Define absorption, spontaneous emission and stimulated emission.

Or

(b) Write any five laser applications.

14. (a) State the postulates of the special theory of relativity.

Or

(b) Derive the length contraction.

15. (a) Convert decimal 23.6 to binary number.

Or

(b) What is Logic gates? Explain.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Define mass defect and packing fraction. Derive the expression for the binding energy per nucleon.

Or

(b) Explain nuclear fusion.

17. (a) Describe the classification of magnetic materials.

Or

(b) Explain crystalline and amorphous materials.

18. (a) Explain the working of CO_2 laser.

Or

(b) Describe the working and applications of He-Ne laser.

19. (a) Explain the relativity of time.

Or

(b) Describe the de Broglie waves.

20. (a) Convert hexadecimal into decimal number :

(i) 8D

(ii) 9C.

Or

(b) Explain XOR gate.

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