

(6 pages)

Reg. No. :

Code No. : 10444 E Sub. Code : CNPH 41

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics

Non Major Elective – BASIC PHYSICS – II

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ 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 energy released per fission of ^{235}U is nearly

- (a) 200 ev
- (b) 20 ev
- (c) 2000 ev
- (d) 200 Mev

3. The S.I. unit of Bohr magneton is

- (a) tesla
- (b) joule – tesla
- (c) joule / tesla
- (d) weber/m²

4. According to Mosley's law, the characteristics 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

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6. We need _____ for laser action.
- stimulated absorption
 - stimulated emission
 - spontaneous emission
 - none
7. If N_1 and N_2 are the number of molecules in lower and upper levels, then the condition for population inversion is
- $N_1 = N_2$
 - $N_2 > N_1$
 - $N_1 > N_2$
 - $N_1 - N_2 = 0$
8. A particle of zero rest mass always travels with the speed of
- $3 \times 10^8 \text{ m/s}$
 - $3 \times 10^{-8} \text{ m/s}$
 - 5461 m/s
 - None of the above
9. The binary equivalent of decimal 11 is
- 1010
 - 1100
 - 1011
 - 0111
10. The hexadecimal equivalent of decimal number 141 is
- 7C
 - 8D
 - 8F
 - 9A

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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) Mention the properties of α , β and γ rays.
12. (a) Distinguish between dia, para and ferromagnetic materials.
- Or
- (b) Define conductors and insulators.
13. (a) Define population inversion. How it is achieved?
- Or
- (b) List the properties of paramagnetic materials.
14. (a) State the postulates of the special theory of relativity.
- Or
- (b) Derive the length contraction.

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[P.T.O.]



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

Or

- (b) What is logic gates? Explain.

PART C — ($5 \times 8 = 40$ 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.

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19. (a) Explain the relativity of time.

Or

- (b) Describe the de Broglie waves.

20. (a) Convert hexadecimal into decimal number.

(i) 8 D (ii) 9 C

Or

- (b) Explain XOR gate.
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