

(6 pages)

Reg. No. :

Code No. : 20312 E Sub. Code : CNPH 41

U.G. (CBCS) DEGREE EXAMINATION,
APRIL 2025.

Fourth Semester

Physics

Non-Major Elective — BASIC PHYSICS – II

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. The energy released per fission of ^{235}U is nearly
- (a) 200 eV (b) 20 eV
(c) 2000 eV (d) 200 MeV

2. The principle of the atomic bomb is based on which of the given options?
- (a) Nuclear fusion
(b) Nuclear fission
(c) Radiation
(d) None of these
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 of 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. What is the need to achieve population inversion?
- (a) to excite most of the atoms
(b) to bring most of the atoms to ground state
(c) to achieve stable condition
(d) to reduce the time of production of laser

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
- 3×10^8 m/s
 - 3×10^{-8} m/s
 - 5461 m/s
 - none
9. The radix of an octal number system is
- 8
 - 2
 - 16
 - 10
10. The hexadecimal equivalent of decimal number 141 is
- 7C
 - 8D
 - 8F
 - 9A

Page 3 Code No. : 20312 E

PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Calculate the binding energy of a nucleus.

Or

- (b) Mention the properties of α , β and γ rays.

12. (a) Appraise the properties of ferromagnetic materials.

Or

- (b) Define conductors and insulators.

13. (a) Describe the important characteristic of laser beam.

Or

- (b) Write the applications of laser.

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

Or

- (b) Derive the length contraction.

Page 4 Code No. : 20312 E
[P.T.O.]

15. (a) Convert 215_8 into decimal.

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 about the nuclear fission.

17. (a) Distinguish between diamagnetic and paramagnetic 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) Validate the reference frame.

Or

- (b) Describe the de Broglie waves.

20. (a) Classify the number systems.

Or

- (b) Explain XOR gate.