

(6 pages)

Reg. No. : \_\_\_\_\_

Code No. : 20049 E Sub. Code : SNPH 4 A/  
ANPH 41

U.G. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

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 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The order of magnitude of the B.E per nucleon in a nucleus is
- (a)  $10^{-1}$  Mev
  - (b) 10 Mev
  - (c)  $10^{-2}$  Mev
  - (d) 0.1 Mev

2. A nuclear fission reaction becoming self-sustaining depends on
- (a) Electron
  - (b) Neutron
  - (c) Energy
  - (d) Proton
3. Material that takes permanent magnetic dipoles is known as \_\_\_\_\_
- (a) Paramagnetic
  - (b) Diamagnetic
  - (c) Ferromagnetic
  - (d) Ferrimagnetic
4. The relative Permeability of the super conducting material is
- (a) 0
  - (b) 1
  - (c) -1
  - (d)  $\infty$
5. The unique property of laser is
- (a) Directional
  - (b) Speed
  - (c) Coherence
  - (d) Wavelength

6. \_\_\_\_\_ laser is an example of Optical pumping.

- (a) Ruby (b) He-Ne  
(c) Semi Conductor (d) Dye

7. In Special theory of relativity frame of reference is \_\_\_\_\_

- (a) Inertial (b) Non - inertial  
(c) Non - accelerated (d) Accelerated

8. The concept of matter wave was suggested by

- (a) Heisenberg (b) De Broglie  
(c) Schrodinger (d) Laplace

9. The octal equivalent of the decimal number  $(417)_{10}$  is

- (a)  $(641)_8$  (b)  $(619)_8$   
(c)  $(640)_8$  (d)  $(598)_8$

10. The hexadecimal equivalent of  $(654)_8$  is

- (a) BAC (b) 12A  
(c) 1AC (d) B1C

PART B -- ( $5 \times 5 = 25$  marks)

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

Each answer should not exceed 250 words.

11. (a) Give an account on binding energy of a nucleus?

Or

(b) Compare Nuclear fission and fusion.

12. (a) Describe the properties of diamagnetic materials.

Or

(b) List out the applications of superconductors.

13. (a) Describe about spontaneous emission.

Or

(b) Describe the working of  $\text{CO}_2$  laser.

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

Or

(b) Summarize the postulates of Quantum Mechanics.

15. (a) Convert the decimal number 244 and 145 into a binary number

Or

- (b) Solve : (i)  $10001_2 + 11101_2$  (ii)  $10111_2 + 110001_2$

PART C — ( $5 \times 8 = 40$  marks)

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

Each answer should not exceed 600 words.

16. (a) Describe the liquid — drop model of the nucleus. What are its merits and demerits?

Or

- (b) Explain radioactivity and its types.

17. (a) Discuss about amorphous and crystalline materials.

Or

- (b) Enumerate the important properties of superconductors.

18. (a) Explain about population inversion of photons in laser.

Or

- (b) Describe the working of a He - Ne with a neat diagram.

Page 5 Code No. : 20049 E

19. (a) Explain length contraction and time dilation.

Or

- (b) Define de Broglie wavelength? What is the de Broglie wavelength of an electron of mass  $9.11 \times 10^{-31}$  kg moves at the speed of  $3 \times 10^8$  m/s.

20. (a) (i) Convert the binary number 1010 into its equivalent hex, decimal and octal number.

- (ii) What is BCD? Give an example.

Or

- (b) Explain the digital logic gates with a neat diagram.

Page 6 Code No. : 20049 E