(6 pages)

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

Fourth Semester

Physics

Non-Major Elective — BASIC PHYSICS — II

(For those who joined in July 2017-2020 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following best define nuclear forces?

   (a) The attraction between protons and neutrons

   (b) Repulsion between protons and neutrons

   (c) The attraction between protons and electrons

   (d) The attraction between electrons and neutrons

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. Which of the following materials are diamagnetic?

   (a) Silver   (b) Copper

   (c) Silver and Copper   (d) Iron

4. In superconductivity, the electrical resistance of material becomes

   (a) Zero   (b) Infinite

   (c) Finite   (d) All of the above

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. He-Ne laser is a type of _____.

   (a) Solid laser   (b) Liquid laser

   (c) Gas laser   (d) Diode laser

7. According to the special theory of relativity, physical laws are the same in frames of reference which

   (a) move at uniform velocity

   (b) accelerate

   (c) move in circles

   (d) move in ellipses

8. The wavelength of the matter waves is independent of :

   (a) mass   (b) velocity

   (c) charge   (d) momentum

9. The radix of an octal number system is :

   (a) 8   (b) 2

   (c) 16   (d) 10

10. The subtraction of these binary numbers 101001 – 010110 would generate :

    (a) 010010   (b) 011001

    (c) 100110   (d) 010011

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

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

    Or

    (b) Describe about the properties of alpha rays.

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

    Or

    (b) Comment on conductors.

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

    Or

    (b) List out the advantages of CO_2 laser.

14. (a) Generalize the physical significance of wave function.

    Or

    (b) Analyze the time dilation.

15. (a) Convert 215_8 into decimal.

Or

(b) Convert 10101_2 into an octal number.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Discriminate the radioactivity.

Or

(b) Explain about the nuclear fission.

17. (a) Distinguish dia and paramagnetic materials.

Or

(b) Justify the properties of superconductors.

18. (a) Explain the difference between spontaneous and stimulated emission of radiation.

Or

(b) Examine the working principle of CO_2 laser with suitable energy level diagram.

19. (a) Validate the reference frame.

Or

(b) Explain de Broglie concept of matter waves.

20. (a) Classify the number systems.

Or

(b) Subtract 11010 from 111101.

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