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

Code No. : 20393 E **Sub. Code : CAPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2022.

Second/Fourth Semester

Physics – Allied

ALLIED PHYSICS – II

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. In resistors, the silver stripe tolerance is

   (a) ±5% (b) ±10%

   (c) +5% (d) +10%

2. A circuit is a _____ loop.

   (a) Short circuited (b) Closed

   (c) Opened (d) Both (a) and (b)

3. Magnetic permeability is maximum for _____ materials.

   (a) Diamagnetic (b) Paramagnetic

   (c) Ferromagnetic (d) None of the above

4. The direction of magnetic lines of force is _____.

   (a) From south end to north pole

   (b) From north pole to south pole

   (c) From one end of the magnet to another

   (d) None of these

5. Which of the following semiconductor is mostly used to construct electronic circuits?

   (a) Silicon (b) Germanium

   (c) Selenium (d) Tin

6. The one's complement of binary number 0101 is

   (a) 1010 (b) 1011

   (c) 0110 (d) 1110

7. An alpha particle is same as _____.

(a) A helium nucleus

(b) A hydrogen nucleus

(c) A proton

(d) A positron

8. Radio carbon dating technique is used to estimate the age of _____.

(a) Soil (b) Fossils

(c) Rocks (d) Buildings

9. Which of the following is not an example of projectile?

(a) A bullet fired from a gun

(b) A kicked football

(c) Taking off of an aircraft

(d) A javelin thrown by an athlete

10. According to the special theory of relativity, physical laws are the same in all frames of reference, if they

(a) Move at uniform velocity

(b) Are accelerated

(c) Move in circles

(d) Move in ellipses

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Describe the expression for current density.

Or

(b) Using wheatstone's bridge, find the unknown resistance of a resistor.

12. (a) Derive the relation between M, B and H in magnetic materials.

Or

(b) Derive the Faraday's laws of electromagnetic induction and Lenz's law.

13. (a) Convert the following decimal numbers into binary numbers (i) $(55.95)_{10}$ (ii) 110_{10} (iii) 13_{10} (iv) 27_{10} (v) 44_{10}

Or

(b) Explain OR gate. Give its symbol, truth table and Boolean equation.

14. (a) Explain mass defect and binding energy.

Or

(b) Discuss the following terms. (i) nuclear charge (ii) nuclear spin (iii) nuclear magnetic moment.

15. (a) Explain the different frames of reference.

Or

(b) Describe briefly time dilation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Explain the current voltage characteristics of a resistor and hence verify ohm's law.

Or

(b) Describe how a galvanometer can be converted into a voltmeter.

17. (a) Define self induction and hence derive the expression for the self inductance of a long solenoid.

Or

(b) Write the properties of dia and ferromagnetic materials.

18. (a) Explain the V-I characteristics of a zener diode. Give its uses.

Or

(b) Explain binary addition and binary subtraction with examples.

19. (a) Explain the properties of nucleic.

Or

(b) Write a short note on nuclear forces and explain the various properties of nucleus.

20. (a) Derive the expression for range, time of flight and maximum height of a projectile on a horizontal plane.

Or

(b) Derive Galilean transformation equations.

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