FIRST REVISION TEST - 2024

B

Standard XII

Reg No [ ][ ][ ][ ][ ][ ]

PHYSICS

Time : 3.00 hrs

Part - I

Marks : 70

I. Choose the correct answer:

15 x 1 = 15

1. An electron having charge e and mass m is moving in a uniform electric field E. Its acceleration will be

   a) $\dfrac{e^2}{m}$
   b) $\dfrac{eE}{m}$
   c) $\dfrac{eE^2}{m}$
   d) $\dfrac{mE}{e}$

2. When light passes from one medium to another, which one of the quantities remain unchanged?

   a) refractive index
   b) frequency
   c) wavelength
   d) speed

3. When ultraviolet rays incident on metal plate then photo-electric effect does not occur, it occurs by incident of

   a) infrared rays
   b) X-rays
   c) radio waves
   d) micro waves

4. A charge q moves in a region where electric field and magnetic field both exist, then force on it is

   a) $q(\vec{v} \times \vec{B})$
   b) $q\vec{E} + q(\vec{B} \times \vec{v})$
   c) $q\vec{E} + q(\vec{v} \times \vec{B})$
   d) $q\vec{B} + q(\vec{E} \times \vec{v})$

5. From the following diode circuit, which diode is in forward biased condition?

   a) 0 ⟶ -2 V
   b) 0 ⟶ 2 V
   c) -5 V ⟶ -2 V
   d) 5 V ⟶ 12 V

6. In beta plus decay

   a) anti neutrino is produced with electron

   b) neutrino is produced with positron

   c) neutrino Is produced with electron
   d) none of these

7. A toaster operating at 240 V has a resistance of 120 Ω. Its power is

   a) 400 W
   b) 2 W
   c) 480 W
   d) 240 W

8. Calculate the number of electrons in one coulomb of negative charge.

   a) 6.25×10^{28} electrons
   b) 6.25×10^{19} electrons
   c) 8.25×10^{28} electrons
   d) 6.25×10^{18} electrons

9. The vertical component of Earth's magnetic field at a is equal to the horizontal component. What is the value of angle of dip at this place?
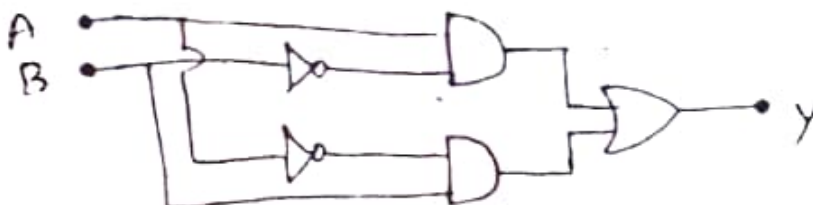
   a) 30°
   b) 45°
   c) 60°
   d) 90°

10 In a transformer, the number of turns in the primary and secondary are 4 10 and 1230 respectively. If the current in primary is 6 A, then that in the secondary coil is

a) 2 A   b) 18 A   c) 12 A   d) 1 A

11. Which of the following electromagnetic radiations is used for viewing objects through fog

a) microwave   b) gamma rays   c) X-rays   d) infrared

12. Pure water has refractive index 1.33. What is the speed of light through it?

a) 2.26×10^8 ms^{-1} b) 2.26×10^{18} ms^{-1}

c) 1.26×10^8 ms^{-1} d) 1.26×10^{18} ms^{-1}

13. In a Young's double-slit experiment, the slit separation is doubled. To maintain the same fringe spacing on the screen, the screen-to-slit distance D must be change to

a) 2D   b) $D/2$ c) $\sqrt{2}D$ d) $D/\sqrt{2}$

14. The nucleus is approximately spherical in shape. Then the surface area of nucleus having mass number A varies as

a) $A^{\frac{2}{3}}$ b) $A^{\frac{4}{3}}$ c) $A^{\frac{1}{3}}$ d) $A^{\frac{5}{3}}$

15. The method of making nano material by assembling the atoms is called

a) top down approach   b) bottom up approach

c) cross down approach   d) diagonal approach

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory)   **6 x 2 = 12**

16. What are the properties of an equipotential surface?

17. State Joule's law of heating.

18. What is magnetic permeability?

19. Mention the ways of producing induced emf.

20. Mention the differences between interference and diffraction.

21. State Malu's law.

22. Define stopping potential.

23. Write down the postulates of Bohr atom model.

24. In the combination of the below gates, write the Boolean equation for output Y in terms of inputs A and B.

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)   6 x 3 = 18

25. Discuss the various properties of conductors in electrostatic equilibrium.

26. Compute the torque experienced by a magnetic needle in a uniform magnetic field.

27. Explain the Maxwell's modification of Ampere's circuital law.

28. Give the Barkhausen conditions for sustained oscillations.

29. Discuss the beta decay process with examples.

30. List out the laws of photoelectric effect.

31. Obtain the equation for apparent depth.

32. Obtain an expression for motional emf for Lorentz Force.

33. Calculate the number of nuclei of Carbon-14 undecayed after 22, 920 years if the initial number of Carbon-14 is atoms is 10,000. The half-life of Carbon -14 is 5730 years.

Part - IV

IV. Answer all the questions.   5 x 5 = 25

34. a) Obtain the law of radioactivity.

(OR)

   b) Draw the circuit diagram of a half wave rectifier and explain its working.

35. a) Obtain Einstein's photoelectric equation with the necessary explanation.

(OR)

   b) Explain the Young's double slit experiment setup and obtain the equation for path difference.

36. a) Describe the method to determine the speed of light.

(OR)

   b) Explain the construction and working of transformer.

37. a) Write down the properties of electromagnetic waves.

(OR)

   b) Deduce the Fizeau's relation for the magnetic field at a point due to an infinitely long straight conductor carrying current using Biot-Savart law.

38. a) Describe the microscopic model of current and obtain general form of Ohm's Law.

(OR)

   b) Obtain the expression for electric field due to an infinitely long charged wire.

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