CHENGALPATTU DISTRICT

SECOND REVISION TEST - 2025

Standard XII   Reg.No. ☐☐☐☐☐☐☐

PHYSICS

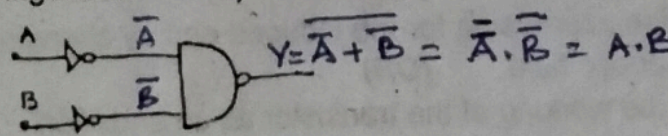Time : 3.00 hrs   Part - I   **Marks : 70**

15 x 1 = 15

I.   **Choose the correct answer:**

1. Stars twinkle due to
    a) Reflection   b) Total internal reflection   c) Refraction   d) Polarization

2. The transverse nature of light is shown in
    a) Interference   b) Diffraction   c) Scattering   d) Polarization

3. A parallel plate capacitor stores a charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
    a) Capacitance   b) Charge   c) Voltage   d) Energy density

4. 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

5. The vertical component of Earth magnetic field at a place 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°

6. The unit of magnetic dipole moment is
    a) Am^{-1} b) Am   c) Am^{-2} d) Am^2

7. The condition for step up transformer
    a) $V_p \gg V_s$ b) $V_s < V_p$ c) $V_s = V_p$ d) $V_s > V_p$

8. In an oscillating LC circuit, the maximum charge on the capacitor is Q. The charge on the capacitor when the energy is stored equally between electric and magnetic field is
    a) $\dfrac{Q}{2}$ b) $\dfrac{Q}{\sqrt{3}}$ c) $\dfrac{Q}{\sqrt{2}}$ d) Q

9. Fraunhofer lines are an example of _____ spectrum.
    a) Line emission   b) Line absorption   c) Band emission d) Band absorption

10. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by
    a) $\lambda_p \alpha \lambda_e$ b) $\lambda_p \alpha \sqrt{\lambda_e}$ c) $\lambda_p \alpha \dfrac{1}{\sqrt{\lambda_e}}$ d) $\lambda_p \alpha \lambda_e^2$

11. The Threshold wavelength for a metal surface whose photo electric functions 3.313 eV is   a) 4125 A°   b) 3750 A°   c) 6000 A°   d) 2062.5 A°

12. The materials used in Robotics are   a) Aluminium and Silver
    b) Silver and Gold   c) Copper and Gold   d) Steel and Aluminium

13. The ratio of collector current to the base current is
    a) Current gain CE configuration   b) Current gain CC configuration
    c) Current gain in CB configuration   d) All of these

14. The circuit equivalent to

$Y = \overline{A} + \overline{B} = \overline{\overline{A} \cdot \overline{B}} = A \cdot B$

    a) AND gate   b) OR gate   c) NOR gate   d) EXOR gate

15. The product of mean life and disintegration constant is
    a) ∞   b) 0   (c) 1   d) 0.6931

Part - II

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

16. What is it safer to be inside a car than standing under a tree during lightning?
17. Define temperature coefficient of resistivity.
18. Define ampere in terms of force.
19. What are the methods of producing induced emf?
20. What are the uses of IR rays?
21. What is the principle of reversibility?
22. Differentiate interference and diffraction.
23. What is called Skip area?
24. Calculate time required for 60% of a sample of radon undergo decay. Give $T_{1/2}$ of radon = 3.8 days

Part - III

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

25. Derive an expression for energy stored in a capacitor.
26. Give an account of magnetic Lorentz force.
27. Mention various energy losses in transformer.
28. Explain the types of absorption spectrum.
29. State and prove Brewster's law.
30. State and prove Demorgan's first and second theorem.
31. Derive the relation between f and R for a spherical mirror.
32. Give the construction and working of photo emissive cell.
33. A copper wire of 10^{-6} m^2 area of cross section carries a current of 2 A. If the number of free electrons per cubic meter in the wire is 8×10^{28}, calculate the current density and average drift velocity of electrons. $V_d = [I/neA] = [2/(8 \times 10^{28} \times 1.6 \times 10^{-19} \times 10^{-6})]$
    $J = [I/A] = [2/(10^{-6})] = 2 \times 10^{6}$ A m^{-2} $V_d = 0.156 \times 10^{-3}$ m s^{-1}.

Part - IV

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

34. a) Derive an expression for electro static potential due to an electric dipole. (OR)
    b) Obtain the Lens maker's formula and mention its significance.
35. a) Describe the microscopic model of current and obtain general form of Ohm's law.
               (OR)
    b) Obtain radius of illumination (or) Snell's window.
36. a) Derive the expression for force on a current carrying conductor in a magnetic field.
               (OR)
    b) Discuss the diffraction at a single slit and obtain the condition for nth minimum.
37. a) Write down Maxwell equations in integral form.   (OR)
    b) Derive an expression for radius and velocity of an electron of H$_2$ atom using Bohr atom model.
38. a) Obtain the expression for the induced emf by changing relative orientation of coil with magnetic field.   (OR)
    b) Explain the working of the transistor as an amplifier.

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