**12**

Time 3 00 Hrs

**First Revision Examination- 2025**
**PHYSICS**

Register No.

Marks : 70

**PART - 1**

I. **Answer all the questions**            **15 x 1 = 15**

1. The particles which gives mass to protons and neutrons are
   a) Higgs particle    b) Einstein particle    c) Nanoparticle    d) Bulk particle

2. A transistor has an $\alpha = 0.95$ then $\beta$ is
   a) 1/19   b) 19   c) 1 5   d) 0.95

3. The Zener diode is primarily used as
   a) Rectifier   b) Amplifier   c) Oscillator   d) Voltage regulator

4. The value of Bohr radius is
   a) $0.539 \, A^0$   b) $0.592 \, A^0$   c) $0.529 \, A^0$   d) $0.593 \, A^0$

5. The ratio of the wavelengths radiation emitted for the transition from $n = 2$ to $n = 1$ in $L^{++}$, $He^+$ and $H$ is
   a) 1 2 3   b) 1 4 9   c) 3:2:1   d) 4:9:36

6. The wavelength $\lambda e$ of a electon and $\lambda p$ 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) $\lambda p \, \alpha \, \lambda e^2$

7. Two coherent monochromatic light beams of intensities I and 4I are superposed. The maximum and minimum possible intensities in the resulting beam are
   a) 5I and I   b) 5I and 3I   c) 9I and I   d) 9I and 3I

8. For light incident from air on a slab of refractive index 2, the maximum possible angle of refraction is
   a) $30^0$   b) $45^0$   c) $60^0$   d) $90^0$

9. 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 them which is the quantity that will change?
   a) capacitance   b) energy density   c) charge   d) voltage

10. Capacitance C of a parallel plate capacitor is

    a) $\dfrac{\varepsilon_o A}{d}$   b) $\dfrac{\varepsilon_o d}{A}$   c) $\dfrac{\varepsilon_o A}{2d}$   d) $\dfrac{2\varepsilon_o d}{A}$

11. There is a current of 1 0A in the circuit shown below. What is the resistance of P?
    a) 1 5 Ω    b) 2.5 Ω    c) 3.5 Ω   d) 4.5 Ω
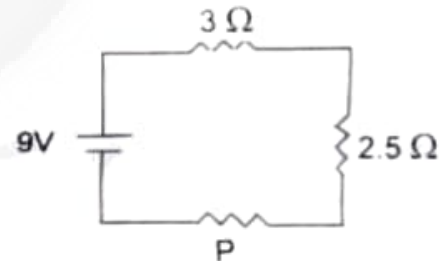
    

12. A cyclotron cannot accelerate _____
    a) electrons   b) protons   c) deutrons   d) $\alpha$ - particles

13. An emf can be induced by _____
    a) change in magnetic field   b) change in area of cross section   c) change in angle   d) all of these

14. In a series RL circuit, the resistance and inductive reactance are the same. Then the phase difference the voltage and current in the circuit is

    a) $\dfrac{\pi}{4}$   b) $\dfrac{\pi}{2}$   c) $\dfrac{\pi}{6}$   d) zero

15. If the amplitude of the magnetic field is $3 \times 10^{-6} T$, then amplitude of the electric field for a electromagnetic waves is
    a) $100 \, Vm^{-1}$   b) $900 \, Vm^{-1}$   c) $600 \, Vm^{-1}$   d) $300 \, Vm^{-1}$

## PART – II

**Answer any six questions. Q. No. 24 is compulsory**      6 x 2 = 12

16. Write a short note on 'electrostatic shielding'.

17. Define temperature co – efficient of resistance.

18. State Fleming's left hand rule.

19. The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak current and frequency.

20. Give the Barkhausen conditions for sustained oscillations.

21. What is distance of closest approach?

22. How will you define threshold frequency?

23. List the uses of Polaroids.

24. Light traveling through transparent oil enters into glass of refractive index 1.5. If the refractive index of glass with respect to the oil is 1.25. What is the refractive index of the oil?

## PART – III

**Answer any six questions. Q. No. 33 is compulsory**      6 x 3 = 18

25. Obtain the equation for critical angle.

26. Mention the differences between interference and diffraction.

27. List out the laws of photoelectric effect.

28. Obtain the law of radioactivity.

29. State and prove De Morgan's first and second theorem.

30. Obtain Gauss law from Coulomb's law.

31. How the emf of two cells are compared using potentiometer?

32. How is a galvanometer converted into a voltmeter?

33. Find the impedance of a series RLC circuit if the inductive reactance, capacitive reactance and resistance are 184 $\Omega$, 144$\Omega$ and 30$\Omega$ respectively. Also calculate the phase angle between voltage and current.

## PART – IV

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

34. a) Derive an expression for electrostatic potential due to an electric dipole. **(OR)**
    b) Derive the expression for the force between two parallel current – carrying conductors

35. a) Describe the microscopic model of current and obtain general form of ohm's law **(OR)**
    b) Explain the construction and working of transformer

36. a) Write down the properties of electromagnetic waves **(OR)**
    b) Obtain the equation for resolving power of optical instruments

37. a) Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism **(OR)**
    b) Describe the working of nuclear reactor

38. a) Briefly explain the principle and working of electron microscope **(OR)**
    b) Sketch the static characteristics of a common emitter transistor and bring out the essential features of input and output characteristics