

CLASS XII

SAMPLE PAPER

PHYSICS

THE SCHOLARS' HOME

Time allowed: 1:45 hours

Maximum Marks: 50

General Instruction: (i) All questions are compulsory.

(ii) Questions **1 to 6** are very short answer type and carry **one** mark each.

(iii) Questions **7 to 11** are short answer type and carry **two** marks each.

(iv) Questions **12 to 19** are short answer type and carry **three** marks each.

(v) Questions **20 to 21** are long answer type and carry **five** marks each.

Use of calculators is not permitted.

You may use the following values of physical constants wherever necessary:

$c = 3 \times 10^8 \text{ ms}^{-1}$; $h = 6.626 \times 10^{-34} \text{ Js}$; $e = 1.602 \times 10^{-19} \text{ C}$; $\mu_0 = 4\pi \times 10^{-7} \text{ T m A}^{-1}$

$1/4\pi\epsilon_0 = 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2}$; Mass of neutron $m_n = 1.675 \times 10^{-27} \text{ kg}$

Boltzmann's constant $k = 1.381 \times 10^{-23} \text{ JK}^{-1}$; Avogadro's number $N_A = 6.022 \times 10^{23} / \text{mol}$

- Q1. The refractive index of glass is 1.5 for the light waves of $\lambda = 6000\text{\AA}$ in vacuum . Calculate their wavelength in glass.
- Q2. What type of wave front will emerge from a (i) point source and (ii) distant light source?
- Q3. What are SI units of magnetic permeability?
- Q4. Under what conditions will the force exerted by the magnetic field on a charged particle be (i) maximum & (ii) minimum?
- Q5. What affect you will find on fringe width when distance between two slits is halved?
- Q6. Write two conditions of total internal reflection of light.
- Q7. Derive an expression for the magnetic moment when an electron revolves with the speed v around an orbit of radius r in hydrogen atom.
- Q8. A proton and an alpha particle of the same velocity enter in a region of uniform magnetic field, acting perpendicular to their directions of motion . find the ratio of the radii of the circular paths described by the particles.
- Q9. Does critical angle depend on the colour of light? Explain.
- Q10. Can two wavefronts intersect each other? Give reason.
- Q11. A telescope is used to resolve two stars separated by $4.6 \times 10^{-6} \text{ rad}$. If the wavelength of light used is 5460\AA , what should be the aperture of the objective of the telescope?
- Q12. A ray of light passing through an equilateral triangular glass prism from air undergoes minimum deviation when angle of incidence is $3/4^{\text{th}}$ of the angle of prism. Calculate the speed of light in the prism.
- Q13. Show the elements of magnetic field earth's magnetic field in a labeled diagram and deduce the relation

between them.

- Q14. Derive an expression for torque experienced by a magnetic dipole in a uniform magnetic field, and hence find the potential energy stored in it.
- Q15. A convex lens has 20cm focal length in air, what is its focal length in water?
- Q16. Draw a well labeled ray diagram for compound microscope. With the help of it find an expression for magnifying power when final image is formed at the least distance of distinct vision.
- Q17. With the help of ray diagram for single slit experiment find the width of central maximum of diffraction pattern.
- Q18. Write and explain any three limitations of cyclotron.
- Q19. What is radial magnetic field? What is the need of it in moving coil galvanometer.
- Q20. Explain principle, construction and working of moving coil galvanometer with the help of a labeled diagram.
- Q21. What is fringe width? Find an expression for it in Young's double slit experiment.