P.S.E.B Sample Paper for 2024-25

Time : 3 Hours   Class 12ᵀᴴ Subject: Physics   Max Marks: 70

Question number 1 contains 20 parts of one marks each. Question number 2 to 8 are of two marks each. Question number 9 to 15 are of three marks each. Question number 16 (Comprehension) is of five marks. Question number 17 and 18 are of five marks each with internal choice. All questions are compulsory.

1. One mark questions:
   (i)   Electric field intensity due to an electric dipole of very small length at a point on axial line at a distance r from its center varies as:
         (a) r
         (b) r^2
         (c) r^{-2}
         (d) r^{-3}

   (ii) The electric potential inside a conducting sphere is:
         (a) Zero
         (b) Increases from centre to the surface of the sphere.
         (c) Decreases from centre to the surface of the sphere.
         (d) Remains constant from centre to the surface of the sphere.

   (iii) The electrical resistance of metals:
         (a) Increases with increase in temperature.
         (b) Is independent of temperature.
         (c) Decreases with increase in temperature.
         (d) None of the above.

   (iv) The effect of temperature of the conductor on the drift velocity of electrons.
         (a) varies linearly with temperature
         b) does not depend on the temperature
         c) increases with increasing temperature

d) decreases with increasing temperature

(v) Path of charged particle entering in uniform magnetic field at an angle 60^0 is :
   (a) Straight line.
   (b) Helical.
   (c) Parabola.
   (d) Circular.

(vi) Lenz's law gives:
   (a) The magnitude of induced emf.
   (b) Magnitude of induced current.
   (c) The direction of induced emf.
   (d) Both the magnitude and direction of induced emf.

(vii) What is the angle between reflected ray and refracted ray when angle of incidence is equal to angle of polarization?
   (a) 90^0
   (b) 0^0
   (c) 30^0
   (d) 120^0

(viii) What will happen, if the electron revolving around nucleus of an atom becomes stationary?
   (a) Will move away from nucleus.
   (b) Will falls into nucleus.
   (c) Nothing will happen.
   (d) None of the above.

(ix) What is the name given to the type of electromagnetic waves used to capture photographs of earth in foggy conditions :
   (a) Visible rays.
   (b) UV rays.
   (c) Microwaves.
   (d) Infrared rays.

(x) Which mirror is used as shaving mirror?
   (a) Concave mirror.
   (b) Convex mirror.

(c) Plane mirror.

(d)Parabolic mirror.

(xi)   The stopping potential depends upon:
(a)Intensity on incident light.
(b)Energy of incident light.
(c) Surface area of the metal.
(d)Independent of Intensity of incident light.

(xii) When Boron is added as impurity to silicon, semiconductor becomes:
(a)N type semiconductor.
(b)P type semiconductor.
(c) PN junction.
(d)None of the above.

(xiii) Isolated magnetic poles called magnetic monopoles are not known to exist. This statement is the result of:
(a)Gauss's theorem in electrostatics.
(b)Gauss's theorem in magnetism.
(c) Both a and b.
(d)None of the above.

(xiv) Which of the following pairs is an isobar?
(a) $_1^1H$ and $_1^2H$
(b) $_1^2H$ and $_1^3H$
(c) $_6^{13}C$ and $_6^{12}C$
(d) $_{18}^{40}Ar$ and $_{19}^{40}K$

(xv)   Wave front due to light source situated at infinity is:
(a)Spherical.
(b)Cylindrical.
(c) Plane.
(d)None of the above.

True/ False

(xvi) When forward biasing is applied to the PN junction, width of depletion layer increases. (T/F)

(xvii) Photoelectric effect is not possible for the light of all frequencies.

(xviii) AC generator is based upon principle of electromagnetic induction.

(xix) Power of a thick lens is smaller than the thin lens.

(xx) Sustained interference is caused by the superposition of two waves coming from two coherent sources.

Two marks questions:

2. What do you mean by quantization of charge?

   OR

   What is the Coulomb's force between two small charged spheres having charge of 2×10^{-7} C and 3×10^{-7} C placed 30 cm apart in air.

3. Define Kirchhoff's first and second law.

   OR

   A wire of length 15 m and uniform area of cross section $6\times 10^{-7}m^2$ has resistance of 5 Ω. Find the value of resistivity of the material of the wire.

4. Draw labelled diagram of converting a galvanometer into an ammeter.

5. State Faraday's law of electromagnetic induction.

6. Give any two uses of X Rays.

7. Write Einstein's photo electric equation.

   OR

Calculate de Broglie wavelength of electron moving with speed of $6 \times 10^5 ms^{-1}$.

8. Write any two difference between nuclear fission and nuclear fusion.

Three marks question.

9. What is an equipotential surface? Show that no work is done in moving a given charge over an equipotential surface.

10. With a circuit diagram, explain how a meter bridge can be used to determine unknown resistance of a given wire.

11. Derive an expression for force per unit length between two parallel straight conductors carrying current in same direction.

OR

A solenoid of length 0.5 m has radius of 1 cm and is made up of 500 turns. It carries a current of 5 A. What is the magnitude of magnetic field inside the solenoid?

12. What do you mean by impedance of LCR series circuit? Derive an expression for it by using phasor diagram.

OR

Find the coefficient of mutual inductance of a pair of a coil if a current of 3 A in one coil causes the flux in the second coil of 1000 turns to change by 10^{-4} weber in each turn.

13. What is total internal reflection? Write necessary conditions for it.

OR

The distance of object needle is 45 cm from a lens which forms an image on the screen placed 90 cm on the other side. What is the type of lens? What is the focal length and the size of the image if the size of object needle is 5 cm?

14. Define binding energy per nucleon. Draw and explain the curve between binding energy per nucleon and mass number.

15. With help of a circuit diagram, explain V-I characteristics of a PN junction diode in forward biasing.

16. Read the passage carefully and answer the questions from (a) to (e).

The strength of the earth's magnetic field varies from place to place on the earth's surface; its value being of the order of 10^{-5} T.

What causes the earth to have a magnetic field is not clear. Originally the magnetic field was thought of as arising from a giant bar magnet placed approximately along the axis of rotation of the earth and deep in the interior. However, this simplistic picture is certainly not correct. The magnetic field is now thought to arise due to electrical currents produced by convective motion of metallic fluids (consisting mostly of molten iron and nickel) in the outer core of the earth. This is known as the dynamo effect.

The magnetic field lines of the earth resemble that of a (hypothetical) magnetic dipole located at the centre of the earth. The axis of the dipole does not coincide with the axis of rotation of the earth but is presently tilted by approximately 11.3° with respect to the later. In this way of looking at it, the magnetic poles are located where the magnetic field lines due to the dipole enter or leave the earth. The location of the north magnetic pole is at a latitude of 79.74° N and a longitude of 71.8° W, a place somewhere in north Canada. The magnetic south pole is at 79.74° S, 108.22° E in the Antarctica.

(a) What is the order of magnitude of magnetic field of earth? (1)

(b) What is the cause of magnetic field of earth assumed these days?(1)

(c) What is the angle between magnetic dipole located at the center of the earth and axis of rotation of the earth?(1)

(d) Where are the magnetic poles located?(1)

(e) What is the location of magnetic South Pole?(1)

Five marks question:

17.State Gauss's theorem. Using this theorem, derive electric field intensity due to thin uniformly charged infinite plane sheet. (1,4)

OR

Define capacitance. Derive capacitance of a parallel plate capacitor having dielectric slab between its plates.(1,4)

18. With help of labelled diagram, write principle of astronomical telescope and derive expression for magnifying power of an astronomical telescope, when final image is formed at least distance of distinct vision. (1,1,3)

OR

What is interference of light? Derive an expression for the fringe width in the Young's double slit experiment. (1,4)