

Class- 12
SAMPLE PAPER, MARCH 2021
SUBJECT – PHYSICS

Time : 3 hrs.

M. M. – 70 Marks

NOTE : Q. No. 1 has 28 parts carrying 1 mark each.

Q. No. 2 to 8 carry 2 marks each.

Q. No. 9 to 14 carry 3 marks each.

Q. No. 15 to 16 carry 5 marks each.

Q1. Multiple Choice Questions :

- (I) If both charges and distance between them is doubled, then electrostatic force will be
(a) F (b) $2F$ (c) Zero (d) None
- (II) Kirchoff's second law is based on law of conservation of
(a) sum of mass and energy (b) momentum
(c) energy (d) charge
- (III) The resistance of ideal ammeter is
(a) infinite (b) very high (c) small (d) zero
- (IV) The best material used for core of transformer is
(a) stainless steel (b) mild steel
(c) hard steel (d) soft iron
- (V) Which of the following radiations have least wavelength?
(a) X-rays (b) γ rays (c) UV rays (d) IR rays
- (VI) The power of plane glass is
(a) zero (b) 1 D (c) 2 D (d) infinite
- (VII) The minimum energy required to remove an electron from metal surface is called
(a) work function (b) kinetic energy
(c) stopping potential (d) potential energy
- (VIII) If two lenses of power +1.5D and +1.0D are placed in contact then effective power of the combination is
(a) 2.5 D (b) 1.5 D (c) 0.5 D (d) 3.25 D
- (IX) The maximum kinetic energy of photoelectrons emitted from a metal surface when photons of energy 6eV fall on it is 4eV. The value of stopping potential in volt is
(a) 2V (b) 4V (c) 6V (d) 10V
- (X) Which of these is not released during nuclear disintegration?
(a) α particles (b) β particles (c) γ rays (d) X rays

- (XI) Holes are majority carriers in
- (a) ionic solids
 - (b) metals
 - (c) intrinsic semiconductors
 - (d) extrinsic semiconductors
- (XII) Which of these electromagnetic rays are suitable for RADAR systems?
- (a) X rays
 - (b) U.V rays
 - (c) visible rays
 - (d) microwaves
- (XIII) How does the resistance of a conductor vary as a function of temperature.)
- (a) increases
 - (b) decreases
 - (c) remains same
 - (d) first increases then decreases
- (XIV) A galvanometer can be converted to ammeter by placing
- (a) small resistance in parallel
 - (b) small resistance in series
 - (c) large resistance in parallel
 - (d) large resistance in series
- (XV) The formation of mirage is explained by
- (a) total internal reflection of light
 - (b) refraction of light
 - (c) diffraction of light
 - (d) dispersion of light
- (XVI) A semiconductor doped with donor impurity is
- (a) p type
 - (b) n type
 - (c) intrinsic semiconductor
 - (d) none
- (XVII) When we apply reverse bias to a junction diode it
- (a) lowers the potential barrier
 - (b) raises the potential barrier
 - (c) increases the majority carriers of current
 - (d) decreases the majority carries of current
- (XVIII) The S.I Unit of mutual inductance is
- (a) henry
 - (b) weber
 - (c) tesla
 - (d) farad
- (XIX) According to Huygen's principle, light is a form of
- (a) particle
 - (b) rays
 - (c) wave
 - (d) none of above
- (XX) When a ray of light enters a glass slab, then
- (a) its frequency and colour change
 - (b) only frequency changes
 - (c) its frequency and wavelength change

- (d) its frequency does not change
- (XXI) The de-Broglie wavelength of a tennis ball of mass 66g moving with velocity of 10 m/s is approximately
- (a) 10^{-33}m (b) 10^{-31}m (c) 10^{-16}m (d) 10^{-25}m
- (XXII) Atoms having different atomic number as well as different mass number but having same number of neutrons are called
- (a) isotopes (b) isobars (c) isotones (d) radioisotopes
- (XXIII) Which of the following in motion can not be deflected by magnetic field?
- (a) electron (b) proton (c) sodium ion (d) neutron

TRUE / FALSE :

- (XXIV) Semiconductors can only be doped with pentavalent impurity.
- (XXV) The shape of equipotential surface due to point charge is always spherical.
- (XXVI) Magnetic dipole moment is a scalar quantity.
- (XXVII) The power of thick lens is smaller than that of thin lens.
- (XXVIII) In moving coil galvanometer, we use radial magnetic field so that the scale is linear.

TWO MARKS QUESTIONS :

- Q2.** No two electric lines of force intersect each other. Why?

OR

A capacitor is charged through a potential difference of 200V, when 0.1C charge is stored in it. How much energy will it release when it is discharged?

- Q3.** Write two differences between emf and terminal potential difference of a cell.

OR

The resistance in the left gap of a metre bridge is 10Ω and balance point is reached at 40 cm from left, then calculate the unknown resistance.

- Q4.** Which rule is used to find direction of magnetic field acting at a point near a current carrying straight conductor, also state this rule?
- Q5.** A capacitor blocks d.c but allows a.c to pass through it. Why?
- Q6.** Write two uses of I.R. rays.
- Q7.** Define (i) stopping potential
(ii) work function, in relation to photoelectric emission

OR

Calculate the de-Broglie wavelength for electrons moving with speed of 6×10^5 m/s.

- Q8.** Prove that nuclear density is independent of mass number.

THREE MARKS QUESTIONS:

Q9. With the help of circuit diagram explain how potentiometer is used to compare e.m.f of two cells.

Q10. Find magnetic field intensity at a point well within the solenoid carrying current.

OR

A solenoid is 2.0m long and 3.0m in diameter. It has 5 layers of windings of 1000 turns each and carries a current of 5.0 A, what is the magnetic field at its centre, given $\mu_0 = 4\pi \times 10^{-10} \text{ T A}^{-1}\text{m}$.

Q11. Define mean value of a.c Also derive expression for it.

OR

An a.c source of 200V, 50Hz connected across a 400Ω resistor and an inductor of $3/\pi$ H in series. Calculate reactance, impedance, current in the coil.

Q12. Prove laws of refraction of light on the basis of Huygen's principle.

OR

In Young's experiment, two slits are kept 1mm apart and screen is placed 1m away. What is the fringe width when light of wavelength 500nm is used?

Q13. Find expression for radius of orbit of electrons in hydrogen atom by using Bohr's postulates.

Q14. With the help of circuit diagram explain the working of full wave rectifier.

FIVE MARKS QUESTIONS :

Q15. Define capacitance of parallel plate capacitor. Find expression for capacitance of parallel plate capacitor having dielectric slab introduced between the plates.

OR

State Gauss theorem. Using it find expression for electric field intensity due to an infinitely long straight uniformly charged wire.

Q16. Discuss Fraunhofer diffraction at a single slit. Also derive expression for linear width of central maximum.

OR

Draw a course of rays in case of astronomical refracting telescope when final image is formed at infinity. Obtain expression for its magnifying power.

