

Standard 12
PHYSICS
Part - I

Time: 3.00 Hours

Marks: 70
15x1=15

Note: Answer all the questions.
Choose the best answer.

- 1) Which charge configuration produces a uniform electric field?
 - a) Point charge
 - b) infinite uniform line charge
 - c) uniformly charged infinite plane
 - d) uniformly charged spherical shell
- 2) A dipole of dipole moment \vec{p} placed in an uniform electric field \vec{E} with angle θ . Then the torque acting on the dipole is
 - a) along \vec{p}
 - b) Opposite \vec{p}
 - c) along \vec{E}
 - d) perpendicular to plane containing \vec{p} and \vec{E}
- 3) The temperature coefficient of resistance of a wire is $0.00125 \text{ per}^\circ\text{C}$. At 20°C , its resistance is 1Ω . The resistance of the wire will be 2Ω at
 - a) 800°C
 - b) 700°C
 - c) 850°C
 - d) 820°C
- 4) A Circular coil of radius $5 \times 10^{-2} \text{ m}$ and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is
 - a) 1.0 Am^2
 - b) 1.2 Am^2
 - c) 0.5 Am^2
 - d) 0.8 Am^2
- 5) The vertical component of Earth's 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) At resonance of LCR circuit
 - a) Impedance (Z) maximum
 - b) current minimum
 - c) Impedance (Z) is equal to R
 - d) $\gamma_0 = \frac{1}{\sqrt{LC}}$
- 7) Which of the electromagnetic wave used to view the objects through thick fog
 - a) Microwave
 - b) γ -ray
 - c) X-ray
 - d) IR waves
- 8) "Sky Wax" is an application of nano product in the field of
 - a) Medicine
 - b) Textile
 - c) sports
 - d) Automotive industry
- 9) The materials used in Robotics are
 - a) Aluminium and silver
 - b) Silver and gold
 - c) Copper and gold
 - d) steel and aluminum
- 10) What is the Logic operation of given circuit

 - a) AND
 - b) OR
 - c) NAND
 - d) Ex-OR
- 11) If the nuclear radius of ^{27}Al is 3.6 fermi, the approximate nuclear radius of ^{64}Cu is
 - a) 2.4
 - b) 1.2
 - c) 4.8
 - d) 3.6
- 12) Emission of electrons by the absorption of heat energy is called emission
 - a) photoelectric
 - b) field
 - c) thermionic
 - d) secondary
- 13) Light travels 50cm through the medium of refractive index 1.5 from the medium of refractive index 1. Then the optical path of the medium is
 - a) 50 cm
 - b) 25 cm
 - c) 75 cm
 - d) None of the above

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- 14) The transverse nature of light is shown in
 a) interference b) diffraction c) scattering d) polarisation
- 15) Order the emitted particles in the given reaction
 ${}_Z A^A \rightarrow {}_{Z-1} Y^A \rightarrow {}_{Z-1} K^{A-4} \rightarrow {}_{Z-1} K^{A-4}$
 a) α, β, γ b) β, α, γ c) γ, α, β d) γ, β, α

6x2=12

Part - II

Note: Answer any 6 questions. Q.No. 19 is compulsory.

- ✓16) What are the differences between Coulomb force and gravitational force?
 ✓17) State Kirchhoff's voltage rule?
 18) What are the limitations of cyclotron?
 ✓19) The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak value, frequency, time period and instantaneous value at $t = 2\text{ms}$.
 ✓20) What is meant by Fraunhofer lines?
 21) An object is placed at a certain distance from a convex lens of focal length 20cm. Find the distance of the object if the image obtained is magnified 4 times.
 ✓22) What is a photo cell? Mention the different types of photo cells?
 ✓23) Define curie.
 24) Write the D-Morgan's theorem.

6x3=18

Part - III

Note: Answer any 6 questions. Q.No. 26 is compulsory.

- ✓25) Obtain Gauss Law from Coulomb's law
 ✓26) When two resistances connected in series and Parallel their equivalent resistances are 15Ω and $56/15\Omega$ respectively. Find the individual resistances.
 ✓27) Write the special features of Larmor Force.
 28) How can the Induced emf produced by changing the area of the coil?
 ✓29) Write and six properties of electromagnetic waves.
 30) Write note on: i) Mirrage ii) Total internal reflection
 ✓31) State and prove Brewster's Law
 ✓32) Note on characteristic X-ray spectrum
 33) Calculate the time required for 60% of a sample of radon undergo decay. (Given $T_{1/2}$ of radon = 3.8 days)

Part - IV

5x5=25

Note: Answer all the questions.

- 34) a) Explain in detail the construction and working of a Van De Graff generator.
 (OR)
 b) Write the Integral form of Maxwell's Equations.
- 35) a) Compare the emf of two cells using potential meter.
 (OR)
 b) State De-Broglie hypothesis and Derive an expression for De - Broglie Wave length of electrons.
- 36) a) Explain the construction and working of transformer.
 (OR)
 b) What is dispersion? Obtain the equation for dispersive power of a prism
- 37) a) Explain the simple Microscope and Derive the expression for magnification in near point focussing.
 (OR)
 b) Find the Radius and the Velocity of orbiting electron in the n^{th} orbit using Bohr hypothesis.
- 38) a) What is half - Wave rectifier and explain its function.
 (OR)
 b) Deduce the relation for the magnetic induction at a point due to an infinitely long straight conductor carrying current.