

RTVM

REVISION EXAMINATION - 2024

12 - Std

PHYSICS

TV904

Time : 3.00 hrs

7

12-PHY-EM

PART - I

Note : Answer all the questions. ii) Choose the most appropriate the given four alternatives and write the option code and answer.

- Which charge configuration produces a uniform electric field?
 - Point charge
 - uniformly charged infinite plane
 - uniformly charged infinite line
 - uniformly charged spherical shell.
- 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 doubled then which is the quantity that will change?
 - capacitance
 - charge
 - voltage
 - energy density
- The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is
 - 0.2 Ω
 - 0.5 Ω
 - 0.8 Ω
 - 1.0 Ω
- A wire of length l carrying a current I along the y - direction is kept in a magnetic field given by $\vec{B} = \frac{\beta}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k})T$. The magnitude of Lorentz force acting on the wire is
 - $\sqrt{\frac{2}{3}}\beta Il$
 - $\sqrt{\frac{1}{3}}\beta Il$
 - $\sqrt{2}\beta Il$
 - $\sqrt{\frac{1}{2}}\beta Il$
- In an oscillating LC circuit, the maximum charge on the capacitor is Q . The charge on the capacitor when the energy is stored equally between the electric and magnetic fields is
 - $\frac{Q}{2}$
 - $\frac{Q}{\sqrt{2}}$
 - $\frac{Q}{\sqrt{3}}$
 - Q
- Fraunhofer lines are an example of spectrum.
 - line emission
 - line absorption
 - band emission
 - band absorption
- Which of the following is an electromagnetic wave?
 - α - rays
 - β - rays
 - γ - rays
 - all of them
- Stars twinkle due to
 - reflection
 - total internal reflection
 - refraction
 - polarisation
- In Young's double slit experiment the slit separation is doubled to maintain the same fringe spacing on the screen. The screen to slit distance D must be changed to
 - $2D$
 - $\frac{D}{2}$
 - $\sqrt{2}D$
 - $\frac{D}{\sqrt{2}}$
- The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by
 - $\lambda_e \propto \lambda_p$
 - $\lambda_e \propto \sqrt{\lambda_p}$
 - $\lambda_e \propto \frac{1}{\sqrt{\lambda_p}}$
 - $\lambda_e \propto \lambda_p^2$
- Emission of electrons by the absorption of heat energy is called emission.
 - photo electric
 - field
 - thermionic
 - secondary
- The nucleus is approximately spherical in shape. Then the surface area of nucleus having mass number A varies as
 - $A^{2/3}$
 - $A^{1/3}$
 - $A^{1/2}$
 - $A^{3/2}$

13. The Zener diode is primarily used as
a) rectifier b) amplifier c) oscillator d) voltage regulator
14. The particle size of ZnO material is 30nm. Based on the dimension it is classified as
a) Bulk material b) Nano material c) soft material d) magnetic material
15. The blue print for making ultra durable synthetic material is mimicked from
a) lotus leaf b) morpho butterfly c) parrot fish d) peacock feather

PART - II

Answer any six questions and question number 16 is compulsory.

6 × 2 = 12

16. Define electric dipole moment. Give its unit.
17. What is displacement current?
18. State Ampere's circuital law.
19. Mention the ways of producing induced emf
20. Write the uses of infra- red rays.
21. Why does the sky appears blue?
22. What is Peltier effect?
23. Define stopping potential.
24. An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed as per turn of the secondary coil if the transformer is connected to a 230v Ac mains.

PART - III

Answer any six questions and question number 33 is compulsory.

6 × 3 = 18

25. Obtain the expression for an energy stored in the parallel plate capacitor.
26. State Kirchoff's current and voltage rule.
27. Mention the various energy losses in a transformer.
28. Derive the relation between f and R for a spherical mirror.
29. Mention the difference between interference and diffraction.
30. Give the uses of polaroids.
31. List out salient features of magnetic Lorentz force.
32. Give the construction and working of a photo emission cell.
33. Find the impedance of a series RLC circuit, if the inductive reactance, capacitive reactance, and resistance are 184Ω , 144Ω and 30Ω respectively. Also calculate the phase angle between voltage and current.

PART- IV

Answer all the questions.

5 × 5 = 25

34. a) Calculate the electric field due to a dipole on its axial line. **(OR)**
b) Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current.
35. a) Explain the determination of the internal resistance of cell using voltmeter. **(OR)**
b) Explain the construction and working of a transformer.
36. Write down Maxwell equations in integral form. **(OR)** Obtain lens maker's formula.
37. a) Describe Davisson - Germer experiment which demonstrated the wave nature of electrons. **(OR)**
b) Explain the spectral series of hydrogen atom.
38. a) What is frequency? List out the advantage and limitations of frequency modulation. **(OR)**
b) Explain the construction and working of a full wave rectifier.