

Class : 12

Register Number

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SECOND REVISION EXAMINATION - 2025**PHYSICS**

Time Allowed : 3.00 Hours]

[Max. Marks : 70

PART - I

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15x1=15

I. Answer all the questions.

Choose the correct answer.

1. Suppose the radius of the sphere of Vande graff generator is 0.5 m and electric field at the surface is $3 \times 10^8 \text{ NC}^{-1}$ then the potential created will be
(a) $1.5 \times 10^6 \text{ V}$ (b) $15 \times 10^6 \text{ V}$ (c) $1.5 \times 10^8 \text{ V}$ (d) $15 \times 10^8 \text{ V}$
2. The rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such way that its end closer to the pole is 20 cm away from the mirror. The length of the image is
(a) 2.5 cm (b) 5 cm (c) 10 cm (d) 15 cm
3. A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\lambda/2$. If the maximum kinetic energy of emitted photoelectrons in the second case is 3 times that in the first case, the work function of the material is
a) $\frac{hc}{\lambda}$ b) $\frac{2hc}{\lambda}$ c) $\frac{hc}{3\lambda}$ d) $\frac{hc}{2\lambda}$
4. Two wires of A and B with circular cross section are made up of the same material with equal length. Suppose $R_A = 3R_B$, then what is the ratio of radius of wire A to that of 'B'?
a) 3 b) $\sqrt{3}$ c) $1/\sqrt{3}$ d) $1/3$
5. A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly.
(a) 1.0 Am^2 (b) 1.2 Am^2 (c) 0.5 Am^2 (d) 0.8 Am^2
6. If the magnification of small astronomical telescope is 50 and the focal length of eye-piece is 2cm, then the tube length of the telescope is
(a) 102 m (b) 1.02 cm (c) 1.02 m (d) 52 cm
7. In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in the primary is 6A, then that in the secondary coil is
(a) 2 A (b) 18 A (c) 12 A (d) 1 A
8. If the amplitude of the magnetic field is $3 \times 10^{-6} \text{ T}$, then amplitude of the electric field for the electromagnetic waves is
(a) 100 Vm^{-1} (b) 300 Vm^{-1} (c) 600 Vm^{-1} (d) 900 Vm^{-1}
9. The method of making nanomaterial by assembling the atoms is called
(a) Top down approach (b) Bottom up approach
(c) Cross down approach (d) Diagonal approach
10. The light emitted in an LED is due to
(a) Recombination of charge carriers (b) Reflection of light due to lens action
(c) Amplification of light falling at the junction (d) Large current capacity
11. Two identical conducting balls having positive charges q_1 and q_2 are separated by a centre to centre distance 'r'. If they are made to touch each other and then separated to the same distance, the force between them will be
(a) less than before (b) Same as before (c) more than before (d) Zero
12. The power generated due to induced emf by changing the area of the coil
(a) $\frac{B^2 V^2}{R}$ (b) $\frac{B^2 r V^2}{R}$ (c) $\frac{B^2 r V}{R^2}$ (d) $\left(\frac{B r V}{R}\right)^2$
13. Which of the following statement is true for cause and effect, relationship
(a) $E \propto q$ and $B \propto |dl|$ (b) $B \propto qdl$ and $E \propto |dl|$
(c) $E \propto q^2$ and $B \propto (|dl|)^2$ (d) $E \propto q$ and $B \propto (|dl|)^2$

14. In discharge tube, the pressure at 0.01 mm of mercury the following phenomenon happens.
- Positive column appears, Crooke's dark space disappears
 - Both positive column and Crooke's dark space appear.
 - Crooke's dark space disappears but cathode rays are produced.
 - Positive column appears and cathode rays are produced.
15. The ratio of the wavelengths of radiation emitted for the transition from $n=2$ to $n=1$ in Li^{++} , He^+ and H is
- 1:2:3
 - 1:4:9
 - 3:2:1
 - 4:9:36

PART - II

II. Answer any six questions. Question Number 24 is Compulsory. 6x2=12

- State Coulomb's law in electrostatics?
- In a transistor connected in the common base configuration. $\alpha = 0.95$, $I_E = 1$ mA. Calculate I_C and I_B
- Define work function of a metal. Give its unit.
- Distinguish between drift velocity and mobility.
- Define ionisation potential.
- An ideal inductor blocks AC. Why?
- What are Fraunhofer lines.
- Define ampere.
- Light travelling through transparent oil enters into glass of refractive index 1.5. If the refractive index of glass with respect to the oil is 1.25. What is refractive index of the oil.

PART - III

III. Answer any six questions. Question Number 33 is Compulsory. 6x3=18

- What are the differences between Coulomb force and gravitational force?
- Obtain the equation for apparent depth?
- Find the de Broglie wavelength associated with an alpha particle which is accelerated through a potential difference of 400 V. Given that the mass of the proton is 1.67×10^{-27} Kg.
- Give the properties of dia/para/ferromagnetic materials.
- State and obtain Malus' law.
- A 400 mH coil of negligible resistance is connected to an AC circuit in which an effective current of 6 mA is flowing. Find out the voltage across the coil if the frequency is 1000 Hz.
- Discuss the beta decay process with an example?
- What does RADAR stand for? Give the application of RADAR?
- The Resistance of a nichrome wire at 20°C is 10Ω . If its temperature coefficient of resistivity of nichrome is $0.004/^\circ\text{C}$, find the resistance of the wire at boiling point of water. Comment on the result.

PART - IV

IV. Answer all the questions. 5x5=25

- (a) Calculate the electric field due to dipole on its axial line. (OR)
(b) Derive mirror equation.
- (a) Obtain the law of radioactivity. (OR)
(b) Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
- (a) How the emf of two cells are compared using potentiometer. (OR)
(b) i) What is rectification?
ii) Draw the circuit diagram of a half wave rectifier and explain its working.
- (a) Explain the effect of potential difference on photoelectric current? (OR)
(b) Discuss the working of cyclotron in detail.
- (a) Explain the types of absorption spectrum. (OR)
(b) Prove law of refraction using Huygen's principle.