

Model Question Paper-Batch IV
Second year Higher Secondary Examination
PHYSICS

Answer any 5 questions from 1 to 7. Each question carries 1 mark.

(5 X 1= 5 marks)

1. SI unit of Electric field is _____

2. Work done in an equipotential surface

$$\left(\frac{1}{4\pi\epsilon_0} \frac{q}{r^2}, \text{ Zero}, \frac{1}{4\pi\epsilon_0} \frac{q}{r}, \frac{1}{4\pi\epsilon_0} \rho \cos\theta \right)$$

3. Principle of AC Generator is _____

4. Electromagnetic wave used in RADAR is _____

5. Unit of Power of a lens is _____

6. Ionisation energy of Hydrogen atom

(+13.6 eV , -13.6 eV , + 13.6 J , -13.6 eV)

7. Binding Energy per nucleon is maximum for –

(Ag , Au , Fe , U)

Answer any 5 questions from 8 to 14. Each question carries 2 mark.

(5 X 2=10 marks)

8. Obtain the relation between Electric current and drift velocity.

9. Write two properties of magnetic field lines.

10. What are the Energy losses in Transformer ?

11. Find the frequency of electromagnetic wave , if the wavelength is 570 nm.

12. State Huygens principle.

13. Write the limitations of Rutherford 's nuclear atom model.

14. Atomic mass of Aluminium atom is 27. Find the radius of its nucleus.

(Given $R_0=1.2$ fermi.)

Answer any 6 questions from 15 to 21. Each question carries 3 mark.

(6 X 3= 18 marks)

15.(a) What do you mean by an Electric dipole ?

(1

mark)

(b) An Electric dipole with dipole moment 4×10^{-9} cm is aligned at 30° with the direction of a uniform Electric field of magnitude 5×10^4 N/C . Calculate the magnitude of the Torque acting on the dipole.

(2

marks)

16. Derive an expression for potential due to an electric dipole.

17.(a) State Ampere's circuital law.

(1 mark)

(b) Find the magnetic field inside the solenoid by applying Ampere's circuital law.

(2 marks)

18. Write any three differences between dia , para and ferromagnetic materials.

19. Obtain Snell's law of refraction using wave theory of light.
20. (a) Write Einstein's photoelectric equation. (1 mark)
 (b) Draw a graph showing variation of photoelectric current with intensity of light. (2 marks)
21. Explain working of a half wave rectifier with a neat diagram.

**Answer any 3 questions from 22 to 25..Each question carries 4 mark.
 (3 X 4= 12 marks)**

22. (a) Derive an expression for the Capacitance of a parallel plate capacitor. (3 marks)
 (b) What happens to the Capacitance when a dielectric is inserted between the plates of a capacitor ? (1 mark)
23. Draw a neat diagram of the Wheatstone bridge and arrive at its balancing condition. (2 marks.)
24. (a) Define Self inductance and write its unit. (2 marks)
 (b) Current in a circuit falls from 5.0 A to 0.0 A in 0.1 s .If the average emf of 200V induced, give an estimate of the self inductance of the circuit. (2 marks)
25. With the help of a neat diagram arrive at an expression for finding the refractive index of a prism. (3 marks)

**Answer any 3 questions from 26 to 29..Each question carries 5 mark.
 (3 X 5= 15 marks)**

26. (a) State and explain Gauss's theorem in electrostatics. (2 marks)
 (b) Find the Electric field due to a uniformly charged spherical shell. (3 marks)
27. (a) State Biot-savart's law. (2 marks)
 (b) Using this law, find the expression for magnetic field on the axis of a circular current loop. (3 marks)
28. (a) Draw the phasor diagram for an LCR circuit. (2 marks)
 (b) Derive an expression for the impedance of an LCR circuit. (3 marks)
29. (a) Derive Lens maker's formula. (3 marks)

marks)

(b) For a convex lens, the radii of curvature of the faces are 10 cm and 15 cm and

its focal length is 12 cm. What is the refractive index of the material of lens ?

(2

marks)

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