

11. A transformer converts 200 V ac into 2000 V ac. Calculate the number of turns in the secondary if the primary has 10 turns.
12. If the wavelength of electromagnetic radiation is doubled , what happens to the energy of photon?
13. What is the relation between the amplitudes of the electric and magnetic fields in free space for an electromagnetic wave?
14. Give examples of “photosensitive substances”. Why are they called so?
15. State Heisenberg’s Uncertainty Principle.

SECTION - B

6 × 4 = 24

- Note:**
- (i) Answer **ANY SIX** questions.
 - (ii) Each question carries **FOUR** marks.
 - (iii) All are of short answer type questions.

16. Distinguish between half –wave and full-wave rectifiers.
17. Derive an expression for potential and kinetic energy of an electron in any orbit of a hydrogen atom according to Bohr’s atomic model. How does. P.E change with increasing **n**.
18. Obtain an expression for the emf induced across a conductor which is moved in a uniform magnetic field which is perpendicular to the plane of motion.
19. Obtain an expression for the magnetic dipole moment of a current loop.
20. Derive an expression for the electric potential due to a point charge.
21. Explain the distance of closest approach and impact parameter.
22. Explain the behaviour of dielectrics in an external field.
23. State Gauss’s law in electrostatics and explain its importance.
24. Derive the formula for equivalent capacitance in parallel combination.
25. Does the principle of conservation of energy hold for interference and diffraction phenomena? Explain briefly.
26. Derive an expression for the intensity of the electric field at a point on the equatorial plane of an electric dipole
27. Derive the equation for the couple acting on a electric dipole in a uniform electric field.
28. With a neat labelled diagram explain the formation of image in a simple microscope.

29. A light ray passes through a prism of angle A in a position of minimum deviation. Obtain an expression for (a) the angle of incidence in terms of the angle of the prism and the angle of minimum deviation (b) the angle of refraction in terms of the refractive index of the prism.

SECTION - C

2 × 8 = 16

- Note:** (i) Answer any **ANY TWO** questions.
(ii) Each question carries **EIGHT** marks.
(iii) All are long answer type questions.

30. What are beats? Obtain an expression for the beat frequency. Where and how are beats made use of?

Two organ pipes of lengths 65 cm and 70 cm respectively, are sounded simultaneously. How many beats per second will be produced between the fundamental frequencies of the two pipes? (Velocity of sound = 330 m/s).

31. State the working principle of potentiometer explain with the help of circuit diagram how the potentiometer is used to determine the internal resistance of the given primary cell.

A potentiometer wire is 5 m long and a potential difference of 6 V is maintained between its ends. Find the emf of a cell which balances against a length of 180 cm of the potentiometer wire.

32. Explain the principle and working of a nuclear reactor with the help of a labeled diagram.

Calculate the energy released by fission from 2 g of ${}^{235}_{92}\text{U}$ in kWh. Given that the energy released per fission is 200 Mev.

33. How are stationary waves formed in closed pipes? Explain the various modes of vibrations and obtain relations for their frequencies.

A closed organ pipe 70 cm long is sounded. If the velocity of sound is 331 m/s, what is the fundamental frequency of vibration of the air column?