

VERY SHORT QUESTIONS:**QUESTION NO:1**

1. Define 'power' of a convex lens. What is its unit?
2. What is hypermetropia? How can it be corrected?
3. What is myopia? How can it be corrected?
4. A small, angled prism of 4° deviates a ray through 2.48° . Find the refractive index of the prism.
5. What is dispersion? Which colour gets relatively more dispersed?

QUESTION NO:2

1. Distinguish between ammeter and voltmeter?
2. What is principle of moving coil galvanometer?
3. What is the importance of Oersted's experiment?
4. How do you convert a moving coil galvanometer into an ammeter?
5. State Ampere's law and Biot-savart's law.

QUESTION NO:3

1. Classify the following materials with regard to magnetism :
i) Manganese, ii) Cobalt, iii) Nickel iv) Bismuth, v) Oxygen, vi) Copper
2. Define magnetic inclination (or) angle of dip.
3. Magnetic lines of force form continuous closed loops. Why?
4. What direction compass needle points at poles? Which needle to be used at poles?
5. What are the units of Magnetic moment, Magnetic induction and Magnetic field?

QUESTION NO:4

1. Define magnetic declination.
2. What is the magnetic moment associated with a solenoid?
3. State Gauss law for Magnetism?
4. What happens to compass needles at the Earth's pole?
5. Magnetic lines of force form continuous closed loops. Why?

QUESTION NO:5

1. A transformer converts 200V ac into 2000V ac. Calculate the number of turns in the secondary if the primary has 10 turns.
2. What is the phenomenon involved in the working of a transformer?

3. What type of transformer is used in a 6V bed lamp?
4. What is transformer ratio?
5. A power transmission line feeds input power at 2300V to a stepdown transformer with its primary windings having 4000 turns. What should be the number of turns in the secondary in order to get output power at 230V?

QUESTION NO:6

1. What is the principle of production of electromagnetic waves?
2. What are the applications of microwaves?
3. Give two uses of infrared rays? Which animal can detect infrared waves?
4. If the wavelength of electromagnetic radiation is doubled what happens to the energy of photon?
5. Micro waves are used in Radars why ?

QUESTION NO:7

1. What are “cathode rays”?
2. What is ‘Work function’ ?
3. What is “Photo electric effect”?
4. What important fact did Millikan’s experiment establish?
5. How is the De-Broglie wavelength associated with an electron accelerated through a potential difference of 100 volts?

QUESTION NO:8

1. Write down DE Broglie’s relation and explain the terms there in.
2. Write down Einstein’s photo electric equation.
3. State Heisenberg’s Uncertainty principle?
4. Give examples of “Photosensitive substances” why they are called so?

QUESTION NO:9

1. Draw the circuit symbols for p-n-p and n-p-n transistors.
2. Which gates are called universal gates?
3. What is a p-n junction diode? Define depletion layer.
4. What is a p-type semi-conductor ? What are the majority and minority charge carriers in it?
5. What happens to the width of the depletion layer in a p-n junction diode when it is in
(i) forward biased and (ii) reverse biased?

QUESTION NO:10

1. What are the basic blocks of communication system?
2. Define modulation. Why is it necessary?
3. Which type of communication is employed in Mobile Phones?
4. What is sky wave propagation?

5. Mention the basic methods of modulation

II SHORT ANSWER QUESTIONS:

QUESTION NO:11

1. Why does the setting sun appear red?
2. Explain the formation of a rainbow?
3. Define critical angle. Explain total internal reflection using a neat diagram?
4. Explain the formation of mirage?
5. With a neat, labelled diagram explain the formation of image in a simple microscope?

QUESTION NO:12

1. How do you determine the resolving power of your eye?
2. Explain Doppler effect in light. Distinguish between red shift and blue shift?
3. Derive the expression for the intensity at a point where interference of light occurs. Arrive at conditions for maximum and zero intensity.
4. Does the principle of conservation of energy hold for interference and diffraction phenomena? Explain briefly?

QUESTION NO:13

1. State and explain Coulomb's inverse square law in electricity.
2. State Gauss's law in electrostatics and its importance.
3. Derive an expression for the intensity of electric field at a point on the axial line of a dipole.
4. Derive an expression for the intensity of electric field at a point on the equatorial plane of an electric dipole.
5. Define intensity of electric field at a point. Derive an expression for the intensity due to a point charge.

QUESTION NO:14

1. Derive an expression for the capacitance of a parallel plate capacitor
2. Explain behaviour of dielectrics in an external field.
3. Explain series and parallel combination of capacitors. Derive the formula for equivalent capacitance in each combination.
4. Derive an expression for the electric potential due to point charge.
5. Derive expression for the potential energy of an electric dipole placed in a uniform electric field.

QUESTION NO:15

1. State and explain Biot-Savart law.
2. State and explain Ampere's law.
3. A current of 10A passes through two very long wires held parallel to each other and separated by a distance of 1m. What is the force per unit length between them?
4. Derive an expression for the magnetic field at a point on the axis of a current carrying circular coil using Biot-Savart law?

5. Derive an expression for the magnetic induction at the centre of a current carrying circular coil using Biot-Savart law?

QUESTION NO:16

1. Describe the ways in which Eddy currents are used to advantage.
2. Obtain an expression for the mutual inductance of two long co-axial solenoids.
3. 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.
4. Obtain an expression for the magnetic energy stored in a solenoid in terms of the magnetic field, area and length of the solenoid.

QUESTION NO:17

1. Explain the different types of spectral series.
2. What are the limitations of Bohr's theory of hydrogen atom?
3. State the basic postulates of Bohr's theory of atomic spectra.
4. Describe Rutherford atom model. What are the drawbacks of this model?
5. The wave length of first member of Balmer Series is 6563 \AA . Calculate the wave length of second member of Lyman Series.

QUESTION NO:18

1. Describe how a semiconductor diode is used as a Half wave rectifier.
2. Distinguish between half-wave and full-wave rectifiers.
3. What is rectification? Explain the working of a full-wave rectifier.
4. Define NAND and NOR gates. Give their truth tables. or Write truth tables of Universal Logic gates.
Which gates are called universal gates.
5. What are n-type and p-type semiconductors? How is a semiconductor junction formed?

III LONG ANSWER QUESTIONS:

QUESTION NO:19

1. a. Explain the formation of stationary wave in an air column enclosed in open pipe. Derive the equations for the frequencies of the harmonics produced.
b. A Pipe 30cm long is open at both ends. Find the fundamental frequency. Velocity of sound in air is 330m/s
a. Explain the formation of stationary waves in stretched strings and hence deduce the laws of transverse waves in stretched string?
b. A steel wire 0.72m long has a mass of $5.0 \times 10^{-3} \text{ kg}$. If the wire is under a tension of 60N, What is the speed of transverse waves on the wire?

2. a. How are stationary waves formed in closed pipes? Explain the various modes of vibrations and obtain relations for their frequencies.
- b. A closed organ pipe 70cm long is sounded. If the velocity of sound is 331m/s, what is the fundamental frequency of vibration of the air column?
3. What is Doppler effect? Obtain an expression for the apparent frequency of sound heard when the source is in motion with respect to an observer at rest.
4. a. What are beats? Obtain an expression for the beat frequency. Where and how are beats made use of?
- b. Two organ pipes of lengths 65cm and 70cm respectively, are sounded simultaneously. How many beats per second will be produced between the fundamental frequencies of the two pipes.
(Velocity of sound=330m/s)

QUESTION NO:20

1. a. State Kirchhoff's laws for electrical network. Using these laws deduce the condition for balancing in a Wheatstone bridge.
- b. The four resistors $20\ \Omega$, $40\ \Omega$, $(20 + x)\ \Omega$, $80\ \Omega$, S respectively form a wheat stone bridge, find the value of 'x', if bridge is balanced.
2. a. 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.
- b. In a potentiometer arrangement a cell of emf 1.25V gives a balance point at 35.0cm length of the wire. If the cell is replaced by another cell and the balance point shifts to 63.0 cm what is the emf of the second cell?
3. a. State the working principle of potentiometer explain with the help of circuit diagram. How the emf of two primary cells are compared by using the potentiometer.
- b. A wire of resistance $4R$ is bent in the form of a circle. What is the effective resistance between the ends of the diameter.

QUESTION NO:21

1. Explain the principle and working of a nuclear reactor with the help of a labelled diagram. Find the energy equivalent of one atomic mass unit in joules.
2. What is radioactivity? State the law of radioactive decay. Show that radioactive decay is exponential in nature.
3. Explain the source of stellar energy. Explain the carbon-nitrogen cycle, proton-proton cycle occurring in stars