

MODEL PAPER-3

Time : 3Hrs.

PHYSICS

Max.Marks: 60

SECTION - A

Answer all questions.

Each question carries 2 marks.

All are very short answer type questions.

10 × 2 = 20 Marks.

1. Why are household appliances connected in parallel?
2. How do you convert a moving coil galvanometer into a voltmeter?
3. What is myopia? How can it be corrected?
4. What is sky wave propagation?
5. Write the truth table of NAND gate. How does it differ from AND gate?
6. The air column in a long tube, closed at one end, is set in vibration. What harmonics are possible in the vibrating air column?
7. What are eddy currents?
8. What is Fresnel distance?
9. Define magnetic inclination or angle of dip.
10. If the wavelength of electromagnetic radiation is doubled. What happens to the energy of photon?

SECTION - B

Answer any six questions.

Each question carries 4 marks.

All are short answer type questions.

6 × 4 = 24 Marks.

11. Derive an expression for the electrostatic potential energy of a system of two point charges and find its relation with electric potential of a charge.

12. Draw a circuit diagram showing how a potentiometer may be used to find internal resistance of a cell and establish a formula for it.
13. 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.
14. Discuss the intensity of transmitted light when a polaroid sheet is rotated between two crossed polaroids.
15. Derive an expression for the electric intensity of electric field at a point on the equatorial line of an electric dipole.
16. Define Retentivity and coercivity. Draw the hysteresis curve for soft iron and steel. What do you infer from these curves?
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. Draw and explain the current – voltage (I-V) characteristic curves of a junction diode in forward and reverse bias.

SECTION - C

Answer any two of the following.

Each question carries 8 marks.

All are long answer type questions.

8 × 2 = 16 Marks.

19. What is Doppler's shift? Obtain an expression for the apparent frequency of sound heard when the observer is in motion with respect to a source at rest.
Two trucks heading in opposite direction with speeds of 60 kmph and 70 kmph respectively approach each other. The driver of the first truck sounds his horn of frequency 400Hz. What frequency does the driver of the second truck hear? (Velocity of sound = 330 m/s). After the two trucks have passed each other, what frequency does the driver of the second truck hear?
20. Derive an expression for the force acting between two very long parallel current carrying conductors and hence the define ampere.

A current of 10 A passes through two very long wires held parallel to each other and separated by a distance of 1 m. What is the force per unit length between them?

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

The half-life of radium is 1600 years. How much time does 1 g of radium take to reduce to 0.125g.

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