

HSEIRKN15

6416-X

PHYSICS

(Long Answer Type Questions)

1. State the principle of superposition of charges. Derive an expression for the force on a charge "q" due to discrete position of n-charges in terms of their position vectors.

Or

Discuss briefly the principle, construction and working of van de Graff generator.

2. Derive an expression for the force per unit length between two long straight parallel conductors carrying current in the same direction and hence define the unit of current.

Or

State and explain Ampere circuit law and find the magnetic field at a point inside the solenoid carrying current.

3. State Lenz's law of Electromagnetic Induction. Show that it is in accordance with Law of Conservation of Energy

Or

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What is meant by root mean square value of alternating current? Derive an expression for r.m.s. value of alternating current.

4. State Huygen's principle and prove the laws of refraction on its basis

Or

Derive lens maker's formula for a convex lens.

(Short Answer Type Questions)

5. A wire of resistance one ohm is stretched to double its length. What! is the new resistance?

6. Define resistivity of material and discuss the factors on which it depends

7. State and prove Brewster's law.
8. The angle of minimum deviation for prism of angle $\frac{\pi}{3}$ is $\frac{\pi}{6}$. Calculate the velocity in the material of prism, if the velocity of light in vacuum is 3×10^8 m/sec.
9. Calculate the radius of the smallest orbit of Hydrogen atom.
10. Give the logic symbol, truth table, Boolean expression and realization (circuit diagram) of NOT gate.
11. Distinguish amongst insulators, conductors and semiconductors in terms of their Energy, band diagram.
12. Ground wave propagation is not suitable for high frequency. Discuss.

(Very Short Answer type Questions)

13. The following very short answer type questions of two marks, each may be answered in a few words or few sentences or as may be required: <https://www.jkboseonline.com>

- (a) How many electrons are present in pc of charge ?
- (b) State two factors by which the current sensitivity of a moving coil galvanometer can be improved.
- (c) What is Wattless current ?
- (d) Which of the following has shortest wavelength
 - (i) Microwaves
 - (ii) Ultraviolet and
 - (iii) X-ray
- (e) What do you understand by mass defect?
- (f) State Einstein's Photoelectric Equation.
- (g) Write the expression for the de-Broglie wavelength of photon.
- (h) What do you mean by magnifying power of a microscope ?

(Objective Type Questions)

14. Choose the correct/most appropriate answer and write it in your answer-book :

- (i) 1 Volt equals :

(a) 1 Joule (b) 1 J/C (c) ICAJ (d) 1 JC

(ii) Resistivity of a conductor depends on its :

(a) Length (b) Volume (c) Area of cross-section (d) Temperature

(iii) Define the term magnetic moment.

(iv) Transformer is based upon principle field.

(V) Sky appears blue because of

(vi) 1 amu = MeV.

(VII) AN type of semiconductor is negatively charged. (True/False)

(viii) The speed of Electromagnetic waves in vacuum is :

(a) $\sqrt{\mu_0 \epsilon_0}$ (b) $\mu_0 \epsilon_0$ (c) $\frac{\epsilon_0}{\mu_0}$ (d) $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$

(ix) Communication channel consist of:

(a) Transmission line (b) Optical fibre (c) Free space (d) All of them

(x) Modulated wave is....

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