HSEIIRKO - 13

81017-P

PHYSICS

(Long Answer Type Questions)

1. Using Gauss's theorem derive an expression for electric field due to a uniformly charged spherical shell (i) at a point outside the shell (ii) at a point inside the shell.

Or

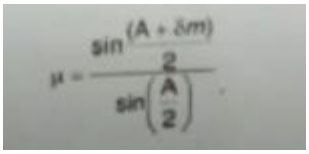
What is electric potential energy? Derive an expression for potential energy of a system of two point charges.

2. Calculate force per unit length between two long straight conductors carrying current in the same direction and hence define Ampere,

Or

Derive an expression for torque acting on a bar magnet held at an angle with the direction of uniform magnetic field.

3. Discuss the phenomenon of refraction through a prism and prove that for a prism



Or

What is Polarisation of light? Explain Brewster's law.

4. Eplain formation of energy bands in solids and define conduction band and valence band

OF

Explain the working of a NOT gate. Give its symbol and write its truth table and 32 nimiz expression

(Short Answer Type Questions)

5. A parallel plate capacitor having plate area of 10chicm each and are separated by 2.5 mm. The capacitor is charged to 200 V. Calculate energy stored in capacitor.

6. Deduce Wheatstone bridge principle using Kirchhoff's laws.

7. What are Eddy currents? How can they be 32inimized?

8. Give six properties of electromagnetic waves.

9. Write three points of difference between interference and diffraction pattern of light

10. Calculate the frequency and wavelength associated with a photon of energy 6.6×10^{-15} J (Given $h = 6.6 \times 10^{34}$ JS).

11. What is meant by half-life of a radioactive elehrtent? Derive an expression for it

12. Discuss briefly, how amplitude modulated wave is produced?

(Very Short Answer Type Questions)

13. What are the factors on which resistance of a conductor depends? Give corresponding relation.

14. How do magnetic field lines prefer to pass through a ferromagnetic substances than through air?

15. What is electric resonance?

16. Name various methods of producing induced e.m.f.

17 Give two applications of optical fibres.

18 Calculate the value of Rydberg's constant

19. The refractive index of glass is 1.5. Find the speed of light in glass.

20. Name the elements of Communication System.

(Objective Type Questions)

21. (A) Do as directed

(I) Alloys are used to make standard resistances and not pure conductors (True/False)

(ii) Potentiometer measures e.m.f. of a cell without drawing any current from the cell.

(True/False)

(iii) The S.l. unit of magnetic field strength is.....

(iv) The dimensional formula for co-efficient of self-inductance is.....

(v) Two coherent sources have wavelength of λ_A and λ_B. Then $\lambda_A = \lambda_B$ (True/False)

(B) Choose the correct/most appropriate answer:

(vi) The phenomenon responsible for blue colour of sky is:

(a) Dispersion (b) Polarisation (C) Scattering (d) Diffraction

(vii) If particles are moving with same velocity, then maximum de Broglie wavelength is for.

(a) Proton (b) Neutron (c) α-particle (d) β-particle

(viii) The penetrating power is maximum for:

(a) α -rays (b) β -rays (c) Protons (d) λ-rays

(ix) A semiconductor is cooled from T.K to TK Is resistance

(a) will increase (b) will decrease (c) will not change (d) will first decrease then increase

(x) If the reverse voltage in a diode is increased the width of depletion region.

(a) increase (b) decrease (c) fluctuates (d) does not change