HSEIIRPKGN17

15808

PHYSICS

Time : 3 Hours] [Maximum Marks : 70

(Long Answer Type Questions) 5 each

1. What is a capacitor ? Explain its principle. Obtain a relation for the capacitance of a parallel plate capacitor.

Or

State Gauss's law in electrostatics. Derive an expression for electric field due to a uniformly charged spherical shell at a point inside the shell.

2. State Biot-Savart law. Derive an expression for the magnetic field at the axis of circular current carrying coil.

Or

Give the principle construction and working of moving coil galvanometer.

3. State and explain Lenz's law. How will you verify it experimentally ?

Or

Give the principle construction and working of A. C. generator.

4. Explain the working of a compound microscope. Obtain expression for its magnification power.

Or

State laws of reflection and verify these using Huygen's wave theory.

(Short Answer Type Questions) 3 each

5. State and explain the law of conservation of charge.

6. What is a potentiometer ? How is it used to compare e. m. f. of two cells ?

7. A wire of resistance 10 ohms is stretched to double its original length. Calculate its new resistance.

8. Explain the phenomenon of self-induction. Define coefficient of self-induction.

9. Define total internal reflection. Write two conditions for total internal reflection.

10. In Young's double slit experiment the slits are 2.5 mm apart and are at a distance of 2 m from the screen. Find the fringe width for light of wavelength 5000 Å.

11. Distinguish between nuclear fission and nuclear fusion.

12. Clearly distinguish between *n*-type and *p*-type semiconductors.

(Very Short Answer Type Questions) 2 each

14. Calculate the force per unit length between two parallel straight wires 1 cm apart in air each carrying a current of 2 Amperes.

15. Give the uses of infrared rays.

16. Derive Einstein's photoelectric equation.

17. Calculate de Broglie wavelength of mass of 1 g moving with velocity of 10^3 m/s.

18. Two lenses of powers –1.0 and 2.70 D are kept in contact. Find the focal length of combination.

19. Give any *two* properties of β-rays.

20. What is rectification ? Draw a circuit diagram showing use of *p-n* junction as full-wave rectifier.

21. What do you mean by (i) ground wave (ii) sky wave ?

(Objective Type Questions) 1 each

22. Do as directed :

(i) What is the condition for potentiometer to be more sensitive ?

(ii) The direction of magnetic field is one, along which a moving charge experiences no magnetic force. (True/False)

(iii) The electromagnetic waves used in the telecommunication in two lines are :

(a) ultraviolet

(b) infrared

(c) visible

(d) microwaves

(iv) Two concave lenses of focal length 20 cm each are placed in contact. What is the power of the compound lens ?

(v) Complete the nuclear reaction :

$$_3Li^7 + ? \rightarrow {}_3Li^6 + {}_1H^2$$

(vi) Write the Truth table of OR gate.

(vii) What is the relation between current gain in common emitter and common base mode of transistor as an amplifier ?

(viii) Define De-modulation.

(ix) In which frequency range space waves are normally propagated ?

(a) HF (b) VHF

(c) UHF (d) SHF

(x) What type of communication is used for Television ?