B–1–A

Roll No.....

Total No. of Questions : **21**] [Total No. of Printed Pages : **4**

XIISZRJDF20
1101–A
PHYSICS

Time : 3 Hours] **[Maximum Marks : 70**

(Long Answer Type Questions) 5 each

1. Using Gauss's law derive an expression for electric field due to uniformly charged thin spherical shell at a point outside the shell.

Or

What is parallel plate capacitor ? Derive an expression for the energy stored in a capacitor.

2. Give the principle, construction and working of a moving coil galvanometer.

Or

Discuss the properties of dia, para and ferromagnetic materials.

3. What is meant by total internal reflection ? State its conditions.

Or

Define fringe width. Derive expression for fringe width in interference pattern.

4. Define Rectification. How can a p-n junction diode be used as a full wave rectifier ?

Or

Draw an OR gate using two diodes, explain its working and write its truth table.

(Short Answer Type Questions) 3 each

5. Calculate the potential energy in case of dipole having magnitude of each charge as 3×10^{-6} C. The charges are separated at a distance of 2000 Å.

6. Distinguish between resistance and resistivity.

7. Explain the limitations of cyclotron.

8. State and explain Faraday's laws of electromagnetic induction.

9. Write any *six* characteristics of electromagnetic waves.

10. For a given medium, the polarising angle is 45°. What will be the critical angle of the medium ?

11. State postulates of Bohr's theory of Hydrogen atom.

12. What is space wave propagation ? Give *two* examples of communication system which use space wave mode.

(Very Short Answer Type Questions) 2 each

13. Briefly explain the principle of Potentiometer.

14. Why is the core of a transformer laminated ?

15. A capacitor behaves as perfect conductor for high frequency a.c. Explain why ?

16. Find the power of a convex lens of focal length 20 cm.

17. Why does sky look blue ?

18. Give *two* points of difference between nuclear fission and nuclear fusion.

19. State laws of photoelectric emission.

20. What is Modulation ?

(Objective Type Questions) 1 each

21. (a) Do as directed :

(i) The copper strips in a slide wire bridge are thick because ..... . (Fill in the blank)

(ii) The advantage of placing the prism in minimum deviation position is to obtain pure spectrum. *(True/False)*

(iii) The momentum of a photon is 'P', the wave length is ..... . (Fill in the blank)

(iv) Mass defect is difference between ..... .

(Fill in the blank)

(v) The resistance and depletion layer in p-n junction diode decreases during forward bias. (True/False)

(b) Choose the correct/most appropriate answer :

(vi) 1 kWh is equal to :

(A) 3.6×10^5 J (B) 3.6×10^{-6} J

(C) 3.6×10^6 J (D) 36000 J

(vii) Resonant frequency of LCR-resonant circuit is :

(A) $2\pi\sqrt{LC}$ (B) $2\pi/\sqrt{LC}$

(C) $\frac{1}{2\pi}\sqrt{LC}$ (D) $\frac{1}{2\pi\sqrt{LC}}$

(viii) The tip of a needle does not give a sharp image on a screen. This is due to :

(A) Polarization (B) Interference

(C) Diffraction (D) Refraction

(ix) An electron of mass 'm' and charge 'e' is moving from rest through a potential difference 'V' in vacuum. Its final velocity is :

(A) $\sqrt{\frac{2eV}{m}}$ (B) $\sqrt{\frac{eV}{m}}$

(C) $\frac{eV}{2m}$ (D) $\frac{eV}{m}$

(x) A hole in a p-type semiconductor is :

(A) an excess electron

(B) a missing electron

(C) a missing atom

(D) a positive ion