

XIIARKDN20

2001-C

## PHYSICS

### Section-A

(Very-Very Short Answer Type Questions)

1. A wire of resistivity ' $\rho$ ' is stretched to twice its length. What will be its new resistivity ?
2. What is the magnetic force exerted by a magnetic field on a stationary charge ?
3. At very high frequency a capacitor behaves as a pure conductor. Why ?
4. If the intensity of incident radiation on a metal is doubled, what happens to the kinetic energy of electrons emitted ?
5. How does the conductivity of a semiconductor change with rise of temperature ?

### Section-B

(Very Short Answer Type Questions)

6. State and explain Biot-Savart law for magnetic field due to a current element.

Or

Define magnetic declination and magnetic dip.

7. The reading of hot wire ammeter in a.c. circuit is 10A. What is rms value of current and peak value of current ?
8. Distinguish step-up and step-down transformers.
9. What is Polarisation? What type of waves can be polarised?
10. Sky waves are not used in transmitting TV signals. Why?

### Section-C

(Short Answer Type Questions)

11. A point charge of  $2 \mu\text{C}$  is at the centre of a cubic Gaussian surface of 9 cm edge. What is the net electric flux through the surface and through one face of the cube ?

12. With the help of circuit diagram explain how you will compare e.m.fs of two primary cells using potentiometer.

Or

Using Kirchhoff's laws, derive the condition for balance of a Wheatstone bridge circuit.

13. Calculate resistivity of the material of a wire 2.0 m long, 0.6 mm diameter and having resistance of 3.0 ohm.

14. Using phasor-diagram solution of series LCR circuit, derive an expression for impedance.

15. Give two uses of each of the following:

(i) Microwave (ii) Infrared waves (iii) X-rays

16. What is phenomenon of total internal reflection ? Give the conditions for its occurrence.

17. Show that the de-Broglie wavelength of electron of energy 'E' is given by relation:

$$\lambda = \frac{h}{\sqrt{2mE}}$$

18. Show that in Bohr's hydrogen atom  $r \propto n^2$ , where 'r' is the radius and 'n' is the principal quantum number.

19. Define mass defect and obtain an expression for binding energy per nucleon.

20. With the help of a circuit diagram explain the voltage regulating action of Zener diode.

21. Give logic symbol. Boolean expression and truth-table of an AND gate.

22. What is amplitude modulation ? Discuss its advantages.

Section-D

(Value Based Questions)

23. Ravi was very much fascinated towards astronomy that he decided

to make a telescope. He carefully studied about the construction of telescope and prepared his own model and presented his ideas in a science seminar and got first prize.

Questions :

(a) What qualities do Ravi possess ?

(b) What kind of telescope he might have made and draw ray diagram for the same ?

Section-E

(Long Answer Type Questions)

24. State and explain Coulomb's Law in vector form. Hence define unit charge.

Or

What is parallel plate capacitor ? Derive an expression for its capacitance, where dielectric slab is introduced between its plates. <https://www.jkboseonline.com>

25. Discuss the principle, construction and working of a moving coil galvanometer.

Or

What are dia- para- and ferro-magnetic materials. Discuss their important properties.

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

$$\mu = \frac{\sin\left(\frac{A + \delta_m}{2}\right)}{\sin\frac{A}{2}}$$

Or

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

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