A–1–A

Roll No.....

Total No. of Questions : **26]** [Total No. of Printed Pages : **4**

12th SZARJD22
6001–A
PHYSICS

Time : 2.30 Hours] **[Maximum Marks : 70**

Note :– Attempt all questions.

Section–A

1 each

1. Charge resides only on the outer surface of a charged conductor. (True/False)

2. What is the condition of balanced position of Wheatstone bridge ?

3. Ozone layer is present in the stratosphere region of atmosphere. (True/False)

4. Define threshold frequency.

5. P-type semiconductor is electrically neutral. (True/False)

Section–B

2 each

6. Find the electrostatic potential energy of an electric dipole having magnitude of each charge as 3×10^{-6} coulomb, separated by a distance of 2×10^{-7} metre.

Or

Three capacitors of capacitance 1μF, 2μF and 3μF are connected in series. Find the total capacitance of combination.

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7. Mention two points of difference between step up and step down transformer.

8. Give *four* properties of electromagnetic waves.

9. Find the magnifying power and length of astronomical telescope of objective and eye piece of focal length 144 cm and 6 cm respectively.

10. Why ground waves are not suitable for high frequency ?

Section–C

3 each

11. Derive relation between Current and Drift velocity.

Or

Find the resistivity of wire of length 2 m, diameter 0.01 m and resistance 50 mΩ.

12. A battery of e.m.f. 10 V and internal resistance 3 Ω is connected to a resistor so that a current of 0.5 A flows in the circuit. Find the resistance of resistor and terminal voltage of battery, in a closed circuit.

13. A solenoid is 2 m long and 3 cm in diameter, has 5 layers of winding of 1000 turns, each carries a current of 5 A. Find magnetic induction at its centre along its axis and also at the ends.

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

15. Magnetic field through a coil of 200 turns and area of cross-section 0.04 m^2 changes from 0.1 wb/m^2 to 0.04 wb/m^2 in 0.02 second. Find the induced e.m.f. and induced current, if resistance of coil is 10 ohm.

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16. Define Scattering of light. Why sky appears blue ?

17. Derive Einstein's photoelectric equations.

18. Write down the postulates of Bohr's model of hydrogen atom.

19. Define nuclear fission. Explain with the help of an example.

20. Distinguish between *p*- and *n*-type extrinsic semiconductor.

21. Give the truth table, logic symbol and Boolean expression of OR gate.

22. Draw the block diagram of data transmission and data reception.

Section–D

4

23. Owais was very happy to receive a car on his birthday from his father. Then Owais and his friend Basit went for a long drive at night. Basit suggested Owais to get the tubes of his headlight replaced with high power tubes, as the headlight according to him were weak. Owais did so and again went for long drive with his friend to check the new headlights. As they were enjoying the drive, suddenly a scooter coming from opposite side struck their car. Luckily nobody was hurt but the vehicles got badly damaged. Basit slapped the scooterist but the scooterist said that the headlights of the car made him blind and he could not see anything. Owais's father became very angry with Owais and told him that he should have installed special cover on the headlights to reduce the glare. Now, answer the following :

(a) What is the special cover reducing the glare called ? Mention its two other applications.

(b) What is your opinion about Owais and Basit's behaviour ?

(c) What do you think about the reaction of Owais's father ?

(d) Name and state the law that relates refractive index of the material cover with the angle at which reflected light and refracted light are perpendicular to each other.

Section–E

5 each

24. State Gauss' law. Derive an expression for the electric field due to an infinite line of charge.

Or

Give the principle, construction and working of Van de Graff's generator.

25. State Biot Savart's law. Derive an expression for the magnetic field at the centre of circular coil carrying current.

Or

What are diamagnetic, paramagnetic and ferromagnetic substances ? Give their properties.

26. State Huygens' principle. Derive laws of reflection or refraction from it.

Or

What is Lens Maker's formula ? Derive an expression for Lens Maker's formula for a convex lens.

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