

**A-1-C**

Roll No.....

Total No. of Questions : 26]

[Total No. of Printed Pages : 4

**12<sup>th</sup> SZARJD22**  
**6001-C**  
**PHYSICS**

Time : 2.30 Hours]

[Maximum Marks : 70

*Note* :- Attempt all questions.

**Section-A**

1 each

1. The dielectric constant of a metal is infinite. (True/False)
2. What is the condition for the Wheatstone bridge to be most sensitive ?
3. All electromagnetic waves are transverse in nature. (True/False)
4. Define work function.
5. Intrinsic semiconductors are electrically neutral. (True/False)

**Section-B**

2 each

6. Three capacitors of capacitance  $1 \mu\text{F}$ ,  $2 \mu\text{F}$  and  $3 \mu\text{F}$  are connected in parallel. Find the total capacitance of combination.

*Or*

The electrostatic force on a small sphere of charge  $0.4 \mu\text{C}$  due to another small sphere of charge  $-0.8 \mu\text{C}$  in air is  $0.2 \text{ N}$ . Calculate distance between the two spheres.

7. Define mean value and root mean square value of alternating current.

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Turn Over

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( 2 )

8. Define electromagnetic wave. Write the expression for velocity of electromagnetic wave in terms of amplitude of electric field ( $E_0$ ) and amplitude of magnetic field ( $B_0$ ).
9. Calculate speed of light in a medium for angle of polarization of  $60^\circ$ .
10. Why are short waves used for long distance transmission ?

**Section-C**

3 each

11. State and explain principle of potentiometer.

*Or*

A 220 volt-100 watt bulb is connected to 110 volt source. Calculate the power consumed by the bulb.

12. A wire of resistance 5 ohm is stretched by double its original length. Find the new resistance.
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  $0.04 \text{ m}^2$  changes from  $0.1 \text{ wb/m}^2$  to  $0.04 \text{ wb/m}^2$  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. <https://www.jkboseonline.com>
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.