

A-1-B

Roll No.....

Total No. of Questions : 26]

[Total No. of Printed Pages : 4

12th SZARJD22**6001-B****PHYSICS**

Time : 2.30 Hours]

[Maximum Marks : 70

Note :- Attempt all questions.**Section-A**

1 each

1. Capacitance of a spherical conductor of radius (r) is $c = 4\pi\epsilon_0 r$.
(True/False)
2. A wire of resistivity (s) is stretched to double its length. What will be its new resistivity ?
3. In an electromagnetic wave, the phase difference between electric field and magnetic field is zero.
(True/False)
4. Define threshold wavelength.
5. n -type semiconductor is electrically neutral.
(True/False)

Section-B

2 each

6. How much charge and energy is stored in a 12PF capacitor connected to a 50 V battery ?

Or

If force between two equal charges separated by a distance of 2 m in free space is equal to weight of 20 kg child. Find the magnitude of charges. Take $g = 10 \text{ m/s}^2$.

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Turn Over

A-1-B

7. Define inductive reactance and capacitive reactance in mathematical form.
8. Define electromagnetic wave. Write the expression for velocity of electromagnetic wave in terms of permittivity of free space (ϵ_0) and permeability of free space (μ_0).
9. Calculate the speed of light in a medium whose critical angle is 45° .
10. Why sky waves are not used for transmission of T.V. signals ?

Section-C

3 each

- 11 State and explain Kirchhoff's law.

Or

How many electrons pass through a wire in 2 minutes, if current of 300 mA passes through it.

12. A wire of resistance 5 ohm is stretched to 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 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.

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.