

A-1-Y

Roll No.....

Total No. of Questions : 26]

[Total No. of Printed Pages : 4

XIIARSZJDA21

3001-Y

PHYSICS

Time : 3 Hours]

[Maximum Marks : 70

Note :- Attempt all questions.

Section-A

1 each

1. Give S.I. unit of electric flux.
2. Define Conductance.
3. With what speed an electromagnetic wave move in free space ?
4. Define Work Function.
5. What is Reverse Biasing ?

Section-B

2 each

6. 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 N . Calculate distance between two spheres.
7. Define coefficient of mutual inductance between two coils.

Or

State Faraday's laws of electromagnetic induction.

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Turn Over

A-1-Y

- ~~8.~~ What is meant by displacement current ?
- ~~9.~~ Define De-Modulation.
- ~~10.~~ What is Scattering of light ?

Section-C

3 each

- ~~11.~~ State and derive Ohm's law.
- ~~12.~~ Derive an expression for average life of a radioactive sample.

Or

~~13.~~ Distinguish between Nuclear fission and Nuclear fusion.

13. A battery of emf 10 V and internal resistance 3Ω is connected to a resistor. If current in circuit is 0.5 A what is the resistance of and also what is the terminal voltage of battery when the circuit is closed.
14. Derive an expression for force on a current carrying conductor in external uniform magnetic field.
- ~~15.~~ Derive an expression for root-mean square value of an alternating current.
16. State Lenz's law and prove that it is in accordance with law of conservation of energy.
- ~~17.~~ A ray of light falling at an angle of 50° is refracted through a prism and suffers minimum deviation. The angle of prism is 60° . Find the angle of minimum deviation and also the refractive index of prism.

18. Explain laws of photoelectric effect on the basis of Einstein's photoelectric equation.
19. State the basic postulates of Bohr's model of atom.
20. What is AND gate ? Write its symbol, Boolean expression and Truth Table.
21. Discuss the working of $p-n-p$ or $n-p-n$ transistor.
22. Explain space wave propagation and ground wave propagation.

Section-D

4

23. If you look into a shiny spoon, you can see an inverted image on one side and upright image on the other side, why ? Could you see upright image on both sides ? <https://www.jkboseonline.com>

Section-E

5 each

24. What is electrical dipole moment ? Derive an expression for electric field intensity due to a dipole at a point on its axial line.

Or

State Gauss Law. Using Gauss law calculate electric field intensity at a point due to an infinitely long straight uniformly charged wire.

25/ State Ampere's circuital law. Using Ampere's law, find the expression for magnetic field due to a current carrying solenoid.

Or

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

26. Derive Lens-Maker's formula for convex lens. Write the necessary sign convention used.

Or

State Huygen's wave principles. Use them to prove laws of refraction of light.

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