

G - 54

Roll No.

Total No. of Questions 21]

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HSE2KROXI

9317-C

PHYSICS

Time : 3 Hours + 15 Minutes extra to read the question paper]

[Maximum Marks: 70

(Long Answer Type Questions)

1. Derive an expression for the potential energy of three point charges. Hence, generalise the result for a system of N-point charges.

Or

Define capacitance of a parallel plate capacitor. Derive an expression for the electrostatic energy stored in a charged capacitor.

2. Describe the principle, construction and working of a moving coil Galvanometer.

Or

Using Biot-Savart law, obtain an expression for the magnetic field at a point due to an infinitely long straight conductor carrying current 'I'.

3. What do you understand by polarization of light? Derive the relation connected the polarising angle of a medium and its refractive index.

Or

Draw a diagram of Young's double slit expt. and derive an expression for fringe width.

4. Establish mirror formula in case of a convex mirror. State the sign conventions used.

Or

State Huygen's principle and prove the laws of reflection on the basis of wave theory.

(Short Answer Type Questions)

5. State Coulomb's Law. Define one coulomb.
6. Derive relation between drift velocity and electric current.
7. What are Paramagnetic Substances ? Give properties of paramagnetic substances.
8. Define and derive an expression for root mean square value of alternating current.
9. Show that the De-Broglie wavelength ' λ ' of electrons accelerated through a potential difference of 'V' volts can be expressed as $\lambda = \frac{h}{\sqrt{2meV}}$
10. Define half-life of a radioactive nucleus. Derive expression for it :
11. How is OR gate realised ? Explain.
12. Sky waves are not used in transmitting T.V. signals. Why state the two factors by which the range of T.V. signals can be increased ?

(Very Short Answer Type Questions)

13. What are the factors on which the e.m.f of a cell depends ?
14. What are eddy currents ? Write its two applications.
15. Give the uses of micro-waves.
16. Define power of a lens. What is its unit?
17. What is cylindrical wave-front ? Can two wave-fronts of a single wave cross each other ? Why?
18. The half-life period of a radio-active substance is 30 days. What is disintegration constant ?
19. Give Boolean expression and truth table of NOT gate.
20. Differentiate between Space Wave and Sky Wave Propagation.

(Objective Type Questions)

21. (i) Define terminal potential difference of a cell.
- (ii) What is the effect of temperature on the internal resistance of a battery?
- (iii) Define one henry.

(iv) Inductance coils are made of copper Why?

(v) Why is there sparking, when an electrical circuit switched off?

Choose correct answer :

(vi) A plane electromagnetic wave is incident on a material surface. The wave delivers momentum P and energy E : <https://www.jkboseonline.com>

(a) $P \neq 0, E \neq 0$

(b) $p = 0, E = 0$

(c) $P = 0, E \neq 0$

(d) $P \neq E, E \neq 0$

(vii) The wavelength of matter wave is independent of:

(a) mass

(b) velocity

(c) momentum

(d) charge

(viii) Which of the following electromagnetic waves ?

(a) γ -rays

(b) β -rays

(c) β -rays

(d) α -rays

(ix) Zener diode is used for :

(a) Producing oscillation in an oscillator

(b) Amplification

(c) Stabilisation

(d) Rectification

(x) How many NAND gates are used to form an AND gate?

(a) 1 (b) 2 (c) 3 (d) 4