

SIR CV RAMAN COACHING CENTRE – IDAPPADI,SALEM -2025

XLL PHYSICS LESSON [1 TO 7] MODEL QUESTION PAPER

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Section – A (10 X 1 = 10 M)

CHOOSE THE CORRECT BEST ANSWER

1.The speed of light in an isotropic medium depends on, (a) its intensity (b)its wavelength (c) the nature of propagation (d) the motion of the source w.r.t medium

2. A piece of copper and another of .germanium are cooled from room temperature to 80K. The resistance of

- a) each of them increases b) each of them decreases
c) copper increases and germanium decreases
d) copper decreases and germanium increases

3. Consider a point charge $+q$ placed at the origin and another point charge $-2q$ placed at a distance of 9 m from the charge $+q$. Determine the point between the two charges at which electric potential is zero.

- a) 6m b) 0 m c) 5m d) 3m

4.positive Thomson effect example

- a) silver b) Neon c) Helium d) mercury

5. A non-conducting charged ring carrying a charge of q , mass m and radius r is rotated about its axis with constant angular speed ω . Find the ratio of its magnetic moment with angular momentum is

- | | |
|--------------------|--------------------|
| (a) $\frac{q}{m}$ | (b) $\frac{2q}{m}$ |
| (c) $\frac{q}{2m}$ | (d) $\frac{q}{4m}$ |

6. Suppose a cyclotron is operated to accelerate protons with a magnetic field of strength 1 T. Calculate the frequency in which the electric field between two Dees could be reversed.

- a) 15.3 Hz b) 1.53Hz c) 15.3MHz d) 1.53 MHz

7. In an oscillating LC circuit, the maximum charge on the capacitor is Q . The charge on the capacitor when the energy is stored equally between the electric and magnetic fields is

- | | |
|--------------------------|--------------------------|
| (a) $\frac{Q}{2}$ | (b) $\frac{Q}{\sqrt{3}}$ |
| (c) $\frac{Q}{\sqrt{2}}$ | (d) Q |

8. The average value of AC is times

- a) 0.637 b) - 0.637 c) 0.707 d) -0.707

9. The transverse nature of light is shown in, (a) interference (b) diffraction (c) scattering (d) polarisation

10. The instantaneous magnitude of the electric and magnetic field vectors in electromagnetic wave are related by

- a) E/B b) B/E c) E x B d) All

SECTION – B (X 2 = 10 M)

Answer any five questions : compulsory Q.no 13

11. Define ‘electrostatic potential’

12. Difference between polar molecule and non polar molecule

13. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it

14. Obtain the equation for apparent depth

15. The current sensitivity of a galvanometer can be increased by

16. How is a galvanometer converted into (i) an ammeter and (ii) a voltmeter?

17. List out the advantages of stationary armature-rotating field system of AC generator.

18. What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?

SECTION - ,C (5 X 3 = 15 M)

ANSWER ANY FIVE QUESTIONS Q.NO 24.

19. Discuss about Nicol prism

20. Relation between drift velocity and current

21. Compute the torque experienced by a magnetic needle in a uniform magnetic field

22. Mention the various energy losses in a transformer.

23. Discuss the Hertz experiment.

24. A capacitor of capacitance $\frac{10^2}{\pi} \mu\text{F}$ is connected across a 220 V, 50 Hz A.C. mains. Calculate the capacitive reactance, RMS value of current and write down the equations of voltage and current.

25. Calculate the magnetic field at the centre of a square loop which carries a current of 1.5 A, length of each side being 50 cm

26. Obtain the expression for electric field due to an uniformly charged spherical shell

SECTION – C (5 X 5 = 25 M)

ANSWER ALL QUESTIONS

27. a) Explain in detail the construction and working of a Van de Graaff generator.

(OR)

b) A parallel plate capacitor filled with mica having $\epsilon_r = 5$ is connected to a 10 V battery. The area of each parallel plate is 6 cm² and separation distance is 6 mm. (a) Find the capacitance and stored charge. (b) After the capacitor is fully charged, the battery is disconnected and the dielectric is removed carefully. Calculate the new values of capacitance, stored energy and charge

28 a) Derive the equation for acceptance angle and numerical aperture of optical fibre

(or)

b) Two electric bulbs marked 20 W – 220 V and 100 W – 220 V are connected in series to 440 V supply. Which bulb will get fused?

28.a) Derive the expression for the force on a current-carrying conductor in a magnetic field

(or)

b) A short bar magnet has a magnetic moment of 0.5 J /T Calculate magnitude and direction of the magnetic field produced by the bar magnet which is kept at a distance of 0.1 m from the centre of the bar magnet along (a) axial line of the bar magnet and (b) normal bisector of the bar magnet

29 a) Derive an expression for phase angle between the applied voltage and current in a series RLC circuit

(oR)

b) Show that the mutual inductance between a pair of coils is same ($M_{12} = M_{21}$)

30. Write short notes on (a) microwave (b) X-ray (c) radio waves (d) visible spectrum

(oR)

b) Obtain the equation for resultant intensity due to interference of light