

COMMON QUARTERLY EXAMINATION - 2024**Standard - XII**

Reg.No.

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Time: 3.00 hrs.

PHYSICS

Thoothukudi

Marks: 70

PART - A

District

Answer all the questions.**15×1=15**

- If voltage applied on a capacitor is increased from V to $2V$. Choose the correct conclusion
 - Q remains the same, C is doubled
 - Q is doubled C doubled
 - C remains same, Q doubled
 - Both Q & C remain same
- A parallel plate capacitor stores a charge Q at a voltage V . Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
 - capacitance
 - charge
 - voltage
 - Energy density
- A toaster operating at $240V$ has a resistance of 120Ω . Its power is
 - $400W$
 - $2W$
 - $480W$
 - $240W$
- In Jule's heating law, when R and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is
 - straight line
 - parabola
 - circle
 - ellipse
- A circular coil of radius $5cm$ and 50 turns carries a current of $3A$. The magnetic dipole moment of the coil is nearly
 - $1.0 Am^2$
 - $1.2 Am^2$
 - $0.5 Am^2$
 - $0.8 Am^2$
- The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
 - 30°
 - 45°
 - 60°
 - 90°
- An inductor $20mH$, a capacitor $50\mu F$ and a resistor 40Ω are connected in series across a source of emf $v = 10\sin 340t$. The power loss in AC circuit is
 - $0.76W$
 - $0.89W$
 - $0.46W$
 - $0.67W$
- In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is $6A$, then that in the secondary coil is
 - $2A$
 - $18A$
 - $12A$
 - $1A$
- Which of the following is false for electromagnetic waves?
 - transverse
 - non - mechanical waves
 - longitudinal
 - produced by accelerating charges
- If the amplitude of the magnetic field is $3 \times 10^{-6}T$, then the amplitude of the electric field for a electromagnetic waves is
 - $100Vm^{-1}$
 - $300Vm^{-1}$
 - $900Vm^{-1}$
 - $600Vm^{-1}$
- Stars twinkle due to
 - reflection
 - total internal reflection
 - refraction
 - polarisation
- When a biconvex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as a plane sheet of glass. This implies that the liquid must have refractive index
 - less than one
 - less than that of glass
 - greater than that of glass
 - equal to that of glass
- If the focal length is $150cm$ for a lens, what is the power of the lens?
 - $0.67D$
 - $0.56D$
 - $0.77D$
 - $0.43D$
- For a steady current $f = 0$, capacitive reactance will be
 - zero
 - infinity
 - more than one
 - constant

15. The wave Front of Fresnel diffraction is
 a) spherical (or) cylindrical b) plane c) circle d) Rectangle

PART - B

Answer any six questions. Question No.24 is compulsory.

6×2=12

16. Why does the sky appear reddish during sunrise and sunset?
 17. State coulombs law in electrostatics.
 18. What is Peltier effect?
 19. State Lenz law.
 20. State Ampere's circuital law.
 21. Define Q - factor.
 22. Write any two uses of X rays.
 23. Write the relation between path difference and phase difference.
 24. The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak current and frequency.

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PART - C

Answer any six questions. Question No.33 is compulsory.

6×3=18

25. Derive an expression for the torque experienced by a dipole due to a uniform electric field.
 26. Derive the equation for energy stored in a capacitor.
 27. Explain the equivalent resistance of a series resistor network.
 28. How will you convert galvanometer into ammeter. Justify.
 29. What are the energy losses in transformer. Explain.
 30. Write advantages and disadvantages of AC over DC.
 31. An electron moving perpendicular to a uniform magnetic field 0.5007 undergoes circular motion of radius 2.50 mm. What is the speed of electron?
 32. Write the properties of electromagnetic waves?
 33. Calculate the distance upto which ray optics is a good approximation for light of wavelength 500nm falls on an aperture of width 0.5mm.

PART - D

Answer all the questions:

5×5=25

34. Calculate the electric field due to a dipole on its axial line. **(OR)**
 Explain in detail the construction and working of a Van de Graff generator.
 35. Obtain the condition for bridge balance in Wheatstone's bridge. **(OR)**
 How the emf of two cells are compared using potentiometer?
 36. Derive an expression for the force on a current carrying conductor placed in a magnetic field. **(OR)**
 Calculate the magnetic field inside and outside of the long solenoid using Ampere's circuital law.
 37. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit. **(OR)**
 Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
 38. Derive the equation for lens maker's formula. **(OR)**
 Explain the Youngs double slit experimental set up and obtain the equation for path difference.