



Half Yearly Exam

PHYSICS

Time: 3.00 Hours Marks: 70 Std :XII Name:

I. Choose the correct answer :

[15 × 1 = 15]

- 1) Two metallic spheres of radii 1 cm and 3 cm are given charges of  $-1 \times 10^{-2} C$  and  $5 \times 10^{-2} C$  respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is  
a)  $3 \times 10^{-2} C$       b)  $4 \times 10^{-2} C$       c)  $1 \times 10^{-2} C$       d)  $2 \times 10^{-2} C$
- 2) A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1 mm. Calculate the capacitance of this capacitor.  
a)  $22.12 \times 10^{-32} F$       b)  $22.12 \times 10^{+32} F$       c)  $22.12 \times 10^{-12} F$       d)  $22.12 \times 10^{+12} F$
- 3) A potential difference across 24  $\Omega$  resistor is 12 V. What is the current through the resistor?  
a) 0.5 A      b) 1 A      c) 1.5 A      d) 2 A
- 4) In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60 W bulb for use in India is R, the resistance of a 60 W bulb for use in USA will be  
a) R      b) 2R      c) R/4      d) R/2
- 5) The magnitude of magnetic moment of an electron in a circular orbit of radius r with a speed V is equal to  
a)  $\frac{eVr}{2}$       b) eVr      c)  $\frac{er}{2V}$       d)  $\frac{2V}{er}$
- 6) A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnet dipole moment of the coil is nearly  
a)  $1.0 Am^2$       b)  $1.2 Am^2$       c)  $0.5 Am^2$       d)  $0.8 Am^2$
- 7) In a transformer, the number of turns in the primary and the secondary coil are 300 and 1800 respectively. If the current in primary is 6 A, then that in the secondary coil is  
a) 2 A      b) 18 A      c) 12 A      d) 1 A
- 8)  $\frac{20}{\pi^2} H$  inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50 Hz is  
a)  $50 \mu F$       b)  $0.5 \mu F$       c)  $500 \mu F$       d)  $5 \mu F$
- 9) If  $V_g, V_x, V_m$  are speeds of gamma rays, X-rays and microwaves respectively in vacuum, then  
a)  $V_g < V_x < V_m$       b)  $V_g > V_x > V_m$       c)  $V_g > V_x < V_m$       d)  $V_g = V_x = V_m$
- 10) The dimension of  $\frac{1}{\mu_0 \epsilon_0}$  is  
a)  $[LT^{-1}]$       b)  $[L^2T^{-2}]$       c)  $[L^{-1}T]$       d)  $[L^{-2}T^{-2}]$
- 11) A ray of light gets refracted into the air medium from crown glass of refractive index 1.541. If angle of incidence is equal to the critical angle  $40.5^\circ$ , then the angle of refraction will be  
a) equal to the critical angle      b) lesser than the critical angle  
c) equal to  $90^\circ$       d) greater than critical angle
- 12) Pure water has refractive index 1.33. What is the speed of light through it?  
a)  $2.26 \times 10^8 ms^{-1}$       b)  $2.26 \times 10^{-8} ms^{-1}$       c)  $12.26 \times 10^8 ms^{-1}$       d)  $12.26 \times 10^{-8} ms^{-1}$
- 13) For a Astigmatism eye, the defect is cured by using a  
a) convex lens      b) concave lens      c) cylindrical lens      d) plane glass
- 14) Two coherent monochromatic light beams of intensities I and 4I are superposed. The maximum and minimum possible intensities in the resulting beam are  
a) 5I and I      b) 5I and 3I      c) 9I and I      d) 9I and 3I
- 15) The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is  
a) 4125 Å      b) 3750 Å      c) 6000 Å      d) 2062.5 Å

**II) Answer any Six questions. Question no. 24 is compulsory:**

[6 × 2 = 12]

- 16) Define 'electric flux'
- 17) Define electrical resistivity.
- 18) State Ampere's circuital law.
- 19) What are step-up and step-down transformers?
- 20) What is displacement current?
- 21) What is principle of reversibility?
- 22) What is astigmatism? What is its remedy?
- 23) Define stopping potential.
- 24) In an electric field of magnitude  $570 \text{ NC}^{-1}$ , is applied in the copper wire, find the acceleration experienced by the electron.

**III) Answer any Six questions. Question no. 33 is compulsory:**

[6 × 3 = 18]

- 25) Explain in detail Coulomb's law and its various aspects.
- 26) Obtain the condition for bridge balance in Wheatstone's bridge.
- 27) Give an account of magnetic Lorentz force.
- 28) Mention the various energy losses in a transformer.
- 29) Explain the types of absorption spectrum.
- 30) What is the focal length of the combination if the lenses of focal lengths -70 cm and 150 cm are in contact? What is the power of the combination?
- 31) Discuss about pile of plates.
- 32) Derive an expression for de Broglie wavelength of electrons.
- 33) A radiation of wavelength 300 nm is incident on a silver surface. Will photoelectrons be observed? [work function of silver = 4.7 eV]

**IV) Answer all the questions in detail:**

[5 × 5 = 25]

- 34) a) Explain in detail the construction and working of a Van de Graaff generator.  
(OR)  
b) Describe the microscope model of current and obtain general form of Ohm's law.
- 35) a) Calculate the magnetic field inside and outside of the long solenoid using Ampere's Circuital law.  
(OR)  
b) Derive an expression for phase angle between the applied voltage and current in a series RLC circuit
- 36) a) Write down the properties of electromagnetic waves.  
(OR)  
b) Obtain the lens maker's formula and mention its signification.
- 37) a) Obtain the equation for resolving power of optical instruments.  
(OR)  
b) Briefly explain the principle and working of electron microscope.
- 38) a) Discuss the conversion of galvanometer into an ammeter and also a voltmeter.  
(OR)  
b) Prove that the total energy is conserved during LC oscillations.

Prepared By

A. Muthuganesh., M.Sc., M.Phil., B.Ed., Ph.D.,

Department of Physics,

K. V. S. Matric. Hr. Sec. School,

Thoothukudi – 628002.

Kindl send me your district Questions & Keys to email Id - Padasalai.net@gmail.com

