



2209-2023

**Standard 12**

Time: 3.00 Hours

**PHYSICS**

Marks: 70

**Part - A****15x1=15****Answer all the questions:**

1) Two points A and B are maintained at a potential of 7V and -4V respectively. The workdone in moving 50 electrons from A to B.

a)  $8.80 \times 10^{-17}$  J

b)  $-8.80 \times 10^{-17}$  J

c)  $4.40 \times 10^{-17}$  J

d)  $5.80 \times 10^{-17}$  J

2) 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?

a) capacitance

b) charge

c) Voltage

d) Energy density

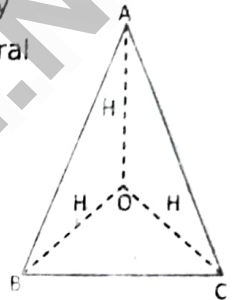
3) If the charge +q is placed in three corners of an equilateral triangle. Then electric field at the center of the triangle.

a)  $\frac{q}{4\pi\epsilon_0 r^2}$

b)  $\frac{q}{4\pi\epsilon_0 r^2}$

c)  $\frac{3q}{4\pi\epsilon_0 r^2}$

d) zero



4) The specific resistance of a thin and thick copper wire is  $\rho_1 \Omega\text{m}$  and  $\rho_2 \Omega\text{m}$  respectively then.

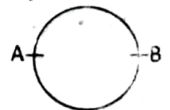
a)  $\rho_1 > \rho_2$

b)  $\rho_2 > \rho_1$

c)  $\rho_1 = \rho_2$

d)  $\frac{\rho_2}{\rho_1} = \infty$

5) A wire of resistance  $2 \Omega$  per meter is bent to form a circle of radius 1m. The equivalent resistance between its two diametrically opposite points A and B as shown in fig.



a)  $\pi \Omega$

b)  $\frac{\pi}{2} \Omega$

c)  $2\pi \Omega$

d)  $\frac{\pi}{4} \Omega$

6) A particle having mass m and charge q accelerated through a potential difference V. Find the force experienced when it is kept under perpendicular magnetic field  $\vec{B}$

a)  $\sqrt{\frac{2q^3BV}{m}}$

b)  $\sqrt{\frac{q^3B^2V}{2m}}$

c)  $\sqrt{\frac{2q^3B^2V}{m}}$

d)  $\sqrt{\frac{2q^3BV}{m^3}}$

7) A non-conducting charged ring carrying a charge of  $q_1$  mass m and radius r is rotated about its axis with constant angular speed W. Find the ratio of its magnetic moment with angular momentum is

a)  $\frac{q}{m}$

b)  $\frac{2q}{m}$

c)  $\frac{q}{2m}$

d)  $\frac{q}{4m}$

8) Magnetic field at a point at a distance 1 m from the current carrying conduction of current 2A.

a)  $1 \times 10^{-7}$  T

b)  $2 \times 10^{-7}$  T

c)  $3 \times 10^{-7}$  T

d)  $4 \times 10^{-7}$  T

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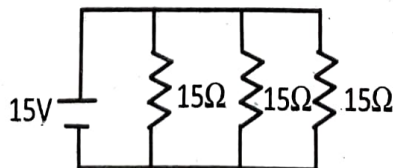
- 9) When the current changes from +2A to -2A in 0.5s an emf of 8V is induced in a coil. The Co-efficient of self - induction of the coil is  
 a) 0.2 H                      b) 1 H                      c) 0.8 H                      d) 0.1 H
- 10) In a transformer the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A. Then that is the secondary coil is.  
 a) 2A                      b) 18 A                      c) 12 A                      d) 1A
- 11) The dimension of  $\frac{1}{\mu_0 \epsilon_0}$   
 a)  $[LT^{-1}]$                       b)  $[L^2T^{-2}]$                       c)  $[L^{-1}T]$                       d)  $[L^{-2}T^2]$
- 12) Fraunhofer lines are an example of ..... spectrum  
 a) line emission                      b) line absorption  
 c) band emission                      d) band absorption
- 13) The light falls from air medium on a glass prism having refractive index 2. Then maximum refracted angle is  
 a)  $30^\circ$                       b)  $45^\circ$                       c)  $60^\circ$                       d)  $90^\circ$
- 14) A yellow light which falls on the prism at minimum deviation position having angle of incidence  $i_1$  and angle of emergence  $i_2$ .  
 a)  $i_1 = i_2$                       b)  $i_1 > i_2$                       c)  $i_1 < i_2$                       d)  $i_1 + i_2 = 90$
- 15)  $\frac{20}{\pi^2}$  H induction is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50Hz is  
 a)  $50 \mu F$                       b)  $0.5 \mu F$                       c)  $500 \mu F$                       d)  $5 \mu F$

## Part - B

6x2=12

Answer any six questions: Q.No: 24 is compulsory:

- 16) Compare Gravitational force and coulomb force.  
 17) Why two electric field lines cannot intersect.  
 18) Define Specific Resistance  
 19) Find the current in the following circuit.



- 20) Give the Ampere's circuital law.  
 21) Write the methods to increase the current sensitivity of a Galvanometer.  
 22) Give the generator rule.  
 23) Why the sky appears redish in contour at the time of sun rise and sunset.  
 24) Where the object to be placed to form image as 4 times of the object for the convex lense having focal length 20 cm.

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Part - C

6x3=18

**Answer any six questions: Q.No: 33 is compulsory:**

- 25) Obtain the expression for the energy stored in a capacitor.
- 26) Find the expression for the effective resistance of the Resistors connected in series.
- 27) Give the properties of dia magnetic materials.
- 28) Explain the energy losses in transformer.
- 29) Give the integral forms of maxwel equns.
- 30) What is displacement current and Fraunhofer lines.
- 31) Derive the relation between f and R of spherical mirrors.
- 32) Explain - How will the galvanometer can be converted into ammeter?
- 33) The magnetic flux passing through a coil perpendicular to its plane is a function of time and its given by  $\phi_B = (2t^3 + 4t^2 + 8t + 8)$  wb. If the resistance of the cell is  $5\Omega$ , determine the induced current through the coil at a time  $t = 3$  second.

Part - D

5x5=25

**Answer all the questions:**

- 34) Explain the Fizeau's method to determine the speed of light.

(OR)

What is emission spectra? explain its types.

- 35) Explain the construction and function of transformer.

(OR)

How will you find internal resistance of the cell using voltmeter.

- 36) Describe the microscopic model of current and obtain general form of Ohm's law

(OR)

Derive the expression for the force between two parallel, current carrying conductors.

- 37) Calculate the electric field due to a dipole on its axial line

(OR)

Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.

- 38) Obtain lens maker's formula and mention its significance.

(OR)

Calculate the magnetic field inside and outside of the long solenoid using Ampere's circuital law.

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