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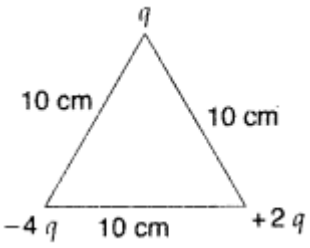
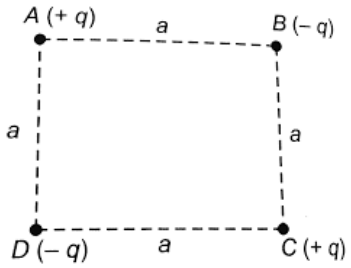
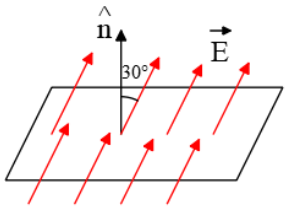
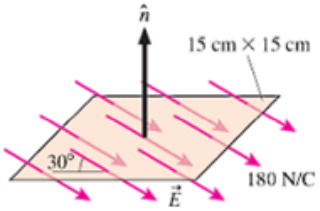
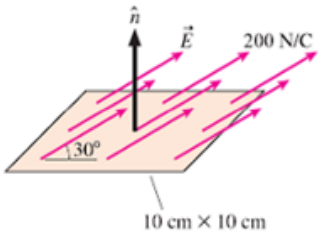
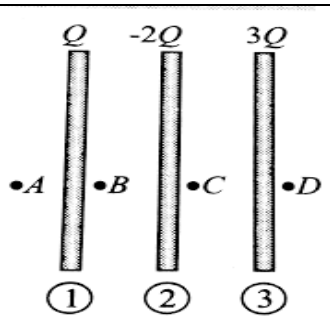
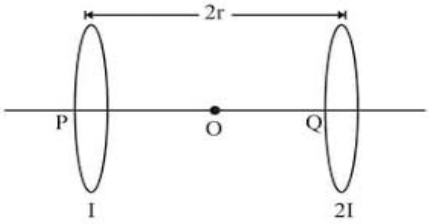
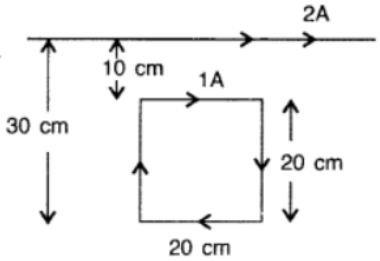
Subject: Physics **Std- XII** **Worksheet : B**

TOPIC : ELECTROSTATICS UNIT AND MOVING CHARGES

1.	Find the dimensions of the following physical quantities (i)Capacitance (ii)Electric field (iii) Electric Volt (iv) Electric flux
2.	What is the work done in moving a test charge q through a distance of 1 cm along the equatorial axis of an electric dipole?
3.	Derive the expression for the electric potential at any point due to an electric dipole
4.	Derive an expression for the potential energy of an electric dipole of dipole movement $\vec{p}$ in the electric field $\vec{E}$
5.	Two-point charges 4Q, Q are separated by lm in air. At what point on the line joining the charges is the electric field intensity zero?
6.	Calculate the work done to dissociate the system of three charges placed on the vertices of a triangle and in the second figure at the vertices of a square of side 'a' as shown.  
7.	   find the electric flux in each of the cases.
8.	Two charges of magnitudes –2Q and + Q are located at points (a, 0) and (4a, 0), respectively. What is the electric flux due to these charges through a sphere of radius 3a with its centre at the origin?

9.	 Find the net electric Fields at points A ,B .C and D.
10	State the dimensions of magnetic permeability and magnetic induction .
11	Two concentric coils each of rdius equal to 2 π cm are placed at right angles to each other ,3 A and 4 A are the currents flowing in each coil ,respectively.find the magnetic induction at the centre of the coil.
12	A beam of a α particles projected along +x-axis, experiences a force due to a magnetic field along the +y-axis. What is the direction of the magnetic field?
13	A beam of electrons projected along +x-axis, experiences a force due to a magnetic field along the +y axis. What is the direction of the magnetic field?
14	Using the concept of force between two infinitely long parallel current carrying conductors, define one ampere of current.
15	A particle of mass 'm' and charge 'q' moving with velocity V enters the region of uniform magnetic field at right angle to the direction of its motion. How does its kinetic energy get affected?
16	A steady current (I_1) flows through a long straight wire. Another wire carrying steady current (I_2) in the same direction is kept close and parallel to the first wire. Show with the help of a diagram how the magnetic field due to the current I1 exerts a magnetic force on the second wire. Write the expression for this force.
17	Two identical circular loops, P and Q, each of radius r and carrying current I and 21 respectively are lying in parallel planes such that they have a common axis. The direction of current in both the loops is clockwise as seen from O which is equidistant from both the loops. Find the magnitude of the net magnetic field at point O. 
18	A square loop of side 20 cm carrying current of 1A is kept near an infinite long straight wire carrying a current of 2A in the same plane as shown in the figure.Calculate the magnitude and direction of the net force exerted on the loop due to the current carrying conductor. 

1. (i)Observe fig . a and state the signs of Q1 and Q2.

(ii)State the point at which electric field is minimum.

(a)

(b)

2. (i)Few spherical equipotential surfaces are shown in the figure. Find

the electric field at any point X.

(ii)Find the electric field strength in reference to the figure (b).

(a)

(b)

3. (i)There are two equipotential surfaces as shown in figure. The distance between

them is r . The charge of q coulomb is taken from the surface A to B, the resultant work done will be ……

(ii) A 200 μC charge is at the centre of a square of side 10 cm. Find the work done in moving a charge of 20 μC between two diagonally opposite points on the square.

4.

(i) Find the net electric force on q1(+q).

(ii) Find the net electric field and potential at O.

5

10 Two charged spherical conductors of radii R1 and R2 when

connected by a conducting wire acquire charges q1 and q2 respectively. Find the ratio of their surface charge densities in terms of their radii.

11 Two point charges + q and -2q are placed at the vertices ‘B’ and ‘C’ of an equilateral triangle ABC of side as given in the figure. Obtain the

expression for (i) the magnitude and (ii) the direction of the resultant electric field at the vertex A due to these two charges.

8.

9. A hollow cylindrical box of length 1m and area of cross-section 25 cm2 is placed in a three dimensional coordinate system as shown in the

figure. The electric field in the region is given by

where E is in NC-1 and x is in metres. Find

(a) Net flux through the cylinder.

(b) Charge enclosed by the cylinder.

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11 Two point charges + q and -2q are placed at the vertices ‘B’ and ‘C’ of an equilateral triangle ABC of side as given in the figure. Obtain the

expression for (i) the magnitude and (ii) the direction of the resultant electric field at the vertex A due to these two charges.

(a)