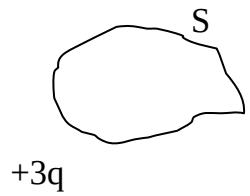
INTERNATIONAL INDIAN SCHOOL, RIYADH

WORKSHEET -1

CHAPTER-1 ELECTRIC FIELDS AND CHARGES

GRADE: XII **SUBJECT: PHYSICS**

1. What is the force between two small charged spheres having charges of 2×10^{-7}C and 3×10^{-7}C placed 30 cm apart in air?
2. The electrostatic force on a small sphere of charge 0.4μC due to another small sphere of charge -0.8μC in air is 0.2N.
   (a) What is the distance between the two spheres?
   (b) What is the force on the second due to the first?
3. A spherical Gaussian surface encloses a charge of 8.85×10^{-12}C.
   (a) Calculate the electric flux passing through the surface?
   (b) How would the flux change if the radius of the Gaussian surface is doubled and why?
4. Two large parallel thin metallic plates are placed close to each other. The plates have surface charge densities of opposite signs and of magnitude 20×10^{-12}C/m^2. Calculate the electric field intensity
   (i) in the outer region of the plates and
   (ii) in the interior region between the plates.
5. State Gauss's law in electrostatics. Use this law to derive the expression for the electric field due to a uniformly charged infinite thin plane sheet.
6. Define term' electric dipole moment'. Is it a scalar or vector?
7. Why must electrostatic field be normal to the surface at every point of a charged conductor?
8. A charge 'q' is placed at the centre of a cube. What is the electric flux passing through a single face of the cube?
9. Define electric flux.
10. Figure shows three point charges, +2q, -q and +3q. Two charges +2q and -q are enclosed within a surface 'S'. What is the flux due to this configuration through the surface 'S'?



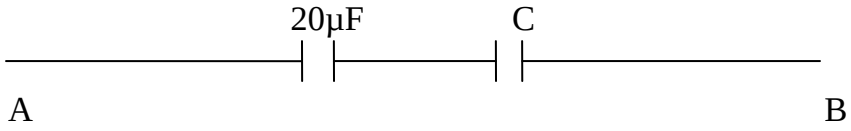
INTERNATIONAL INDIAN SCHOOL, RIYADH

WORKSHEET -2

CHAPTER-2 ELECTRIC POTENTIALS AND CAPACITANCE

GRADE: XII **SUBJECT: PHYSICS**

1. Explain the underlying principle of working of a parallel plate capacitor. If two similar plates, each of area A having surface charge densities +σ and –σ are separated by a distance d in air, write expressions for
   (a) the electric field at points between the two plates.
   (b) the potential difference between the plates.
   (c) the capacitance of the capacitor so formed.
2. (i) Can two equipotential surfaces intersect each other? Give reasons.
   (ii) Two charges –q and +q are located at points A (0, 0, -a) and B (0, 0, +a) respectively. How much work is done in moving a test charge from point P (7, 0, 0) to Q (-3, 0, 0)?
3. What is the electrostatic potential due to an electric dipole at an equatorial point?
4. The equivalent capacitance of the combination between A and B in the given figure is 4μF.



(i) Calculate the capacitance of the capacitor C.
(ii) Calculate the charge on each capacitor if a 12V battery is connected across terminals A and B.

5. Two charges 5×10^{-8} C and -3×10^{-8} C are located 16 cm apart. At what point(s) on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.
6. A regular hexagon of side 10 cm has a charge 5 5C at each of its vertices. Calculate the potential at the centre of the hexagon.
7. A parallel plate capacitor with air between the plates has a capacitance of 8 pF (1pF = 10^{-12}F). What will be the capacitance if the distance between the plates is reduced by half, and the space between them is filled with a substance of dielectric constant 6?
8. A 12 pF capacitor is connected to a 50V battery. How much electrostatic energy is stored in the capacitor?
9. What is meant by equipotential surface?
10. Define electrostatic potential.

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WORKSHEET - 4

CHAPTER- 4 MOVING CHARGES AND MAGNETISM

GRADE: XII **SUBJECT: PHYSICS**

1. A long straight wire in the horizontal plane carries a current of 50A in north to south direction. Give the magnitude and direction of **B** at a point 2.5m east of the wire.
2. What is the magnitude of magnetic force per unit length on a wire carrying a current of 8A and making an angle of 30º with the direction of a uniform magnetic field of 0.15T?
3. A galvanometer coil has a resistance of 12Ω and the metre shows full scale deflection for a current of 3mA. How will you convert the metre into a voltmeter of range 0 to 18V?
4. State Ampere's circuital law.
5. What is the direction of the force acting on a charged particle q, moving with a velocity **v** in a uniform magnetic field **B**?
6. Magnetic field lines can be entirely confined within the core of a toroid, but not within a straight solenoid, why?
7. A narrow beam of protons and deuterons, each having the same momentum, enters region of uniform magnetic field directed perpendicular to their direction of momentum. What would be the ratio of the radii of the circular paths described by them?
8. Write the expression for Lorentz magnetic force on a particle of charge 'q' moving with velocity **v** in a magnetic field **B**. Show that no work is done by this force on the charged particle.
9. State Biot-Savart law.
10. Draw a labeled diagram of Moving coil galvanometer.

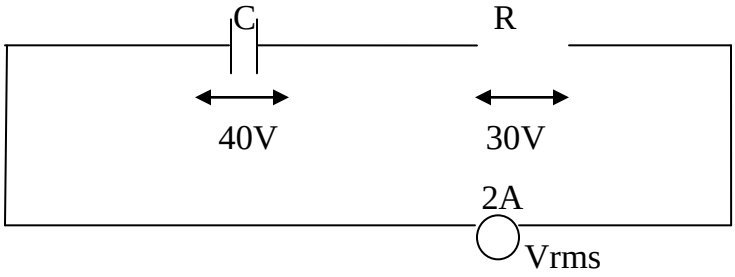
INTERNATIONAL INDIAN SCHOOL, RIYADH

WORKSHEET - 7

CHAPTER- 7 ALTERNATING CURRENTS

GRADE: XII **SUBJECT: PHYSICS**

1. (a) The peak voltage of an ac supply is 300 V. What is the rms voltage?
   (a) The rms value of current in an ac circuit is 10 A. What is the peak current?
2. Define Q-factor.
3. A series LCR circuit with R=20Ω, L=1.5H and C=35μF is connected to a variable frequency 200V ac supply. When the frequency of the supply equals the natural frequency of the circuit, what is the average power transferred to the circuit in one complete cycle.
4. Obtain the resonant frequency w_r of a series LCR circuit with L=2.0H, C=32μF and R=10Ω.What is the Q-factor (Q) of this circuit?
5. Calculate the (i) impedance of the given circuit.



6. Explain the working of a transformer.
7. Calculate the quality factor of a series LCR circuit with L=2.0 H, C= 2μF and R=10Ω.Mention the significance of quality factor in LCR circuit.
8. Draw phasor diagram for series LCR circuit.
9. A series LCR circuit with L = 0.12 H, C = 480 nF, R = 23 Ω is connected to a 230 V variable frequency supply.
   (a) What is the source frequency for which current amplitude is maximum? Obtain this maximum value.
   (b) What is the source frequency for which average power absorbed by the circuit is maximum? Obtain the value of this maximum power.
10. A charged 30μF capacitor having initial charge 6mC is connected to a 27mH inductor.
    (a) What is the angular frequency of free oscillations of the circuit?

    (b)What is the total energy stored in the circuit initially? What is the total energy at later time?