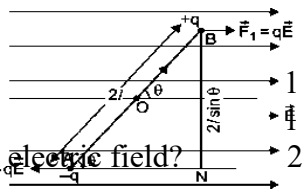
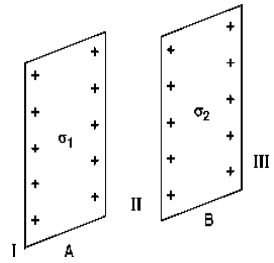
GAIL DAV PUBLIC SCHOOL
SUB:- PHYSICS , CLASS- XII
WORK SHEET , UNIT- I ,ELECTRIC CHARGES AND FIELDS

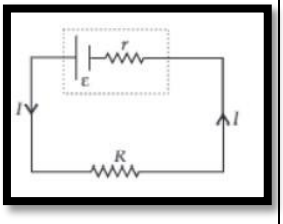
SN	Question	Marks
1	Two-point charges + Q and + q is separated by a certain distance. If + Q > + q then in between the charges the electric field is zero at a point (a) closer to + Q (b) exactly at the mid-point of line segment joining + Q and + q. (c) closer to + q (d) nowhere on the line segment joining + Q and + q.	1
2	**Assertion**: A metallic shield in form of a hollow shell may be built to block an electric field. **Reason:** In a hollow spherical shield, the electric field inside it is zero at every point. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	Electric lines of force about a negative point charge are (a) circular anticlockwise (b) circular clockwise (c) radial, inwards (d) radial, outwards	1
4	The electric field at a point on equatorial line of a dipole and direction of the dipole moment (a) will be parallel (b) will be in opposite direction (c) will be perpendicular (d) are not related	1
5	Two identical metallic spheres of exactly equal masses are taken. One is given a positive charge 'q' and other an equal negative charge. Are their masses after charging equal?	2
6	An electric dipole free to move is placed in an electric field. What is the action on it, when it is placed in (a) a uniform electric field (b) a non-uniform electric field?	2
7	Derive a relation for the intensity of electric field at an equatorial point of an electric dipole.	3
	Case study-based questions (questions no 8- 11) In a uniform electric field of strength E, the net electric force is zero; but a torque equal to pE sin θ acts on the dipole (where θ is the angle between directions of dipole moment p and electric field E). This torque tends to align the dipole along the direction of electric field. Torque in vector form $\vec{\tau} = \vec{p} \, x \, \vec{E}$ 8. When is the torque applied is maximum? 1 9. What is the direction of torque applied 1 10. What is net force and net when an electric dipole is placed in uniform electric field? 2 **OR** 10. What is net force and net when an electric dipole is placed in non-uniform electric field? 2 	4
11	(a) A point charge (+Q) is kept in the vicinity of uncharged conducting plate. Sketch electric field lines between the charge and the plate. (b) Two infinitely large plane thin parallel sheets having surface charge densities σ1 and σ2 (σ1> σ2) are shown in the figure. Write the magnitudes and directions of the net fields in the regions marked II and III. 	5

GAIL DAV PUBLIC SCHOOL
SUB:-PHYSICS ,CLASS- XII
CHAPTER- 2, ELECTROSTATIC-POTENTIAL AND CAPACITANCE

SN	Question	Marks
1	A positively charged particle is released from rest in a uniform electric field. The electric potential energy of the charge (a) remains a constant because the electric field is uniform. (b) increases because the charge moves along the electric field. (c) decreases because the charge moves along the electric field. (d) decreases because the charge moves opposite to the electric field.	1
2	**Assertion:** When two conductors charged to different potentials are connected to each other, the negative charge always flows from lower potential to higher potential. **Reason:** In the charging process, there is always a flow of electrons only. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	A capacitor is charged by a battery. The battery is removed and another identical uncharged capacitor is connected in parallel. The total electrostatic energy of resulting system (a) increases by a factor of 4. (b) decreases by a factor of 2. (c) remains the same. (d) increases by a factor of 2.	1
4	A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery, the distance between the plates of the capacitor is increased using an insulating handle. As a result, the potential difference between the plates (a) increases (b) decreases (c) does not change (d) becomes zero	1
5	Can electrostatic potential at a point be zero, while electric field at that point is not zero?	2
6	If a dielectric slab is introduced between the plates of a parallel plate capacitor after the battery is disconnected. How do the following quantities change? (i) Charge (ii) Potential difference (iii) Capacitance (iv) Energy.	2
7	Define an equipotential surface. Draw equipotential surfaces. (i) in the case of a single point charge and (ii) in a constant electric field in Z-direction. Why the equipotential surfaces about a single charge are not equidistant? (iii) Can electric field exist tangential to an equipotential surface? Give reason.	3

	Case study-based questions (questions no 8- 11) Capacitor and Capacitance A capacitor contains two oppositely charged metallic conductors at a finite separation. It is a device by which capacity of storing charge may be varied simply by changing separation and/or medium between the conductors. The capacitance of a capacitor is defined as the ratio of magnitude of charge (Q) on either plate and potential difference (V) across the plate, i.e., $C = \frac{Q}{V}$ The unit of capacitance is coulomb/volt or farad (F) 8. What is a capacitor? 1 9. What is main purpose of using a capacitor? 1 10. Can we increase the capacitance by increasing potential applied across it? 2 **OR** 10. What will be the effect on capacitance by inserting a dielectric in between the plates? 2	4
11	(a) Derive an expression for the energy stored in a parallel plate capacitor C, charged to a potential difference V. Hence derive an expression for the energy density of a capacitor. 3 (b) Find the ratio of the potential differences that must be applied across the parallel and series combination of two capacitors C_1 and C_2 with their capacitances in the ratio 1:2 so that the energy stored in the two cases becomes the same 2	5

GAIL DAVPUBLIC SCHOOL
SUB:-PHYSICS, CLASS -XII
CHAPTER- 3,CURRENT ELECTRICITY

SN	Question	Marks
1	The relaxation time in conductors (a) increases with the increases of temperature (b) decreases with the increases of temperature (c) it does not depend on temperature (d) all of sudden changes at 400 K	1
2	**Assertion:** For a conductor resistivity increases with increase in temperature. **Reason:** Since $\rho = \frac{m}{ne^2\tau}$, when temperature increases the random motion of free electrons increases and vibration of ions increases which decreases. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	With increase in temperature the conductivity of (a) metals increases and of semiconductor decreases. (b) semiconductors increases and metals decreases. (c) in both metals and semiconductors increases. (d) in both metal and semiconductor decreases.	1
4	In the series combination of two or more than two resistances (a) the current through each resistance is same (b) the voltage through each resistance is same (c) neither current nor voltage through each resistance is same (d) both current and voltage through each resistance are same.	1
5	Define the terms (i) drift velocity, (ii) relaxation time.	2
6	Two conducting wires X and Y of same diameter but different materials are joined in series across abattery. If the number density of electrons in X is twice that in Y, find the ratio of drift velocity of electrons in the two wires.	2
7	Using the concept of free electrons in a conductor, derive the expression for the conductivity of a wire in terms of number density and relaxation time. Hence obtain the relation between current density andthe applied electric field E.	3
	Case study-based questions (questions no 8- 11) Emf of a cell Emf of a cell is the maximum potential difference between two electrodes of the cell when nocurrent is drawn from the cell. Internal resistance is the resistance offered by the electrolyte of a cell when the electric current flows through it.The internal resistance of a cell depends upon the following factors; (i) distance between the electrodes (ii) nature and temperature of the electrolyte (iii) nature of electrodes A (iv) area of electrodes. 	4

	8. What is EMF of a cell? 1 9. Define internal resistance of a cell 1 10. List the factors on which EMF of a cell depends 2 OR 10.Explain the effect of temperature on internal resistance of a cell 2	
11	(i) On the basis of electron drift, derive an expression for resistivity of a conductor in terms of number density of free electrons and relaxation time. On what factors does resistivity of a conductor depend? 3 (ii) Why alloys like constantan and manganin are used for making standard resistors? 2	5