











**PRAYAG PUBLIC SCHOOL**

**CLASS - 12th**

**PHYSICS ASSIGNMENT (HOLIDAY HOMEWORK)**

**Date: (1/ 6/2020 to 10/6/2020)**

**Note** : **Attempt all the questions compulsory .**

 **Each assignment carrying marks.**

 **Do it in a separate copy with neat and clean work.**

 **Subjective**:

**Level – O**

1. How does the force between two point charges change if the dielectric constant of the medium in which they are kept increases.
2. Two point charges of unknown magnitude and sign are placed at a distance **d** apart the electric field intensity is zero at a point not between the charges but on the line joining them. Write two essential conditions for this to happen.
3. Show that no electric field exist inside of hollow charged conductor
4. What is the electrostatic shielding
5. What are the properties of electrostatic line of force
6. Sketch the electric lines of force for two positive charges **Q1** and **Q2** where (**Q1 > Q2**) separated by a distance **d**
7. Define the term electric flux state its unit

A sphere **S1** of radius **R1** encloses a charge q if there is another concentric sphere S2 of radius R2 where **R2 >R1** and there be no additional charges between **S1** and **S2**. find the ratio of electric flux through **S1** and **S2**.

1. State the Gauss's theorem in electrostatics. Apply this theorem to calculate the electric field due to an infinite plane sheet of charge.
2. Define electric potential. Deduce an expression for the electric potential at a point distant ‘**r’** from point charge q.
3. How much work is done in moving a **500** micro coulomb charge between two points on an equipotential surface.
4. Define intensity of electric field at a point. At what point is the electric dipole field intensity parallel to the line joining the charges.
5. Name the physical quantity whose SI unit is **1)-** Coulomb / volt. **2)-**Newton /Coulomb . **3)-** joule / Coulomb
6. What is the ratio of electric field intensity at any two point between the plates of a parallel plate capacitor
7. Prove that the energy stored in a parallel plate capacitor is is **½ cv².**
8. What is dielectric. A dielectric slab of thickness t is kept between the plates of a parallel plate capacitor separated by a distance d. Derive the expression for the capacity of the Capacitor for **t<<d**.
9. Define dielectric constant of a medium in terms of force between electric charges.
10. Draw a diagram to show lines of force in a plane containing two equal point charges of opposite sign separated by a small distance. Giving reason indicate on the diagram a point where a small positive charge experiences a force parallel to the line joining the two charges.
11. Derive an expression for electric field intensity at any point along the axial line of an electric dipole.
12. Derive an expression for the total work done in rotating an electric dipole through an angle theta in a uniform electric field.
13. Define intensity of electric field at a point. At what point is the electric dipole field intensity e parallel to the line joining the charges?
14. Using Gauss law show that no electric field intensity exist inside a hollow charged conductor.
15. What is an equipotential surface show that the electric field is always directed perpendicular to an equipotential surface?
16. Force of attraction between two point charges placed at a distance d apart in a medium is **F**. What should be the distance apart in the same medium so that the force of attraction between them becomes **9F.**
17. A Proton is moved in a uniform electric field of **1.7 × 10 -4** N/C between two points A and B separated by a distance of **0.1** m.

**1**- what is the potential difference between the points?

 **2-**how much work is **1** in the above process.

1. Derive the expression for the capacitance of a parallel plate capacitor having two identical plates each of area **A** and separated by a distance **d**. When the space between the plates is filled by a dielectric medium.

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**Date: (11/ 6/2020 to 20/6/2020)**

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 **Each assignment carrying marks.**

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 **Subjective**:

**Level – 1**

1. The charges **Q1** and **Q2** are placed at the corners of a square as shown in the figure. Find **Q2** such that the resultant force on **Q1** is zero.



1. Five point charges each of magnitude + **Q** are kept at the corner **A,B,C,D and E** of a regular hexagon of side **a .** find the electric field at the centre O of the hexagon.
2.  A small sphere of mass **m** carries a charge **q**. It hangs from a light inextensible thread of length **L** making an angle theta with an infinite line of charge as shown in the figure. Find the linear charge density of the line charge.
3. A circular wire of radius **R** carries a total charge **q** distributed uniformly over it circumference . Small length of wire subtending angle α at the centre is cut off . Find a magnitude of electric field at the centre due to the remaining portion.
4.  A plane surface of area **S** is inclined at an angle **theta** with a uniform electric field as shown in figure. Find the flux of Electric field over S.
5. Twenty seven identical Mercury drops are charge simultaneously to the same potential of **10** volt . What will be the potential, if all the charged drops are made to combine to form one large drop. Assume all drops to be spherical.
6. The electric field at a point due to point charge **30N/C**, and the electric potential at that point is **15J/C** . Calculate the distance of the point from the charge and the magnitude of the charge.
7. Two point charges **A** and **B** of value +**15microC** and **+9microC** are kept **18** cm apart in air. Calculate the work done when charge **B** is moved by **3** cm towards **A**.
8. Two charged particle having +**1microC** and -**1microC** and of mass **50** gm each held at rest while their separation is **2** m . Find the speed of the particles when their separation is **1** m . Neglect the effect of gravity.
9. A certain charge **Q** is to be divided into two parts,  **q** and **Q-q**. What is the relationship of **Q** to **q** if the two parts placed at a given distance **r** apart are to have maximum columbic repulsion? What is the work done in reducing the distance between them to half its value. ?
10. An infinite thin plate sheet of charge density **10 -8**cm -2 is held in air. How far apart are two equipotential surface, whose potential difference is **5** volt.
11. A **1microF** and a **2microF** capacitor are connected in series across a **1200 V** supply.
	1. Find the charge on each capacitor and voltage across each capacitor
	2. The charged capacitor are disconnected from the line and from each other and are now connected with terminals of like sign together . Find the final charge on each capacitor and the voltage across each capacitor.

 **13** - The space between the plates of a parallel plate capacitor is filled with the dielectric as shown in figure **1** and **2**. The area of each plate is **A** and permittivity of the dielectric is **€r** . Find the capacitance in each case.



1. - Calculate the capacitance of the capacitor see in figure the equivalent capacitance of the combination between **P** and **Q** is **30 micro Farad**.
	1. A **20 microfarad** capacitor is charged by a **30 volt** dc supply and then connected across an uncharged **50 microfarad** capacitor calculate: **i**) the final potential difference across the combination. **ii**) initial and final energies . How will you account for the difference energies?