PHYSICS

BOOKS - BETTER CHOICE PUBLICATION

ELECTRIC CHARGES AND ELECTROSTATIC FORCE

Very Short Answer Type Questions

1. How is the mass of a body affected on charging ?

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2. Electrostatic force between two charges is called central force. Why?

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3. What is the basic cause of quantization of charge ?

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4. Define dielectric constant of a medium.

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5. Define SI unit of electric charge.

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6. Deline one Coulomb charge.

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7. What is meant by conservation of charge ?

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8. If $q_1 q_2 > 0$, what is the nature of force between the two charges ?

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9. Write the two properties of electric charge.

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10. State Coulomb's law in electrostatics.

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11. Is it possible to have relative permittivity less than one ?

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12. Write the dimensional formula for $\in_0$

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13. In Coulomb's law, on what factors the value of electrostatic force constant 'k' depends ?

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14. State the limitations of Coulomb's law.

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15. Write a relation between absolute and relative electrical permittivity of a medium.

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16. Write a relation for the electrostatic force between the two point charges placed in a dielectric medium.

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17. What is quantization of charge ?

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18. A charged rod P attracts rod R whereas P repels another charged rod. Q. What type of force is developed between them ?

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Very Short Answer Type Questions Most Expected Questions

1. What does $q_1 + q_2 = 0$ signify in electrostatics?

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2. Let we have two charges q_1 and q_2 and $q_1 q_2 < 0$. What is the nature of force between them?

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3. Name the physical quantity whose S.I. unit is farad metre^{-1}.

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4. What is the use of principle of superposition of charges ?

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5. How does the force between two point charges change if the dielectric constant of the medium in which they are kept, increases ?

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6. What is the permittivity of a medium whose dielectric constant is one ?

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7. Can two balls having same kind of charge on them attract each other ?

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8. What do you mean by invariance of electric charge ?

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Short Answertype Questions

1. What do you mean by quantization of electric charge ? Explain.

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2. Explain the term quantization of charge.

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3. Define the law of conservation of electric charge and give its two examples.

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4. Give the four properties of charge.

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Short Answertype Questions Most Expected Questions

1. Give any four differences between mass and charge.

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2. Vehicles carrying inflammable materials usually have metallic ropes touching the ground during motion. Why?

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3. A comb run through one's dry hair attracts small bits of paper. Why?

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4. What is the importance of Coulomb's law in vector form ?

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5. A positively charged ball A attracts another ball B. Is it necessary that ball B is negatively charged ?

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6. When a glass rod is rubbed with silk then it acquires a charge of $+1.6 \times 10^{-19} C$. What is the charge on the silk ?

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7. State Coulomb's law in vector form and from it define relative permittivity.

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Long Answer Type Questions

1. State and explain Coulomb's law of force in electrostatics. What is the S.I. unit of charge and hence define one Coulomb of charge using this law ?

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2. State principle of superposition of charges and using it find an expression for force acting at a point charge due to assembly, of 'n' point charges.

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3. State Coulomb's law, explain its vectar form and define S.I. Unit of electric charge. State two limitations of Coulomb's law.

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Numerical Problems

1. How many electrons make up one Coulomb of charge ?

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2. Force of attraction between two point charges placed at a distance in a medium is F. What distance apart should these be kept in the same medium, so that force between them becomes F/3 ?

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3. If the distance between the two equal point charges is doubled and their individual charges are doubled, what would happen to the force between them ?

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4. Calculate the Coulomb's force between two α - particles separated by a distance of 3.2×10^{-15} m.

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5. Ten electrons have been removed from each atom to form ions. Find the electrostatic force between two such ions when separated by a distance of 4A in a medium of dielectric constant 4.

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6. Five electrons have been removed from each atom to form ions. Find the electrostatic force between two such ions when separated by a distance of 2Å in a medium of dielectric constant 4.

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7. Twenty electrons have bee removed from each atom to form ions. Find the electrostatic force between two such ions when separated by a distance of 8Å in a medium of dielectric constant 4.

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8. Two similar charges repel each other with a force of 44.1 N when placed 2 cm apart in air. Calculate the strength of charge.

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9. What is the Coulomb's force between two small charged spheres having charge of $2.0 \times 10^{-7} C$ and $3.0 \times 10^{-7} C$ placed 30 cm apart in air.

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10. Find the electrostatic force between two protons placed in free space separated by a distance of 20 cm.

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11. Calculate the Coulomb's force between two a-particles separated by a distance of $3.2 \times 10^{-15} m$.

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12. Calculate the Coulomb's force between two protons separated by 1.6×10^{-15} m.

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13. Calculate the Coulomb's force between proton and electron separated $0.8 \times 10^{-15} m$.

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Numerical Problems Most Expected Numericals

1. Dielectric constant of water is 80. What is its permittivity ?

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2. What is the force of repulsion between two charges of 1C each kept 1m apart in vacuum ?

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3. Force between the two point charges kept a distance of 10 cm is 80 N in air If these charges are kept at the same distance in water, how does the force between them change ?

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4. How far apart should the two electrons be, if the force each exerts on the other is equal to the weight of the electron ?. Given that $\in_0 = 8.854 \times 10^{-12} C^2 N^{-1} m^{-2}$ and $m_e = 9.1 \times 10^{-31}$ kg

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5. Two point charges q_1 and q_2 are 3 m apart and their combined charge is 20 pic. If one repels the other with a force of 0.075 N, what are the two charges ?

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6. Two fixed point charges 4Q and 2Q. are separated by a distance X. Where should the third point charge q be placed for it to be in equilibriam ?

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