# QB365 Question Paper Software
## 12th Standard - Physics
## Electric Charges and Fields Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-09-30

Total Marks: 10

## Questions:

1. **Assertion (A) :** A point charge is lying at the centre of a cube of each side. The electric flux emanating from each surface of the cube is $\frac{1}{6}^{\text{th}}$ of total flux.
   **Reason (R) :** According to Gauss theorem, total electric flux through a closed surface enclosing a charge is equal to $1/\varepsilon_0$ times the magnitude of the charge enclosed.
   **Codes:**
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

2. **Assertion (A) :** Charge is quantized.
   **Reason (R) :** Charge which is less than 1 C is not possible.
   **Codes:**
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

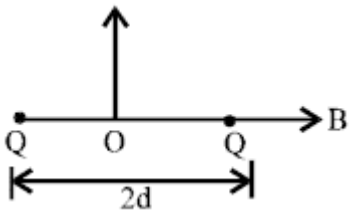
3. Assertion(A) : If a point charge be revolved in a circle around another charge as the centre of circle, tlhen work done by electric field will be Zero.
   Reason (R) Work done is equal to dot product of force and displacement.
   (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) Assertion is true but Reason is false.
   (d) Assertion is false but Reason is true.

4. **Assertion :** The coulomb force is the dominating force in the universe.
   **Reason :** The coulomb force is weaker than the gravitational force.
   **Codes:**
   (a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
   (b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
   (c) Assertion is correct, Reason is incorrect
   (d) Both Assertion and Reason are correct.

5. **Assertion :** The property that the force with which two charges attract or repel each other are not affected by the presence of a third charge.
   **Reason :** Force on any charge due to a number of other charge is the vector sum of all the forces on that charge due to other charges, taken one at a time.
   **Codes:**

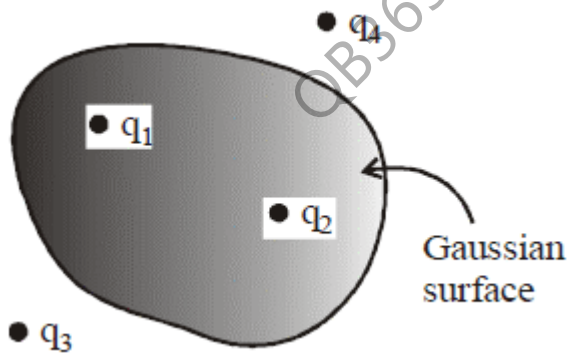
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.

6. **Assertion :** Consider two identical charges placed distance 2d apart, along x-axis.




The equilibrium of a positive test charge placed at the point O midway between them is stable for displacements along the x-axis.
**Reason:** Force on test charge is zero.
**Codes:**
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.

7. **Assertion :** Four point charges q1, q2, q3 and q4 are as shown in figure. The flux over the shown Gaussian surface depends only on charges q1 and q2.




**Reason :** Electric field at all points on Gaussian surface depends only on charges q1 and q2.
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.

8. **Assertion :** The electric flux of the electric field $\oint E.dA$ is zero. The electric field is zero everywhere on the surface.
**Reason :** The charge inside the surface is zero.
**Codes:**
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the

Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.

9. **Assertion :** Sharper is the curvature of spot on a charged body lesser will be the surface charge density at that point
**Reason :** Electric field is non-zero inside a charged conductor.
**Codes:**
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.

10. **Assertion :** If a point charge be rotated in a circle around a charge, the work done will be zero.
**Reason :** Work done is equal to dot product of force and distance
**Codes:**
(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are correct.



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## Answers Key:

1. **(b):** The electric flux through the cube $\phi = q/\varepsilon_0$
A cube has six faces of equal area. Therefore, electric flux through each face = $\frac{1}{6}\phi = \frac{1}{6}(q/\varepsilon_0)$.
2. **c):** The charge q on a body is given as q = ne where n is any integer positive or negative. The charge on the electron is q = 1.6 X $10^{-19}$ C whichis less than 1 C.
3. (a) Force by electric field will be perpendicular to the displacement.
4. (d) Both Assertion and Reason are correct.
**Explanation:**
Gravitational force is the dominating force in nature and not coulomb's force.
Gravitational force is the weakest force. Also, Coulomb's force > > gravitational force.
5. (b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
**Explanation:**
Force on any charge due to a number of other charges is the vector sum of all the forces on that charge due to the other charges, taken one at a time. The individual force are unaffected due to the presence of other charges. This is the principle of superposition of charges.
6. (b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
**Explanation:**
If +ve charge is displaced along x-axis, then net force will always act in a direction

opposite to that of displacement and the test charge will always come back to its original position.

7. (d) Both Assertion and Reason are correct.

   **Explanation:**

   Electric field at any point depends on presence of all charges.

8. (d) Both Assertion and Reason are correct.
9. (d) Both Assertion and Reason are correct.
10. (a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.