CBSE NCERT Based Chapter wise Questions (2025-2026)
Class-XII
Subject: Physics
Chapter Name : *Electric Charges and Field* (Chapter : 1)

Total : 07 Marks (expected) [MCQ(2)-1 Mark, SA(1)-2 Marks, LA(1)-3 Marks]

Level - 2 (Higher Order)

MCQ Type Questions :

1. If σ = surface charge density, ε = electric permittivity, the dimensions of $\dfrac{\sigma}{\varepsilon}$ are same as

   (A) electric force   (B) electric field intensity   (C) pressure   (D) electric charge

2. Two charges each of magnitude 0.01 C and separated by a distance of 0.4 mm constitute and electric dipole. If the dipole is placed in an uniform electric field $\vec{E}$ of 10 dyne/C making 30° angle with $\vec{E}$, the magnitude of torque acting on dipole is

   (A) 4.0×10^{-10} Nm   (B) 2.0×10^{-10} Nm   (C) 1.0×10^{-8} Nm   (D) 1.5×10^{-9} Nm

3. Out of the following is not a property of field lines

   (A) Field lines are continuous curves without any breaks

   (B) Two field lines cannot cross each other

   (C) Field lines start at positive charges and end at negative charges

   (D) They form closed loops

4. Which quantity is a vector quantity among the following?

   (A) Electric flux   (B) electric charge   (C) Electric field   (D) Electric potential

5. Gauss's law is valid for

   (A) Any closed surface   (B) Only regular closed surfaces

   (C) Any open surface   (D) Only irregular open surfaces

6. Which statement is true for Gauss law?

   (A) All the charges whether inside or outside the Gaussian surface contribute to the electric flux.

   (B) Electric flux depends upon the geometry of the Gaussian surface.

   (C) Gauss theorem can be applied to non-uniform electric field.

   (D) The electric field over the Gaussian surface remains continuous and uniform at every point.

7. Above an infinitely large plane carrying charge density σ, the electric field points up and is equal to $\dfrac{\sigma}{2\varepsilon_0}$. What is the magnitude and direction of the electric field below the plane?

   (A) $\dfrac{\sigma}{2\varepsilon_0}$, down   (B) $\dfrac{\sigma}{2\varepsilon_0}$, up   (C) $\dfrac{\sigma}{\varepsilon_0}$, down   (D) $\dfrac{\sigma}{\varepsilon_0}$, up

8. Two parallel large thin metal sheets have equal surface densities 26.4×10^{-12} C/m^2 of opposite signs. The electric field between these sheets is

   (A) 1.5 N/C   (B) 1.5×10^{-16} N/C   (C) 3×10^{-10} N/C   (D) 3 N/C

   [CBSE SP 22]

9. A spherical shell of radius R has a charge $+q$ units. The electric field due to the shell at a point

   (A) inside is zero and varies as r^{-1} outside it   (B) inside is constant and varies as r^{-2} outside it

   (C) inside is zero and varies as r^{-2} outside it   (D) inside is constant and varies as r^{-1} outside it

Assertion-Reason based questions

a) Both Assertion and Reason are correct and Reason is a correct explanation of Assertion

b) Both Assertion and Reason are correct and Reason is not a correct explanation of Assertion

c) Assertion is correct, Reason is incorrect

d) Assertion is incorrect, Reason is correct

10. **Assertion:** If the bob of a simple pendulum is kept in a horizontal electric field, its period of oscillation will remain same.

   Reason: If bob is charged and kept in horizontal electric field, then the time period will be decreased.

   [AIIMS 12]

   Ⓐ a   Ⓑ b   Ⓒ c   Ⓓ d

11. **Assertion:** Acceleration of charged particle in non-uniform electric field does not depend on velocity of charged particle.

   Reason: Charge is an invariant quantity. That is the amount of charge on particle does not depend on frame of reference.

   Ⓐ a   Ⓑ b   Ⓒ c   Ⓓ d

12. **Assertion:** Net electric field inside a conductor is zero.

   Reason: Total positive charge equals to total negative charge in a charged conductor.   [AIIMS 17]

   Ⓐ a   Ⓑ b   Ⓒ c   Ⓓ d

13. **Assertion:** All the charge in a conductor gets distributed on whole of its outer surface.

   Reason: In a dynamic system, charges try to keep their potential energy minimum.

   Ⓐ a   Ⓑ b   Ⓒ c   Ⓓ d

Short Answer Type Questions (SAQ)

14. Define electric line of force and give its two important properties.

15. Apply Gauss's law to derive the expression of electric field due to the charged spherical shell.

16. Depict the orientation of the dipole in (a) stable (b) unstable equilibrium in a uniform electric field.

17. Define the term electric dipole moment. Is it a scaler or vector?

18. If two charges q_1 and q_2 placed at a separation r, force between them is F. If separation increases by 5% then find the percentage charge of force.

Long Answer Type Questions (LAQ)

19. A charge of magnitude $3e$ and mass $2m$ is moving in an electric field $\vec{E}$. The acceleration imparted to charge is _____.

20. A thin plastic rod is bent into a circular ring of radius R. It is uniformly charged with charge density λ. Find the magnitude of the electric field at its centre.

21. An electric field $\vec{E} = \dfrac{2\hat{i} + 6\hat{j} + 8\hat{k}}{\sqrt{6}}$ passes through the surface of 4 m^2 area having unit vector $\hat{n} = \dfrac{2\hat{i} + \hat{j} + \hat{k}}{\sqrt{6}}$. Find the electric flux through the surface.

22. Calculate the field due to an electric dipole of length 10 cm and consisting of charges of ± 100 μc. At a point 20 cm from each charge.

1.	Ⓑ	**6.**	Ⓒ	**11.**	Ⓐ	**16.**		**20.**	zero
2.	Ⓑ	**7.**	Ⓐ	**12.**	Ⓒ	**17.**		**21.**	$12\,\mathrm{Vm^{-1}}$
3.	Ⓓ	**8.**	Ⓓ	**13.**	Ⓐ	**18.**		**22.**	$1.125\times107\,\mathrm{NC^{-1}}$
4.	Ⓒ	**9.**	Ⓒ	**14.**					
5.	Ⓐ	**10.**	Ⓒ	**15.**		**19.**	$\dfrac{3Ee}{2m}$		