

CBT CLASS XII SUBJECT- PHYSICS MONTH-APRIL 2026

Case:-1 Read the following source and answer the questions given below it:

Coulomb, a French physicist, began his career as a military engineer in the West Indies. In 1776, he returned to Paris and returned to a small estate to do his scientific research. He invented a torsion balance to measure the quantity of a force and used it for determination of forces of electric attraction or repulsion between small charged spheres. He thus arrived in 1785 at the inverse square law relation, now known as Coulomb's law. The law had been anticipated by Priestley and also by Cavendish earlier, though Cavendish never published his results. As per different methods of developing charge on a body and based on concept of electrostatic force answer the following.

Q:-1 When a piece of polythene is rubbed with wool, a charge of -2×10^{-7} C is developed on polythene. What is the amount of mass, which is transferred to the polythene?

- A) 1.138×10^{-18} kg B) 1.138×10^{-19} kg C) 11.38×10^{-20} kg D) 11.38×10^{-19} kg

Q:-2 Two charges each of magnitude Q are fixed at 2a distance apart and a third charge 'q' of mass 'm' is placed at the mid-point of the line joining the two charges; all charges being of the same sign. If q charge is slightly displaced from its position along the line and released then its time period will be

- A) 1 Sec
B) infinite
C)

D) $T = 2\pi \sqrt{\frac{ma^3 \pi \epsilon_0}{Qq}}$

$$T = 2\pi \sqrt{\frac{ma \pi \epsilon_0}{Qq}}$$

Q:-3

Charge 'Q' of mass m revolves around a point charge 'q' due to electrostatic attraction. What is its period of revolution by



A)

$$T^2 = \frac{16\pi^3 \epsilon_0 m R^3}{Qq}$$

B)

$$T = \frac{16\pi^3 \epsilon_0 m R^3}{Qq}$$

C)

$$T = \frac{16\pi \epsilon_0 m R^3}{Qq}$$

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D)

$$T^2 = \frac{16\pi \epsilon_0 m R}{Qq}$$

Case:-2 Read the following source and answer the questions given below it:

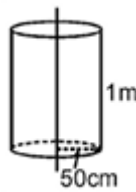
He was a child prodigy and was gifted in mathematics, physics, engineering, astronomy and even land surveying. The properties of numbers fascinated him, and in his work he anticipated major mathematical development of later times. Along with Wilhelm Welsler, he built the first electric telegraph in 1833. His mathematical theory of curved surface laid the foundation for the later work of Riemann. In physics, his (Gauss) law is formulated in 1835, but was not published until 1867 and now we use it to find electric field intensity due to different charge distribution based on Gauss law answer the following

Q:-4

The electric field in a region is given by $\vec{E} = \frac{3}{5}E_0\hat{i} + \frac{4}{5}E_0\hat{j}$ where $E_0 = 2 \times 10^3 \text{ NC}^{-1}$. Electric flux due to this field through a rectangular surface of area 0.2 m^2 parallel to the Y-Z plane will be

- A) $240 \text{ Nm}^2\text{C}^{-1}$
- B) $24 \text{ Nm}^2\text{C}^{-1}$
- C) $40 \text{ Nm}^2\text{C}^{-1}$
- D) $140 \text{ Nm}^2\text{C}^{-1}$

Q:-5 Electric charge is uniformly distributed over a long straight wire of radius 1 mm. The charge per cm length of the wire is 'Q' coulombs. A cylindrical surface of radius 50 cm and length 1 m encloses the wire symmetrically as shown in fig. The total flux passing through the cylindrical surface is



- (1) $\frac{Q}{\epsilon_0}$ (2) $\frac{100Q}{\epsilon_0}$ (3) $\frac{10Q}{\pi \epsilon_0}$ (4) $\frac{100Q}{\pi \epsilon_0}$

Q:-6 If the electric flux entering and leaving a closed surface is ϕ_1 and ϕ_2 , respectively then electric charge inside the surface will be

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$$(1) (\phi_1 + \phi_2)\epsilon_0$$

$$(2) (\phi_2 - \phi_1)\epsilon_0$$

$$(3) \frac{\phi_1 + \phi_2}{\epsilon_0}$$

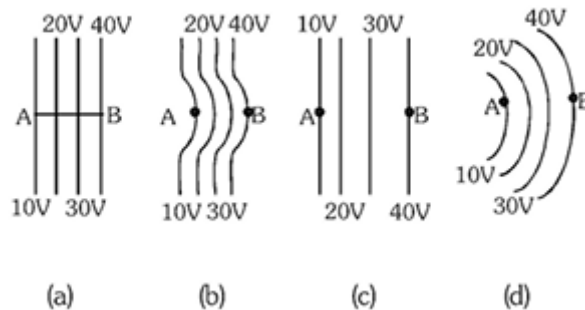
$$(4) \frac{\phi_2 - \phi_1}{\epsilon_0}$$

Case:- 3 Read the following source and answer the questions given below it:

For a given charge distribution, the locus of all the points having the same potential is called Equipotential Surface. Equipotential surface, as the name defines, is a surface on which potential is equal everywhere. It means that if we draw a surface in such a way that the electric potential is the same at all the points of the surface, then it is said to be an equipotential surface.

The potential difference between any two points on an equipotential surface is always zero. In the given equipotential surface below, the potential at point A will be equal to the potential at point B. At every point the electric field is normal to the equipotential surface passing through that point. The spacing between equipotential surfaces indicates the strength of the electric field.

Q:-7 The diagrams below shows regions of equipotential:



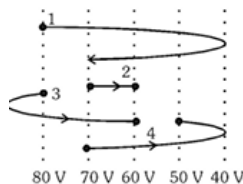
A positive charge is moved from A to B in each diagram.

- (1) In all the four cases the work done is the same
- (2) Minimum work is required to move q in figure (a)
- (3) Maximum work is required to move q in figure (b)
- (4) Maximum work is required to move q in figure (c)

Q:-8 Figure shows a family of parallel equipotential surfaces and four paths along which an electron is made to move from one surface to another as shown.

- (A) What is the direction of the electric field?
- (B) Rank the paths according to work done, greatest first.

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(1) Rightward; $4 > 3 > 2 > 1$

(2) Leftward; $1 > 2 > 3 > 4$

(3) Rightward; $3 = 4 > 2 = 1$

(4) Leftward; $1 > 2 > 3 = 4$

These questions consist of two statements each, printed as **Assertion** and **Reason**. While answering these Questions you are required to choose any one of the following four responses.

(A) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(B) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(C) If Assertion is True but the Reason is False.

(D) If both Assertion & Reason are false.

Q:-9

Assertion- Electric field lines are always perpendicular to the surface of conductor.

Reason:- Electric field is always perpendicular to equipotential surface.

Q:-10

Assertion- For a conductor, when observed at very large distance, equipotential surfaces are plane.

Reason- Electrostatic field is a conservative field.