FOUNDATION

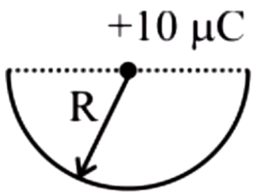
Parishram (2025)

Physics

Electric Charges and Fields

DPP : 9

Q1 A charge $10 \mu C$ is placed at the centre of a hemisphere of radius $R = 10 \text{ cm}$ as shown. The electric flux through the hemisphere (in MKS units) is

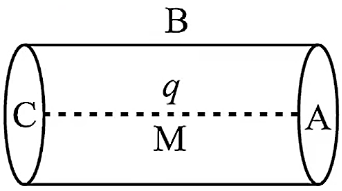


(A) 20×10^5
(B) 10×10^5
(C) 5.6×10^5
(D) 2×10^5

Q2 The total electric flux through a cube when a charge $8q$ is placed at one corner of the cube is

(A) $\varepsilon_0 q$
(B) $\frac{q}{\varepsilon_0}$
(C) $4\pi\varepsilon_0 q$
(D) $\frac{q}{4\pi\varepsilon_0}$

Q3 A hollow cylinder has a charge q coulomb placed at the midpoint of the axis CA. If ϕ is the electric flux in units of volt-meter associated with the curved surface B, the flux linked with the plane surface A in units of volt-meter will be

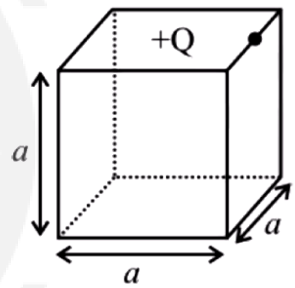


(A) $\frac{1}{2}\left(\frac{q}{\varepsilon_0} - \phi\right)$
(B) $\frac{q}{2\varepsilon_0}$
(C) $\frac{\phi}{3}$
(D) $\frac{q}{\varepsilon_0} - \phi$

Q4 A charge q is placed at one corner of a cube. The electric flux through any of the three faces adjacent to the charge is zero. The flux through any one of the other three faces is

(A) $\frac{q}{3\varepsilon_0}$
(B) $\frac{q}{6\varepsilon_0}$
(C) $\frac{q}{12\varepsilon_0}$
(D) $\frac{q}{24\varepsilon_0}$

Q5 In figure $+Q$ charge is located at one of the edge of the cube, then electric flux through cube due to $+Q$ charge is



(A) $\frac{+Q}{\varepsilon_0}$
(B) $\frac{+Q}{2\varepsilon_0}$
(C) $\frac{+Q}{4\varepsilon_0}$
(D) $\frac{+Q}{8\varepsilon_0}$

Q6 A charge Q is enclosed by a Gaussian spherical surface of radius R. If the radius is doubled, then the outward electric flux will

(A) Be doubled
(B) Increase four times
(C) Be reduced to half
(D) Remain the same

Answer Key

Q1	(C)
Q2	(B)
Q3	(A)
Q4	(D)
Q5	(C)
Q6	(D)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

According to Gauss's theorem

The electric flux through the sphere $= \frac{q}{\varepsilon_0}$

Electric flux through the hemisphere

$= \frac{1}{2}\frac{q}{\varepsilon_0}$

$= \frac{10\times10^{-6}}{2\times8.854\times10^{-12}}$

$= 0.56 \times 10^6 Nm^2C^{-1}$

$= 5.6 \times 10^5 Nm^2C^{-1}$

Video Solution:

Q2 Video Solution:

Q3 Text Solution:

According to Gauss's theorem$\phi_{\rightarrow tal} = \frac{q}{\epsilon_0}$

Let $\phi_A = \phi_C = \phi_0$ and $\phi_B = \phi$

Given as $\phi_{\rightarrow tal} = \phi_A + \phi_C + \phi$

$\therefore \frac{q}{\epsilon_0} - \phi_0 + \phi_0 + \phi$

$\phi_0 = \frac{1}{2}\left(\frac{q}{\epsilon_0} - \phi\right)$

Video Solution:

Q5 Video Solution:

Q6 Video Solution: