For vector $\bar{\mathbf{A}} = r\cos\phi\,\hat{\boldsymbol{r}} + r\sin\phi\,\hat{\boldsymbol{\phi}} + 3z\hat{\boldsymbol{z}}$, $\bar{\nabla}.\bar{\mathbf{A}}$ at point P (2,0,3) is given as:

A metallic sphere of radius 10cm has a surface charge density of 10 nC/m^2. Calculate the electric energy stored in the system?

Determine the surface given by the equation: $r = 4\sin\theta \cos\phi - 2\sin\theta \sin\phi - 4\cos\theta$

An electric field is expressed in Cartesian coordinates by $\bar{\mathbf{E}} = 6x^2\hat{\boldsymbol{x}} + 6y\hat{\boldsymbol{y}} + 4\hat{\boldsymbol{z}}$. Find the potential V_{MN} if points M and N are specified by M (2, 6, -1) and N (-3, -3, 2)?

Two point charges (each carrying one electronic charge but opposite polarity) situated along the x axis are separated by a distance of 1 Å, with x=0 being the bisecting plane. The dipole moment (**p**) and the potential(V) at a point (2,1,2) are -----.

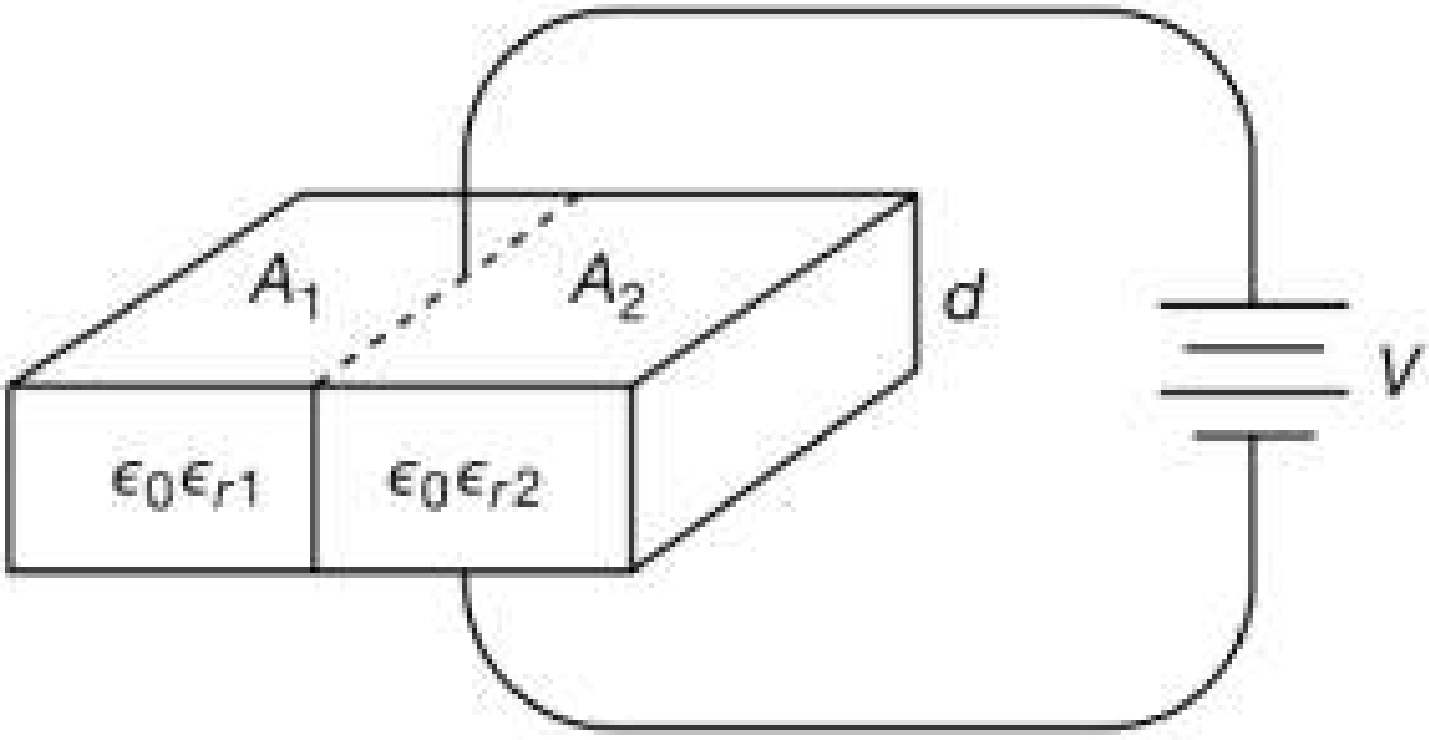
Let the region 1 ($Z< 0$) is composed of a uniform dielectric material with relative permittivity = 3, and electric flux density ($\mathbf{D}_1$) = $3\hat{x} + 9\hat{y} + 4\hat{z}$ $\mu C/m^2$. Determine the polarization ($\boldsymbol{P}_2$) in the region 2 ($Z > 0$) with relative permittivity = 2.

A vector given in Spherical coordinate as $\vec{\boldsymbol{B}} = \frac{10}{r}\hat{\boldsymbol{r}} + r\,cos\theta\hat{\boldsymbol{\theta}} + \hat{\boldsymbol{\varphi}}$, evaluate it at point (-3,4,0) in Cartesian coordinate system?

The gradient of the function $f(x, y, z) = x^3 + y^2 + zx$, at a point (1,2,0) is -----.

When two dielectrics are present in a capacitor with the interface parallel to **E** and **D**, if the separation is 4 mm having areas of $A_1 = 0.2\ m^2$, $A_2 = 0.3\ m^2$ and $\varepsilon_{r1} = 2.0$, $\varepsilon_{r2} = 3.0$ of two dielectrics. Find the equivalent capacitance?

1.



. For which value of α, $\vec{\mathbf{F}}$ is conservative? Given, $\vec{\mathbf{F}} = \hat{\boldsymbol{x}}(2xy + z^3) + \hat{\boldsymbol{y}}x^2 + \hat{\boldsymbol{z}}\alpha z^2$.

A dielectric cube of side $a = 2$ units, centered at the origin, carries a polarization $\boldsymbol{P} = 3\mathbf{r}$. The volume bound ρ_b charge and the surface bound charge σ_b densities, respectively, are -----.

Suppose the functions are $\mathbf{v}_a = 2x\hat{\boldsymbol{x}} + 3y\hat{\boldsymbol{y}} + z\hat{\boldsymbol{z}}$, $\mathbf{v}_b = 3y\hat{\boldsymbol{y}}$, and $\mathbf{v}_c = y\hat{\boldsymbol{y}} + 4z\hat{\boldsymbol{z}}$. Calculate their divergences?