How many boundary conditions (on the potential V) do you use to find V inside the spherical plastic shell?

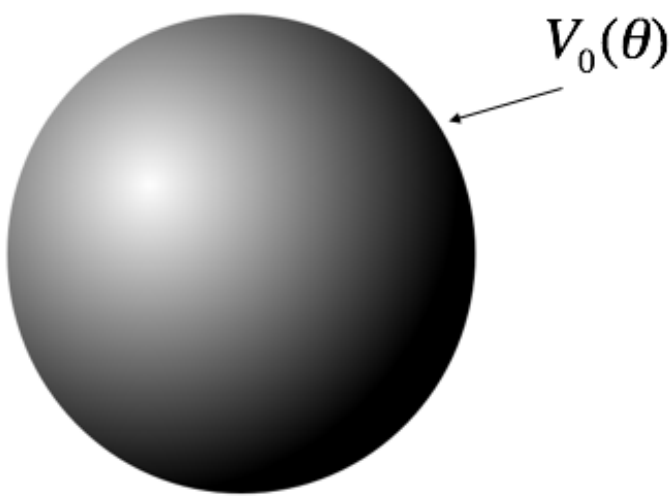
A. 1

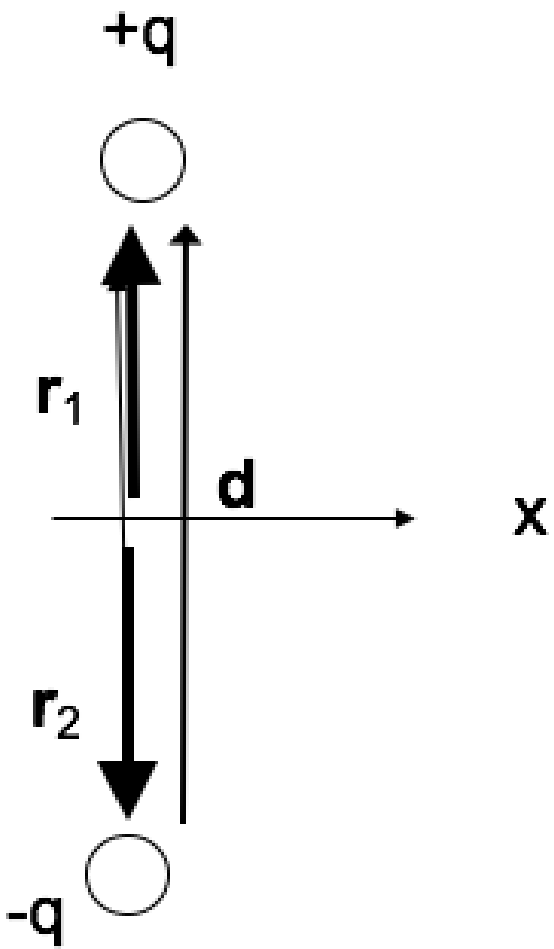
B. 2

C. 3

D. 4

E. It depends on $V_0(\theta)$

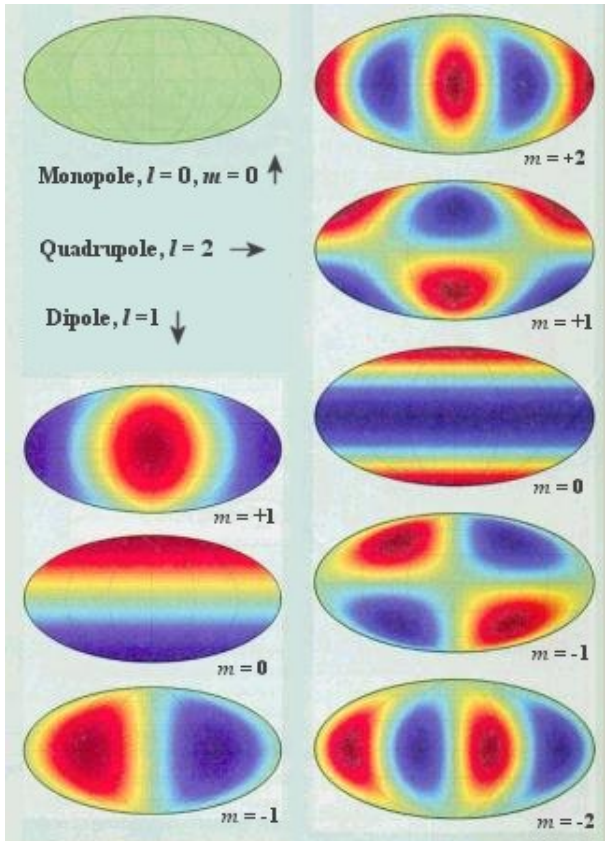




Two charges are positioned as shown to the left. The relative position vector between them is $\mathbf{d}$. What is the value of of the dipole moment? $\sum_i q_i \mathbf{r}_i$

A. $+q\mathbf{d}$
B. $-q\mathbf{d}$
C. Zero
D. None of these

MULTIPOLE EXPANSION

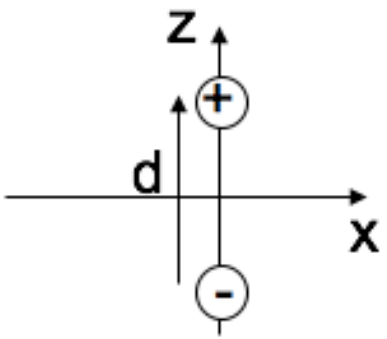


Multipole Expansion of the Power Spectrum of CMBR

For a dipole at the origin pointing in the z-direction, we have derived:

$$\mathbf{E}_{dip}(\mathbf{r}) = \frac{p}{4\pi\varepsilon_0 r^3}\left(2\cos\theta\ \hat{\mathbf{r}} + \sin\theta\ \hat{\theta}\right)$$

For the dipole $\mathbf{p} = q\mathbf{d}$ shown, what does the formula predict for the direction of $\mathbf{E}(\mathbf{r} = 0)$?



A. Down
B. Up
C. Some other direction
D. The formula doesn't apply

IDEAL VS. REAL DIPOLE