**Suggested problems: Chapter 23- HRW-Principles of Physics- ISV 10th Edition.**

**6.**Figure 23-23 gives magnitude of the electric fieldinside and outside a sphere with a positive charge distributed uniformly throughout its volume. The scale of the vertical axis is set by $E_x$= 10 x$10^7$ N/C(a) What is the charge on the sphere? (b) What is field magnitude at r=8.0 m?

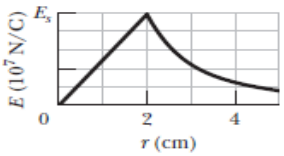

**Fig. 23-23 Problem 6**

**Answer:**(a) 4.4 x $10^{-6}$C ; (b) 6.2 x $10^2$ N?C

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**7.** In Fig. 23-24, two large, thin metal plates are parallel and close to each other. On their inner faces, the plates have excess surface charge densities of opposite signs and magnitude $2.31 \times 10^{-22}$ C/m$^2$. In unit-vector notation, what is the electric field at points (a) to the left of the plates, (b) to the right of them, and (c) between them?

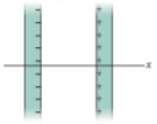
**Fig. 23-24 Problem 7**

**Answer:** (a) zero ; (b) zero ; (c) $-2.61\times10^{-11}\hat{\imath}$ N/C

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**19.** A long straight wire has fixed negative charge with a linear charge density of of magnitude 5.2 nC/m. The wire is to be enclosed by a coaxial, thin walled nonconducting cylinderical shell of radius 1.2 cm. The shell is to have positive charge on its outside surface with a surface charge density σ that makes the net electric field zero. Calculate σ.

**Answer:**6.9 x $10^{-8}$ C/m$^2$

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**26.** An electron is released 9.0 cm from a very long non conducting rod with a uniform 4.5 μC/m What is the magnitude of the electron's initial acceleration?

**Answer:**$1.6\times10^{17}$ m/s$^2$

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**39.** A uniform surface charge of density 8.0 nC/m$^2$ is distributed over the entire *xy* plane. What is the electric flux through a spherical Gaussian surface centered on the origin and having a radius of 5.0 cm?

**Answer:** 7.1 N.m$^2$/C

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**45.** The square surface shown in Fig. 23-44 measures 6.8 mm on each side. It is immersed in a uniform electric field with magnitudeE = 1800 N/C and with field lines at an angle of θ = 35° with a normal to the surface, as shown. Take that normal to be directed "outward," as though the surface were one face of a box. Calculate the electric flux through the surface.

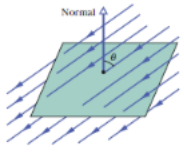

**Fig. 23-44 Problem 45**

**Answer:**–0.068 N.m$^2$/C

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**48.** Figure 23-48 shows two nonconductingspherical shells fixed inplace. Shell 1 has uniform surfacecharge density +6.0 μC/m$^2$ on itsouter surface and radius 3.0 cm;shell 2 has uniform surface chargedensity +4.0 μC/m$^2$ on its outersurface and radius 2.0 cm; the shellcenters are separated by *L*= 12 cm.In unit-vector notation, what is thenet electric field at *x*= 2.0 cm?

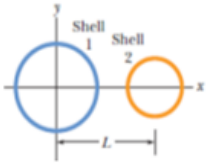

**Fig. 23-46 Problem 48**

**Answer:**$-1.8\times10^4\boldsymbol{j}$ N/C