1. A total charge of 6.3×10^{-8} C is distributed uniformly throughout a 2.7-cm radius sphere. The volume charge density is:
   A) 3.7×10^{-7} C/m^3
   B) 6.9×10^{-6} C/m^3
   C) 6.9×10^{-6} C/m^2
   D) 2.5×10^{-4} C/m^3
   E) 7.6×10^{-4} C/m^3

2. Consider Gauss's law: $\oint \vec{E} \cdot d\vec{A} = q/\varepsilon_0$. Which of the following is true?
   A) $\vec{E}$ must be the electric field due to the enclosed charge
   B) If $q = 0$ then $\vec{E} = 0$ everywhere on the Gaussian surface
   C) If the charge inside consists of $+q$, $+q$ and $-2q$, then the integral is zero
   D) On the surface $\vec{E}$ is everywhere parallel to $d\vec{A}$
   E) If a charge is placed outside the surface, then it cannot affect $\vec{E}$ on the surface

3. A 5.0-μC point charge is placed at the center of a cube. The electric flux in N · m^2/C through one side of the cube is:
   A) 0
   B) 7.1×10^4
   C) 9.4×10^4
   D) 1.4×10^5
   E) 5.6×10^5

4. A conducting sphere of radius 0.01 m has a charge of 1.0×10^{-9} C deposited on it. The magnitude of the electric field in N/C just outside the surface of the sphere is:
   A) zero
   B) 450
   C) 900
   D) 4500
   E) 90,000

5. Charge Q is distributed uniformly throughout an insulating sphere of radius R. The magnitude of the electric field at a point $R/2$ from the center is:
   A) $Q/4\pi\varepsilon_0 R^2$
   B) $Q/\pi\varepsilon_0 R^2$
   C) $3Q/4\pi\varepsilon_0 R^2$
   D) $Q/8\pi\varepsilon_0 R^2$
   E) none of these

6. The flux of the electric field (24 N/C)$\vec{i}$ + (30 N/C)$\vec{j}$ + (16 N/C)$\vec{k}$ through a 2.0 m^2 portion of the *yz* plane is:
   A) 32 N · m^2/C
   B) 34 N · m^2/C
   C) 42 N · m^2/C
   D) 48 N · m^2/C
   E) 60 N · m^2/C

Answer Key :

1. E
2. C
3. C
4. E
5. D
6. D