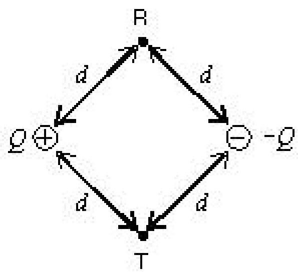
1. Three charges lie on the x axis: 1×10^{-8} C at $x = 1$ cm, 2×10^{-8} C at $x = 2$ cm, and 3×10^{-8} C at $x = 3$ cm. The potential energy of this arrangement, relative to the potential energy for infinite separation, is:
   A) 7.9×10^{-2} J
   B) 8.5×10^{-4} J
   C) 1.7×10^{-3} J
   D) 0.16 J
   E) zero

2. Points R and T are each a distance d from each of two equal and opposite charges as shown. If $k = 1/4\pi \boldsymbol{5}_0$, the work required to move a negative charge q from R to T is:



   A) zero
   B) kqQ/d^2
   C) kqQ/d
   D) $kqQ/(\sqrt{2}d)$
   E) $kQq/(2d)$

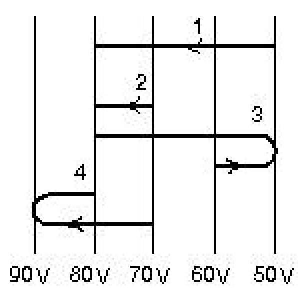
3. Two conducting spheres are far apart. The smaller sphere carries a total charge of 6×10^{-8} C. The larger sphere has a radius that is twice that of the smaller and is neutral. After the two spheres are connected by a conducting wire, the charges on the smaller and larger spheres, respectively, are:
   A) 4×10^{-8} C and 2×10^{-8} C
   B) 2×10^{-8} C and 4×10^{-8} C
   C) -6×10^{-8} C and 12×10^{-8} C
   D) 6×10^{-8} C and 0
   E) 3×10^{-8} C and 3×10^{-8} C

4. A 5-cm radius conducting sphere is charged until the electric field just outside its surface is 2000 V/m. The electric potential of the sphere, relative to the potential far away, is:
   A) 0
   B) 5 V
   C) 100 V
   D) 4×10^{4} V
   E) 8×10^{5} V

5. A total charge of 7×10^{-8} C is uniformly distributed throughout a non-conducting sphere with a radius of 5 cm. The electric potential at the surface, relative to the potential far away, is about:
   A) -1.3×10^{4} V
   B) 1.3×10^{4} V
   C) 7.0×10^{5} V
   D) -6.3×10^{4} V
   E) 0

6. A 2-meter stick is parallel to a uniform 200 N/C electric field. The potential difference between its ends is:
   A) 0
   B) 1.6×10^{-17} V
   C) 3.2×10^{-17} V
   D) 100 V
   E) 400 V

7. An electron goes from one equipotential surface to another along one of the four paths shown below. Rank the paths according to the work done by the electric field, from least to greatest.



   A) 1, 2, 3, 4
   B) 4, 3, 2, 1
   C) 1, 3, 4 and 2 tie
   D) 4 and 2 tie, then 3, then 1
   E) 4, 3, 1, 2

Answer Key :

1. B
2. A
3. B
4. C
5. B
6. E
7. D