24-9 Applying Gauss' Law: Spherical Symmetry

24-09

Quest on 546 0.49-54%

Which one of the graphs shown in Figure 2 represents the variation of the magnitude of the electric field with the distance from the center of a solid charged conducting sphere of radius R in electrostatic equilibrium?

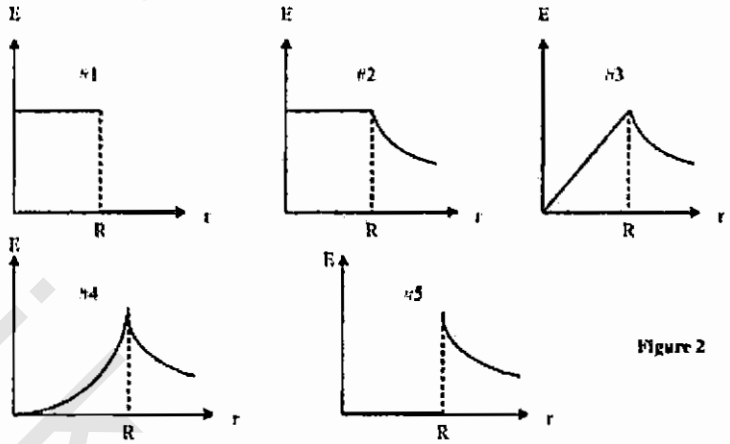

Figure 2

(a) #5
(b) #2
(c) #3
(d) #1
(e) #4

24-09

Question 547 0.21-39%

Two conducting spheres are far apart. The smaller sphere carries a total charge of 4 micro-C, and the larger sphere carries a total charge of 2 micro-C. The larger sphere has a radius that is twice that of the smaller sphere. After the two spheres are connected by a thin conducting wire, the charges on the smaller and larger spheres, respectively, are:

(a) 3 micro-C and 3 micro-C
(b) 2 micro-C and 4 micro-C
(c) -2 micro-C and 8 micro-C
(d) 0 micro-C and 6 micro-C
(e) -4 micro-C and 10 micro-C

24-09

Question 548

A solid insulating sphere has a charge of 20 micro-C uniformly distributed throughout its volume. The magnitude of the electric fields inside the sphere at r = 2 cm and outside the sphere at r = 10 cm, measured from the center of the sphere, are equal. Find the volume charge density of the sphere.

(a) 48 milli-C/m**3.
(b) 24 milli-C/m**3.
(c) 12 milli-C/m**3.
(d) 54 milli-C/m**3.
(e) 20 milli-C/m**3.

24-09

Question 549 0.11-75%

A long noncoducting cylinder (radius 12.0 cm) has a charge of uniform density 5.0 nano-C/m**3 distributed through its column. Determin the magnitude of the electric field 5.C cm from the axis of the cylinder. [See figure (3)].

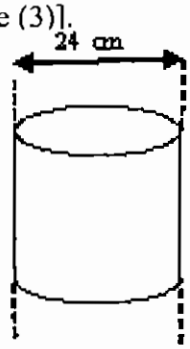

Figure (3)

(a) 14 N/C.
(b) 4 N/C.
(c) 22 N/C.
(d) 34 N/C.
(e) 31 N/C.

24-09

Question 550 0.37-60%

A noncoducting shell has a uniform negative charge of magnitude 5.0*10**(-5) C. Its inner and outer radii are 5.0 cm and 6.0 cm, respectively. The electric field at r = 3.0 cm, from the center, is:

(a) 4.5*10**9 N/C, inward.
(b) 1.5*10**9 N/C, outward.
(c) 4.5*10**9 N/C, inward.
(d) 1.5*10**9 N/C, inward.
(e) zero.

24-09

Question 551 0.33-49%

A hollow metallic sphere, of radius 2.0 cm, is filled with a non-conducting material which carries a charge of 5.0 pico-C distributed uniformly throughout its volume. What is the magnitude of the electric field 1.5 cm from the center of the sphere?

(a) zero.
(b) 17 N/C.
(c) 90 N/C.
(d) 84 N/C.
(e) 68 N/C.

24-09

Question 552 0.40-65%

A non conducting sphere, of radius 4.0 m, has a charge density of 2.0 micro-C/m**3. What is the electric field at a distance 1.7 m from the center?

(a) 4.8*10**3 N/C.
(b) 6.2*10**3 N/C.
(c) 1.3*10**5 N/C.
(d) 1.9*10**5 N/C.
(e) 2.5*10**5 N/C.

24-10
0.40-58%

Question 553

A solid insulating sphere has a charge of 20 micro-C uniformly distributed throughout its volume. The magnitude of the electric fields inside the sphere at r = 2 cm and outside the sphere at r = 10 cm, measured from the center of the sphere, are equal. Find the volume charge density of the sphere.

(a) 12 milli-C/m**3
(b) 24 milli-C/m**3
(c) 20 milli-C/m**3
(d) 54 milli-C/m**3
(e) 48 milli-C/m**3