24-02

Question 502 0.34-63%

A cube, as in figure (6), has an edge length of 3.00 m in a region of a uniform electric field given by the equation: -> E = (- 5.00 j + 6.00 k) N/C, where i, j, and k are the unit vectors in the directions of x, y, and z respectively. Find the electric flux through the top face (shaded).

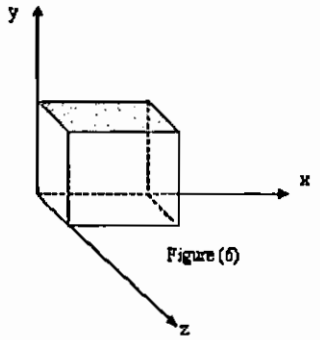

Figure (6)

(a) Zero.
(b) 45 N*m**2/C.
(c) - 30 N*m**2/C.
(d) 30 N*m**2/C.
(e) - 45 N*m**2/C.

24-3 flux of an Electric field

24-03

Question 503

An infinitely long line has a charge density of 7.6 nano-C/m. Calculate the electric flux through a spherical surface of radius R = 7.7 cm whose center, C, lies on the line charge as shown in Figure 3.

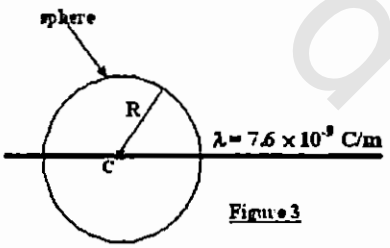

Figure 3

(a) zero
(b) 132 (N*m**2)/C
(c) 92.0 (N*m**2)/C
(d) 415 (N*m**2)/C
(e) 610 (N*m**2)/C

24-03

Question 504

A total charge of 5.00*10**(-6) C is uniformly distributed inside an irregular insulator. The volume of the insulator is 2.50 m**3. Now, imagine a cube of volume 0.50 m**3 inside the insulator. What is the total electric flux through the surface of the cube?

(a) 4.53*10**5 N*m**2/C.
(b) Zero.
(c) 1.13*10**5 N*m**2/C.
(d) 8.10*10**5 N*m**2/C.
(e) 2.51*10**6 N*m**2/C.

24-03

Question 505

A point charge of 2.0 micro-C is placed at the center of a cube 50 cm on edge. What is the flux through the bottom surface?

(a) 1.7*10**4 N*m**2/C.
(b) -2.8*10**4 N*m**2/C.
(c) -5.6*10**4 N*m**2/C.
(d) 1.1*10**5 N*m**2/C.
(e) 3.8*10**4 N*m**2/C.

24-03

Question 506 0.50-43%

The cube in figure 3 has edge lengths of 2.00 m and is oriented as shown in a region in which a uniform electric field exists. The electric field is given by: (-5.00 i + 8.00 k) N/C, where i and k are unit vectors parallel to the x-axis and z-axis respectively. Find the electric flux through the right face (shaded) of the box.

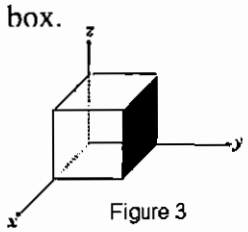

Figure 3

(a) zero
(b) +26.0 N.m**2/C
(c) -10.0 N.m**2/C
(d) +16.0 N.m**2/C
(e) +6.00 N.m**2/C

24-03

Question 507 0.39-74%

A spherical conducting shell has a radius of 20 cm. Point A is a distance of 30 cm from the center of the sphere. The electric field at point A is 500 N/C and is directed radially outward. An additional charge Q is introduced at the center of the shell. The electric field at point A decreases to 100 N/C. What is Q ?

(a) - 5 nano-Coulombs
(b) + 5 nano-Coulombs
(c) - 4 nano-Coulombs
(d) + 1 nano-Coulombs
(e) - 1 nano-Coulombs

24-03

Question 508 0.58-47%

The electric field in the region of space shown in figure 3 is given by: E = (8.0i + 2yj) (N/C), where y is in meters. What is the magnitude of the electric flux through the top face of the cube? (i and j are the unit vectors in the x and y directions, respectively)

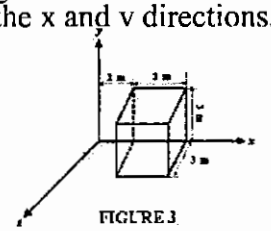

FIGURE 3

(a) 12 N.(m**2)/C
(b) 6.0 N.(m**2)/C
(c) 90 N.(m**2)/C
(d) 130 N.(m**2)/C
(e) 54 N.(m**2)/C
