Started on	Wednesday, 12 January 2022, 10:00 AM
State	Finished
Completed on	Wednesday, 12 January 2022, 11:17 AM
Time taken	1 hour 16 mins
Grade	**8.00** out of 15.00 (**53**%)

Question 1

Incorrect

Mark 0.00 out of 1.00

If a point charge +q is located at the center of a sphere of radius 'r', what is the electric flux passing through a portion of the surface of the sphere defined by $0 < \theta < \frac{\pi}{2}$ and $0 < \phi < \frac{\pi}{2}$?

Select one:

- a. $\frac{q}{8\pi\epsilon_0}$
- b. $\frac{q}{4\epsilon_0}$
- c. $\frac{q}{8\epsilon_0}$
- d. $\frac{q}{4\pi\epsilon_0}$ ✗

Your answer is incorrect.

The correct answer is: $\frac{q}{8\epsilon_0}$

Question 2

Correct

Mark 1.00 out of 1.00

The amount of work done in moving 10 Coulomb from one point to another point on an equipotential surface is

Select one:

- a. Zero ✓
- b. Infinity
- c. 10 eV
- d. 20 eV

Your answer is correct.

The correct answer is: Zero

Question 3

Correct

Mark 1.00 out of 1.00

For the field $\vec{F} = (Cxy + z)\,\hat{x} + 3x^2\hat{y} + x\hat{z}$ to represent an electrostatic field the constant C equals

Select one:

- a. 0
- b. 1
- c. 6 ✓
- d. 3

Your answer is correct.

The correct answer is: 6

Question 4

Incorrect

Mark 0.00 out of 1.00

Consider a uniformly charged sphere of radius R carrying a charge +Q. In such a case divergence of the electrostatic field produced by the sphere is

Select one:

- a. zero everywhere
- b. non zero everywhere
- c. zero outside the sphere and non zero inside the sphere
- d. zero inside the sphere and non zero outside the sphere ✗

Your answer is incorrect.

The correct answer is: zero outside the sphere and non zero inside the sphere

Question 5

Incorrect

Mark 0.00 out of 1.00

A circular disc of radius R is placed in the xy-plane and it carries a surface charge density $\rho = \frac{k}{r}$, where k is a constant. What is the total electric flux passing through a closed surface enclosing this disc?

Select one:

- a. $-\frac{k\pi}{\epsilon_0 R^2}$
- b. $\frac{k}{\epsilon_0}\ \pi R$ ✗
- c. $\frac{k}{\epsilon_0}\ \pi R^2$
- d. $\frac{k}{\epsilon_0}\ 2\pi R$

Your answer is incorrect.

The correct answer is: $\frac{k}{\epsilon_0}\ 2\pi R$

Question 6

Incorrect

Mark 0.00 out of 1.00

Charge Q is uniformly distributed throughout the volume of a sphere of radius R. The ratio of the electrostatic field at a distance $\frac{R}{2}$ from the center to that at a distance R from the center will be

Select one:

- a. 2
- b. $\frac{1}{4}$
- c. 4 ✗
- d. $\frac{1}{2}$

Your answer is incorrect.

The correct answer is: $\frac{1}{2}$

Question 7

Incorrect

Mark 0.00 out of 1.00

Consider a pair of charges +Q and -Q placed at two points with Cartesian coordinates (0,0,0) and $(d,0,0)$ respectively. The net electrostatic force on a charge Q placed at a point with coordinates $(\frac{d}{2},d,0)$

Select one:

- a. Will have both x and y components
- b. Will be along the y-direction ✗
- c. Will be along the x-direction
- d. Will be along -x direction

Your answer is incorrect.

The correct answer is: Will be along the x-direction

Question 8

Correct

Mark 1.00 out of 1.00

Calculate the divergence $\nabla.\vec{E}$ of the vector $\vec{E}=\frac{\hat{r}}{r^n}$, where n is an integer and $\vec{r}$ is the position vector.

Select one:

- a. $\frac{n-2}{r^{n+1}}$
- b. $\frac{2-n}{r^{n-1}}$
- c. $\frac{2-n}{r^{1-n}}$
- d. $\frac{2-n}{r^{n+1}}$ ✓

Your answer is correct.

The correct answer is: $\frac{2-n}{r^{n+1}}$

Question 9

Correct

Mark 1.00 out of 1.00

The electrostatic potential in a region of space is given by $V(x,y,z)=10x + 5$. The magnitude of the electrostatic field at $x=2$ is

Select one:

- a. -10
- b. +25
- c. 0
- d. +10 ✓

Your answer is correct.

The correct answers are: +10, -10

Question 10

Correct

Mark 1.00 out of 1.00

A ring of radius 'R' has a total charge +Q uniformly distributed on it. What are the electrostatic field ($\vec{E}$) and potential (V) at the center of the ring?

Select one:

- a. $\left|\vec{E}\right|=0,V=\frac{Q}{4\pi\epsilon_0R}$ ✓
- b. $\left|\vec{E}\right|=\frac{Q}{4\pi\epsilon_0R^2},V=\frac{Q}{4\pi\epsilon_0R}$
- c. $\left|\vec{E}\right|=0,V=0$
- d. $\left|\vec{E}\right|=\frac{Q}{4\pi\epsilon_0R^2},V=0$

Your answer is correct.

The correct answer is: $\left|\vec{E}\right|=0,V=\frac{Q}{4\pi\epsilon_0R}$

Question 11

Incorrect

Mark 0.00 out of 1.00

Consider a uniformly charged sphere of radius R with volume charge density ρ. The value of $\vec{\nabla}.\vec{E}$ at a point with Cartesian coordinates $\left(\frac{R}{2},\ R,\ 0\right)$ will be

Select one:

- a. Zero
- b. $\frac{\rho}{\epsilon_0}$ ✗
- c. $\frac{\rho}{\epsilon_0}\hat{r}$
- d. $\frac{\rho}{{4\pi\epsilon}_0}$

Your answer is incorrect.

The correct answer is: Zero

Question 12

Correct

Mark 1.00 out of 1.00

Find the electric potential at the center of a circle of radius 2m when there are three charges 1C, - 2C and 3C in its circumference. (Coulomb's constant = \(9\times{10}^9\ N.m^2/C^2 \))

Select one:

- a. \(2.7\times{10}^{10} \) V
- b. \(1.35\times{10}^{10} \) V
- c. \(4.5\times{10}^9 \) V
- d. \(9\times{10}^9 \) ✓

Your answer is correct.

The correct answer is: \(9\times{10}^9 \)

Question 13

Correct

Mark 1.00 out of 1.00

Two points A and B are maintained at a potential of 7 V and -4 V respectively. The work done in moving 50 electrons from A to B is

Select one:

- a. \(8.80 \times 10^{-17} \) J ✓
- b. \(5.80 \times 10^{-17} \) J
- c. \(- 8.80 \times 10^{-17} \) J
- d. \(4.40 \times 10^{-17} \) J

Your answer is correct.

The correct answer is: \(8.80 \times 10^{-17} \) J

Question 14

Correct

Mark 1.00 out of 1.00

The electrostatic field has magnitude 1000 N/C between two parallel conducting plates separated by 5 mm. The potential difference between the plates is

Select one:

- a. 5000 V
- b. 200 V
- c. 50 V
- d. 5 V ✓

Your answer is correct.

The correct answer is: 5 V

Question 15

Incorrect

Mark 0.00 out of 1.00

In equilibrium configuration a spherical conducting shell of inner radius ‘a’ and outer radius ‘b’ has a point charge ‘q’ fixed at the center and a charge density σ uniformly distributed on the outer surface. What is the electrostatic field at a distance 'r' from the center for $a < r < b$?

Select one:

- a. $\frac{4\pi a^2\sigma}{4\pi\epsilon_0r^2}\hat{r}$
- b. $\frac{4\pi b^2\sigma}{4\pi\epsilon_0r^2}\hat{r}$
- c. $\frac{q}{4\pi\epsilon_0r^2}\hat{r}$ ✗
- d. Zero

Your answer is incorrect.

The correct answer is: Zero