JEEt Lo 2021

PHYSICS

GRADE - 12

•LIVE

ELECTRIC FIELD & POTENTIAL QUIZ

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Electric field and potential

Quiz

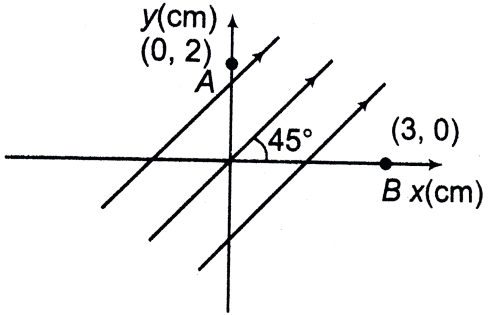
Q. A uniform field of $100\sqrt{2}$ V/m is directed at 45° above the x-axis as shown in figure. The potential difference $V_B - V_A$ is given by

A 2.8 V

B 4 V

C 6.4 V

D 0 V



Q. The electric potential V at any point O (x, y, z all in metres) in space is given by $V = 4x^2$ volt. The electric field at the point (1m, 0, 2m) in volt/metre is

A 8 long negative X-axis

B 8 long positive X-axis

C 16 long negative X-axis

D 16 long positive Z-axis

Q. A uniform electric field having a magnitude E_0 and direction along the positive X-axis exists. If the potential V is zero at x = 0, then its value of X = +x will be

A $V_{(x)} = +xE_0$

B $V_x = -xE_0$

C $V_x = +x^2E_0$

D $V_x = -x^2E_0$

Q. The electric potential V is given as a function of distance x (metre) by $V = (5x^2 + 10x - 9)$ volt. Value of electric field at $x = 1$ is

A 20 V/m

B 6 V/m

C 11 V/m

D -23 V/m

Q. The displacement of a charge Q in the electric field E = $e_1\hat{i} + e_2\hat{j} + e_3\hat{k}$ is $\hat{r} = a\hat{i} + b\hat{j}$. The work done is

A $Q(ae_1 + be_2)$

B $Q\sqrt{(ae_1)^2 + (be_2)^2}$

C $Q(e_1 + e_2)\sqrt{a^2 + b^2}$

D $Q\sqrt{e_1^2 + e_2^2}(a + b)$

Q. Assume that an electric field $E = 30x^2 \hat{i}$ exists in a space. Then, the potential difference $V_A - V_0$, where V_0 is the potential at the origin and V_A the potential at x = 2m

A 120 J/C

B -120 J/C

C -80 J/C

D 80 J/C

Q. The electric field in a certain region is given by $\vec{E} = 5\hat{i} - 3\hat{j}\ \mathrm{KV/m}$. Find the potential difference $V_B - V_A$ between points A and B, having coordinates (4, 0, 3) and (10, 3, 0) respectively.

A -21kv

B 23kv

C 20kv

D -22kv

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Q. The electric potential existing in space is $V(x, y, z) = A(xy + yz + zx)$.

a) Find the expression for the electric field.

b) If A is 10 SI units, find the magnitude of the electric field at (1m, 1m, 1m)

Q. A uniform electric field field exist in x-y plane. The potential of points A(2m, 2m), B(-2m, 2m) and C(2m, 4m) are 4 V, 16 V and 12V respectively. The electric field is

A $(4\hat{i} + 5\hat{j})V/m$

B $(3\hat{i} + 4\hat{j})V/m$

C $-(3\hat{i} + 4\hat{j})V/m$

D $(3\hat{i} - 4\hat{j})V/m$

Q. A charge q = 8.75 μC in an electric field is acted upon by a force F = 4.5 N, the potential gradient at this point is :

A $3.70 \times 10^5\ \text{Vm}^{-1}$

B $5.14 \times 10^3\ \text{Vm}^{-1}$

C $5.14 \times 10^4\ \text{Vm}^{-1}$

D $5.14 \times 10^5\ \text{Vm}^{-1}$

Q. If V_0 is the potential at the origin in an electric field $\vec{E} = E_x\hat{i} + E_y\hat{j}$, the potential at the point (x, y) is :

A $V_0 - xE_x - yE_y$

B $V_0 + xE_x + yE_y$

C $xE_x + yE_y - V_0$

D $\left(\sqrt{x^2+y^2}\right)\left(\sqrt{E_x^2+E_y^2}\right) - V_0$

Q. The potential difference V_{AB} between A(0, 0, 0) and B(1, 1, 0) in an electric field $\vec{E} = x\hat{i} + z\hat{k}$, is :

A 1 V

B $\frac{3}{2}V$

C $\frac{1}{2}V$

D 2 V

Q. In a region the electric potential is given by V = 2x + 2y - 3z obtain the expression for electric field :

A $-2\hat{i} - 2\hat{j} + 3\hat{k}$

B $3\hat{i} + 4\hat{j} - 2\hat{k}$

C $2\hat{i} - 2\hat{j} - 3\hat{k}$

D None of these

Q. Electric field in a plane varies like $(2x\hat{i} + 2y\hat{j})\ N/C$. If potential at infinity is taken as zero, potential at x = 2m, y = 2m is:

A 8 V

B -8 V

C zero

D infinity

Q. In a uniform electric field, the potential is 10 V at the origin of coordinates and 8 V at each of the points (1, 0, 0), (0, 0, 1). The potential at the point (1, 1, 1) will be (HW Question)

A 0

B 4 V

C 8 V

D 10 V

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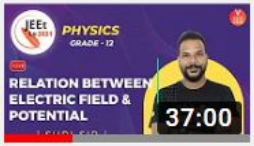

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