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PHYSICS

BOOKS - EDUCART PUBLICATION

SAMPLE PAPER 2

Section A

1. If the size of the gaussian surface increases, the flux through the body:

A. decreases

B. Increases

C. remains the same

D. fluctuates

Answer: C

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2. Charges $5\mu C$ and $10\mu C$ are placed 1 m apart. Work done to bring these charges at a

distance 0.5 m from each other is $(k = 9 \times 10^9 SI)$

A. $7 \times 10^{-1} J$

B. $9 \times 10^{-1} J$

C. $9 \times 10^{1} J$

D. $9 \times 10^{-2} J$

Answer: B

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3. Electric field of a system is independent of:

A. Value of test charge used to find out the field

B. Separation of charges forming the field

C. distance of point

D. position of charges forming the system

Answer: A

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4. Two cells of emfs approximately 5V and 10V are to be accurately compared using a poteniometer of length 400 cm.

A. The battery that runs the potentiometer should have voltage of 8 V.

B. The battery of potentiometer can have a voltage of 15 V and R adjusted so that the potential drop across the wire slightly exceeds 10 V.

C. Potentiometer is usually used for comparing resistance not voltage.

D. The first position of 50 cm of wire itself should have potential drop of 10 V.

Answer: B

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5. What will be the total flux coming out of a unit positive charge put in air?

A. 0

B. ε_0^{-1}

C. 1

D. ε_0^{-2}

Answer: B

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6. If 10^9 electrons move out of a body to another body every second, then the time

required to get a total charge of 1 C on the other body is

A. 200 years

B. 100.years

C. 198 years

D. 210 years

Answer: A

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7. What is electric field intensity when a force of 2.25 N acts on a charge of $15 \times 10^4 C$?

A. $180 NC^{-1}$

B. $1.5 NC^{-1}$

C. $1500 NC^{-1}$

D. $15 NC^{-1}$

Answer: C

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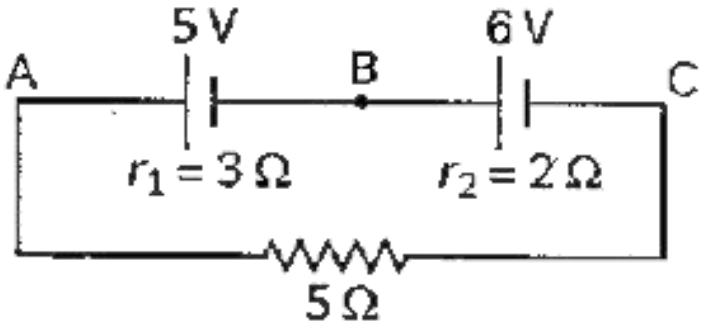
8. Potential difference between A and C is:



A. 55 V

B. 0.55 V

C. 550 V

D. 5.5 V

Answer: D

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9. A wire of resistance 1 Ω is elongated by 10%.

The resistance of the elongated wire is

A. 2 R

B. 16 R

C. 4 R

D. 0.5 R

Answer: B

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10. For any circuit, number of independent equations containing emf's, resistance and current equals:

A. no. of junction

B. no. of branches

C. no. of branches + 1

D. no, of junction + number of branches

Answer: B

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11. The drift current in a p-n junction is

A. $\propto \frac{1}{T}$

B. $\propto T$

C. Independent of T

D. $\propto T^2$

Answer: B

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12. Which of the following is called current density:

A. $\frac{I}{A}$

B. $\frac{I^2}{A}$

C. $\frac{A}{I}$

D. $\frac{I^3}{A}$

Answer: A

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13. The current in a simple series circuit is 5 A. On addition of 2 2 additional resistance, the current drops to 4 A. The original resistance was:

A. 8Ω

B. 12Ω

C. 20Ω

D. 1.25Ω

Answer: A

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14. In super conductor, charge carriers are:

A. electron

B. proton

C. phonons

D. photons

Answer: A

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15. The temperature coefficient of resistance of wire is $0.001259^{\circ}C^{-1}$. If resistance is 1Ω at 300 K, then 2Ω will be at:

A. 1400 K

B. 1100 K

C. 1127 J

D. 1154 K

Answer: B

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16. Galvanometer of resistance 25Ω shows full deflection for current of 10 mA. The resistance required to convert it into 100 V range will be

A. 9975Ω in series

B. 975Ω in series

C. 10025Ω in parallel

D. 10000Ω in parallel

Answer: A

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17. The force on the given coil will be:

A. Bil $\sin\theta$

B. BIL

C. 0

D. BIL$\cos\theta$

Answer: C

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18. Magnetic field at the centre of a coil of 100 turns and radius 2×10^{-3} carrying 1 A current is:

A. $3.14 \times 10^{-10} T$

B. $3.14 \times 10^{-7} T$

C. $3.14 \times 10^{7} T$

D. $3.14 \times 10^{10} T$

Answer: B

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19. Two wires of same length and carrying same current are in shape square and a circle. Ratio of their magnetic moments is:

A. $4:\pi$

B. $\pi:2$

C. $2:\pi$

D. $\pi:4$

Answer: D

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20. Dimension of magnetic moment is given by:

A. $\left[AL^2\right]$

B. $\left[A^2L^2\right]$

C. $\left[AL^3\right]$

D. Both (a) and (c)

Answer: A

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21. Copper ring is held horizontally on a magnet and is dropped through the ring with its length along the axis of the ring. The acceleration of magnet falling is:

A. less than that due to gravity

B. equal than that due to gravity

C. more than that due to gravity

D. depends on diameter of the ring and length of the magnet

Answer: A

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22. The mutual inductance, when air is replaced by a medium of relative is given by:

A. $\mu_r \mu_r n_1 n_2 \pi r_1^2 L$

B. $\mu_0 n_1 n_2 \pi r_1^2 L$

C. $\mu_r n_1 n_2 \pi r_1^2 L$

D. $\mu_r \mu_0 n_1 n_2 \pi r_1^2 L$

Answer: D

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23. Average power dissipation in a pure capacitor is:

A. $\frac{1}{2}CV^2$

B. $\frac{1}{4}CV^2$

C. Zero

D. CV^2

Answer: C

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24. $\varepsilon_0 = \varepsilon_0 \sin \omega t$, represents an ac equation. The time in which emf becomes half of its maximum value starting from zero is:

A. $\frac{T}{2}$

B. $\frac{T}{3}$

C. $\frac{T}{6}$

D. $\frac{T}{12}$

Answer: D

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25. Can a capacitor of suitable capacitance be used in an AC circuit in place of the choke coil ?

A. 1

B. False

C. Sometimes true

D. Can't say

Answer: A

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Section B

1. What is the value of dielectric strength for vacuum?

A. 0

B. 1

C. ∞

D. 10

Answer: C

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2. What is the direction of the force acting on a charged particle q, moving with a velocity $\overrightarrow{v}$ a uniform magnetic field $\overrightarrow{B}$?

A. Perpendicular to $\overrightarrow{v}$ and parallel to $\overrightarrow{B}$

B. Parallel to $\overrightarrow{v}$ and perpendicular to $\overrightarrow{B}$

C. Parallel to both $\vec{v}$ and $\vec{B}$

D. Perpendicular to both $\vec{v}$ and $\vec{B}$

Answer: D

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3. Gauss's law is true only if force due to a charge varies as

A. r^{-2}

B. r^{-4}

C. r^{-1}

D. r^{-3}

Answer: A

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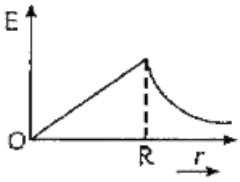
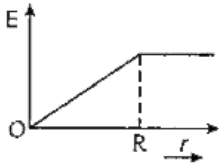
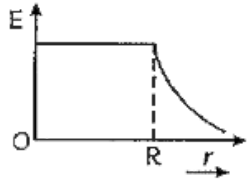
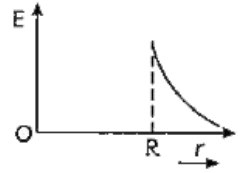
4. Graphical representation of electric field due to uniformly charged sphere of radius R as function of distance from its centre is given by:

A. 

B. 

C. 

D. 

Answer: A

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5. Production of magnetic field can be done by:

A. Changing electric field

B. Moving charge only

C. Both (a) and (b)

D. Changing polarity of the wire in electric field

Answer: B

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6. Value of impedance of series LCR circuit is given by:

A. $Z = \sqrt{R^2 + (X_C + X_L)^2}$

B. $Z = \sqrt{R^2 + (X_L - X_C)^2}$

C. $Z = \sqrt{R^2 + (X_L + X_C)^2}$

D. $Z = \sqrt{R + (X_L + X_C)^2}$

Answer: B

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7. The ratio of pole strength of two pieces of a large magnet when it is broken such that ratio of their length is 4:1 is:

A. $2:1$

B. $1:2$

C. $4:1$

D. $3:1$

Answer: D

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8. Ten identical resistance are connected in parallel, each of resistance 10.2 ohm Net resistance will be:

A. 10Ω

B. 0.01Ω

C. 1Ω

D. 0.1Ω

Answer: D

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9. Out of two magnets of same length and ole strength, one has a small hole at the centre. Then:

A. One with hole has small magnetic moment

B. One with hole has large magnetic moment

C. both have equal magnetic moment

D. Magnetic moment is independent of pole strength

Answer: A

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10. Fleming's left and right hand rules are used in:

A. DC motor and DC generator

B. DC motor and AC motor

C. AC motor and DC generator

D. Any one can be used

Answer: A

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11. If $L = 100\mu H$ and current changes by 1 A in 0.1 second. The emf produced is:

A. 1 mV

B. 10 mV

C. 100 mV

D. 0.1 V

Answer: A

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12. What is the rms current through bulb rated 100 W for 220 V ac supply of 50 Hz?

A. 0.1 A

B. 50 A

C. 0.9 A

D. 0.45 A

Answer: D

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13. Duration of induced .current produced in electromagnetic field is:

A. with magnetic flux :

B. perpendicular to magnetic flux

C. opposing magnetic flux

D. both (b) and (c)

Answer: C

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14. A copper wire is used in a coil because of its:

A. Small resistance

B. High conductivity

C. High resistance

D. Availability

Answer: A

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15. A source of 220 V is connected with a pure inductor of 25 mH. The inductive reactance if the frequency of the source is 50 Hz is given by:

A. 6.5Ω

B. 7.85Ω

C. 8.75Ω

D. 785Ω

Answer: B

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16. Inside a magnet, magnetic lines:

A. do not exist

B. are from South pole to North pole

C. are from North pole to South pole

D. remain scattered

Answer: B

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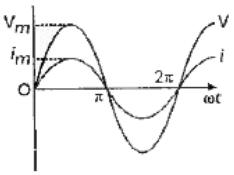
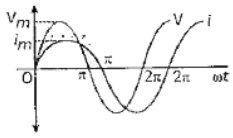
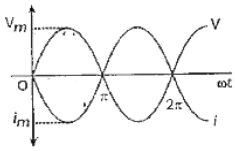
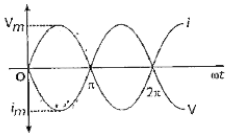
17. Pure resistor, current and voltage are in same phase in which graph?

A. 

B. 

C. 

D. 

Answer: A

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18. Coefficient of coupling between two coils of self-inductances L_1 and L_2 is unity. It means

A. 50% of L_1 is linked with L_2

B. $\sqrt{L_1}$ time of L_1 is linked with L_2

C. 100% of L_1 is linked with L_2

D. none of the above

Answer: B

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19. A step down transformer converts line voltage from 1100 V to 220 V. The primary winding of transformer has 6000 turns and efficiency is 60% and output power is 9 kW. Find the input power:

A. 10 kW

B. 15 kW

C. 20 kW

D. 25 kW

Answer: B

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20. Assertion (A): Magnetic moment of a bar magnet decreases with length.

Reason (R): Magnetic strength decreases as magnetic moment decreases.

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false and (R) is also false.

Answer: D

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21. Assertion (A): When two bodies are rubbed together body A acquires q_1 and body B acquires q_2 then $q_1 + q_2 = 0$

Reason (R): Irrespective charge is enclosed by the surface, total flux through the surface is zero.

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false and (R) is also false.

Answer: A

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22. Assertion (A): Kirchhoff's junction law follows conservation of charge.

Reason (R): Kirchhoff's loop law follows conservation of energy.

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false and (R) is also false.

Answer: B

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23. Assertion : Magnetic force is always perpendicualr to the magnetic field.

Reason : Electric force is along the direction of electric field.

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false and (R) is also false.

Answer: B

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24. Assertion (A): In standard resistors, constanton and manganin are widely used.

Reason (R): For smallest change in temperature, the value of resistance changes for constantan and manganin.

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false and (R) is also false.

Answer: A

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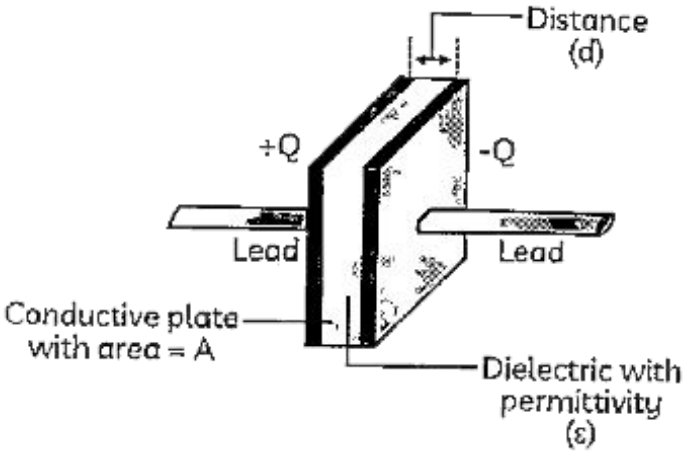
Section C



1.

In a dielectric the potential drop is equal to

A. Electric field strength thickness

B. Zero

C. Electric field strength x area of cross-section

D. Electric field strength

Answer: A

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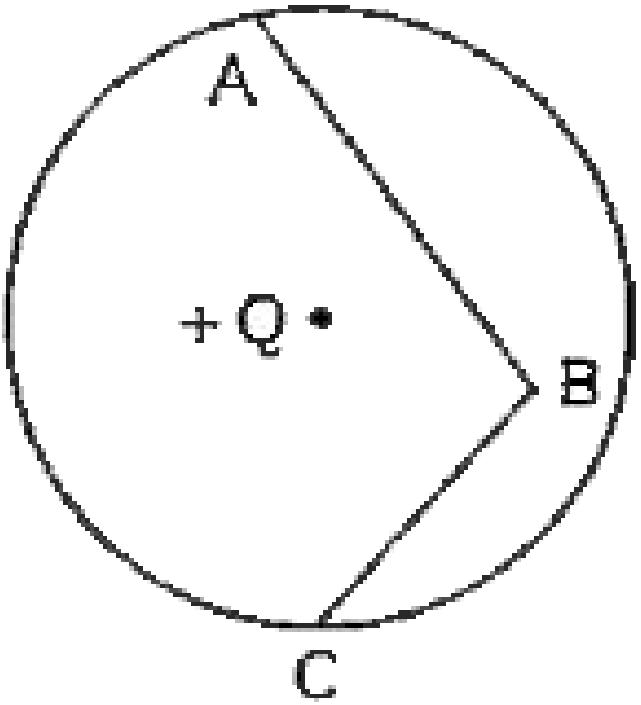
2. A charge +q is placed at the centre of a dotted circle. Work done in taking charge + q

from A to B is W_1 and B to C is W_2. Then:



A. $W_1 > W_2$

B. $W_1 < W_2$

C. $W_1 = W_2$

D. $W_1 \neq W_2$

Answer: C

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3. Read the following paragraph and answer the questions:

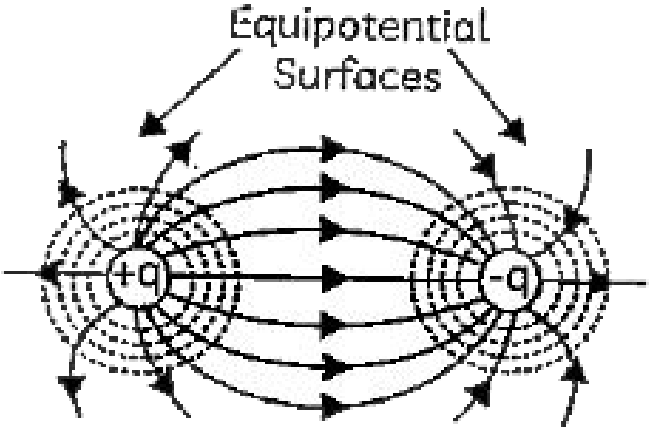
Total amount of work done in bringing the different charges to their respective positions from infinitely large mutual separation is defined as Electrostatic potential energy of a

system.

Work done in carrying charge to any point from infinity is product of potential and charge:

W Potential $\times$ Charge

This work is stored in the system of two point charges in the form of electrostatic potential energy U of the system.



In a uniformly charged conducting sphere, W in moving a charge from point A to point B is

A. Always zero

B. May be zero

C. Non-zero

D. Both (a) and (b)

Answer: A

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4. Read the following paragraph and answer the questions:

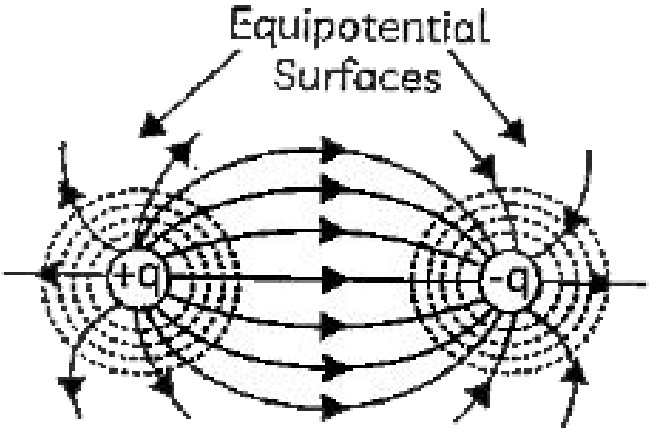
Total amount of work done in bringing the different charges to their respective positions from infinitely large mutual separation is defined as Electrostatic potential energy of a system.

Work done in carrying charge to any point from infinity is product of potential and charge:

W Potential $\times$ Charge

This work is stored in the system of two point

charges in the form of electrostatic potential energy U of the system.



In a uniform electric field, a positively charged particle is released from rest. The electric potential energy of the charge:

A. Decreases because the charge moves opposite to electric field

B. Increases because charge move along the electric field

C. Decreases because the charge moves along the electric field:

D. Remains constant

Answer: C

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5. Read the following paragraph and answer the questions:

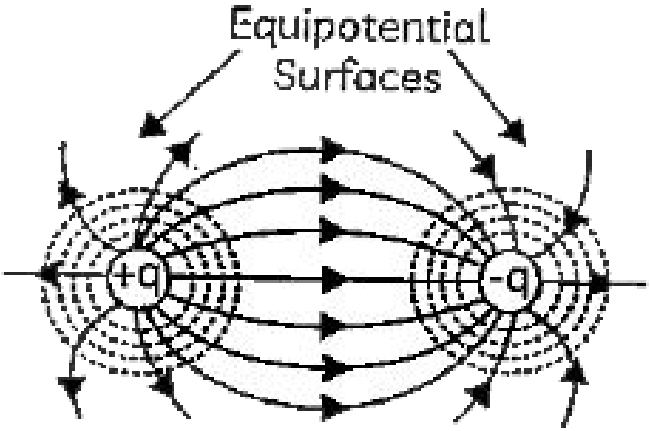
Total amount of work done in bringing the different charges to their respective positions from infinitely large mutual separation is defined as Electrostatic potential energy of a system.

Work done in carrying charge to any point from infinity is product of potential and charge:

W Potential $\times$ Charge

This work is stored in the system of two point

charges in the form of electrostatic potential energy U of the system.



A proton moves a distance d in a uniform electric field E as shown in figure. The work done on the proton by the electric field is:

A. Negative

B. Zero

C. Positive

D. First positive then decrease to zero

Answer: A

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6. Read the following paragraph and answer the questions:

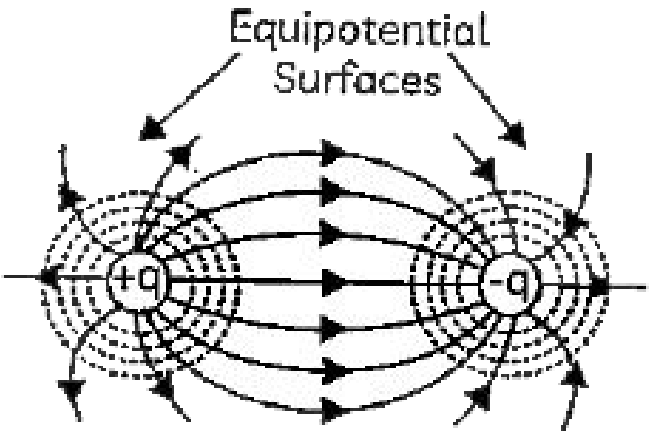
Total amount of work done in bringing the different charges to their respective positions from infinitely large mutual separation is

defined as Electrostatic potential energy of a system.

Work done in carrying charge to any point from infinity is product of potential and charge:

W Potential $\times$ Charge

This work is stored in the system of two point charges in the form of electrostatic potential energy U of the system.



What is the potential energy of the system when two charges of $1\mu C$ are kept in air at 1 m apart:

A. 1 eV

B. 1 J

C. $9 \times 10^{-3} J$

D. zero

Answer: C

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