PHYSICS

BOOKS - MODERN PUBLICATION PHYSICS (KANNADA ENGLISH)

UNIT TEST PAPER -05

Multiple Choice Questions

1. Three point charges are placed at the corners of an equilateral triangle . Assume

that only electrostatic forces are acting .

A. The system will be in equilibrium if the charges have the same magnitude but not all have the same sign.

B. The system will be in equilibrium if the charge have different magnitudes are not all have the same sign.

C. The system will be in equilibrium if the charges rotate about the centre of the triangle.

D. The system can never be in equilibrium

Answer: D

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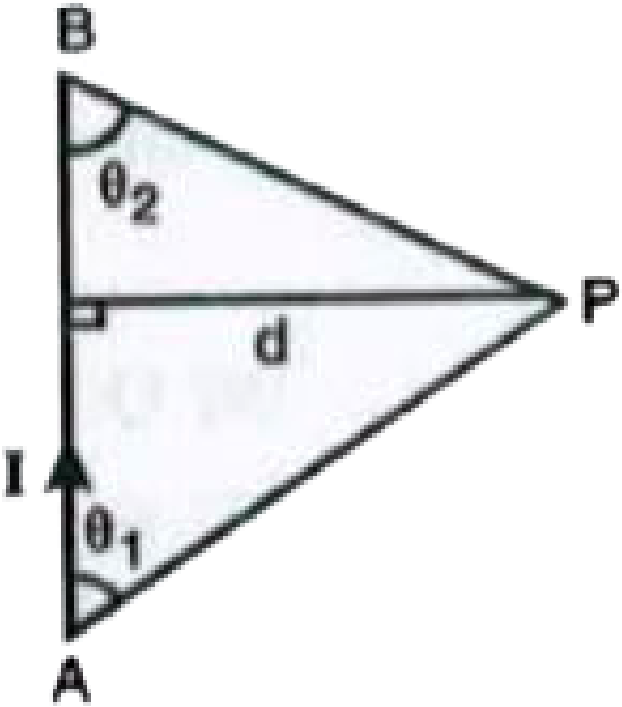
2. AB is a section of a straight wire carrying a current I.P is a point at a distance d from AB . the magnetic field at P due to AB has

magnitude :



A. $\frac{\mu_0 I}{4\pi d}(\cos\theta_1 + \cos\theta_2)$

B. $\frac{\mu_0 I}{4\pi d}(\cos\theta_1 + \cos\theta_2)$

C. $\frac{\mu_0 I}{4\pi d}(\cos\theta_1 + \sin\theta_2)$

D. $\frac{\mu_0 I}{4\pi d}(\sin\theta_1 + \sin\theta_2)$

Answer: A

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3. A positive point charge, which is free to move , is placed inside a hollow conducting sphere with negative charge, away from its centre . It will.

A. move towards the centre

B. move towards the nearer wall of the conductor

C. remain stationary

D. oscillate between the centre and the nearer wall

Answer: C

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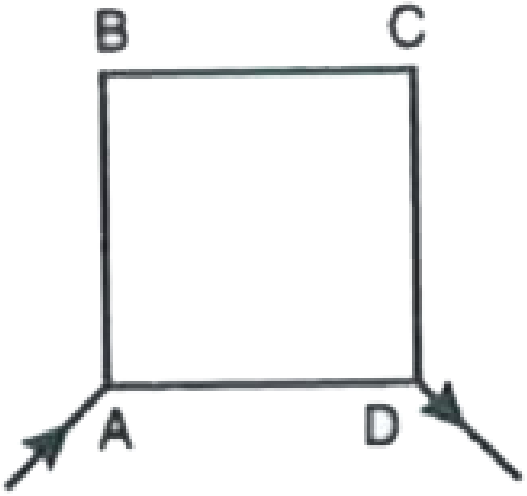
4. ABCD is a square loop made of a uniform conducting wire. A current enters the loop at A and leaves at D . The magnetic field is :



A. zero only at the centre of the loop

B. maximum at the of the loop

C. zero at all points outside the loop

D. zero at all points inside the loop

Answer: A

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5. A conductor AB carries a current i in a magnetic field $\overrightarrow{E}$. $If\overrightarrow{AB} = \overrightarrow{r}$ and the force on the conductor is $\overrightarrow{F}$

A. $\overrightarrow{F}$ does not depend on the shape of AB

B. $\vec{F} = i\left(\vec{r} \times \vec{B}\right)$

C. $\vec{F} = i\left(\vec{B} \times \vec{r}\right)$

D. $\left|\vec{F}\right| = i\left(\vec{r} \times \vec{B}\right)$

Answer: A::B

View Text Solution

6. In a uniform electric field

A. all points are at the same potential

B. no two points can have the same potential

C. pairs of points searated by the same distance have the same difference in potetial

D. none of the above

Answer: D

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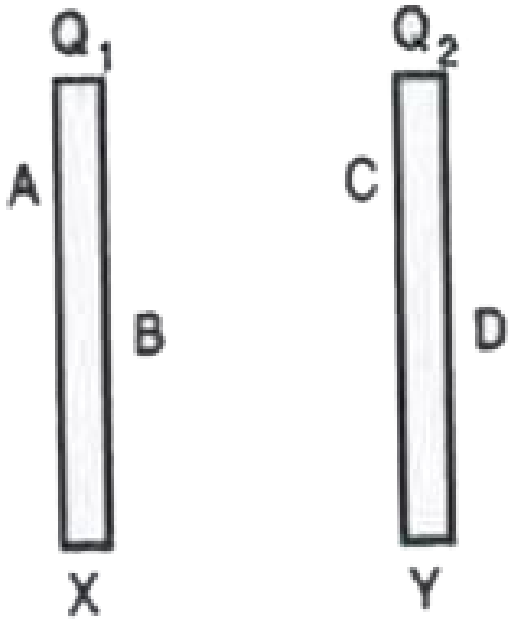
7. Two large, parallel conducting plates X and Y , close to each other, are given charges Q_1 and $Q_2(Q_1 > Q - (2))$. The four surfaces of the plates are A, b, C and D, as shown



A. The charge on A is $\frac{1}{2}(Q_1 + Q_2)$

B. The charge on B is $\frac{1}{2}(Q_1 - Q_2)$

C. The charge on C is $\frac{1}{2}(Q_1 - Q_2)$

D. The charge on D is $\frac{1}{2}(Q_1 + Q_2)$

Answer: A::B::C::D

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8. All the edges of a block with parallel faces are unequal . Its longest edge is twice its

shortest edge. The ratio of the maximum resistance between parallel faces is :

A. 2

B. 4

C. 8

D. indeterminate unless the length of the third edge is specified

Answer: B

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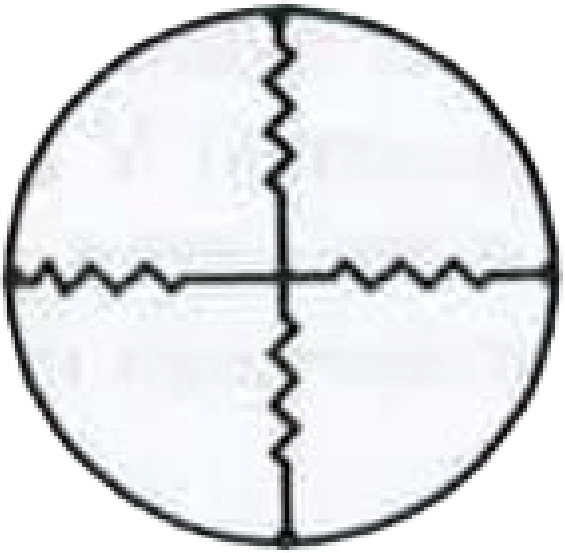
9. In the newtwork shown below, the ring has zero resistance . The equivalent resistance resistance between the point A and B is :



A. 2 R

B. 4 R

C. 7 R

D. 10 R

Answer: B

View Text Solution

10. A flat coil carrying a current has a magnetic moment $\vec{m}$. It is placed in a magnetic field $\vec{B}$ such that $\vec{m}$ is antiparallel to $\vec{B}$. The coil is :

A. not in equilibrium

B. in stable equilibrium

C. in unstable equilibrium

D. in neutral equilibrium

Answer: C

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11. An electric bulb designed to draw P_0 power at V_0 voltage. If the voltage is V, it draws P power . Then .

A. $P = \frac{V_0}{V} P_0$

B. $P = \frac{V}{V_0} P_0$

C. $P = \left(\frac{V}{V_0}\right)^2 P_0$

D. $P = \left(\frac{V_0}{V}\right)^2 P_0$

Answer: C

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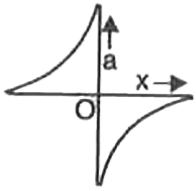
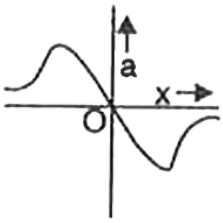
12. Two identical positive charges are fixed on the y-axis at equal distances from the origin O . An particle with a negative charges starts on the x-axis at a large distance from O , moves

along the x-axis , passes through O and moves far away from O. its acceleration a is taken as positive along its direction of motion . The particle's acceleration a is plotted against its x-coordinate. which of the following best represents the plot ?

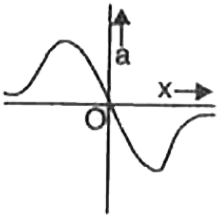
A.



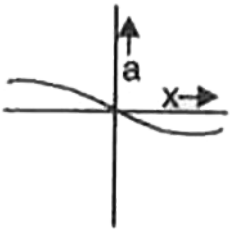
B.



C.



D.



Answer: B

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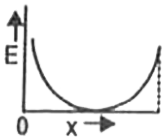
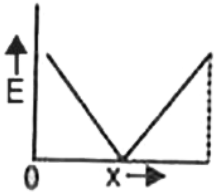
13. Two identical point charges are placed at a separation of l . P is a point on the line joining

the charges, at a distance x from any one charge. The field at P is E.E is plotted against x for values of x from close to zero to slightly less than l . Which of the following best represents the resulting curve ?

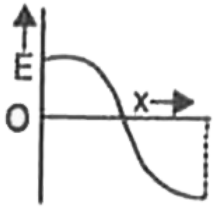
A.

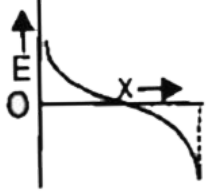


B.



C.

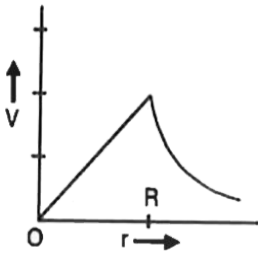


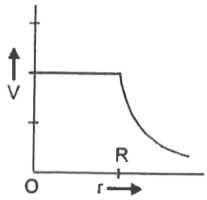
D. 

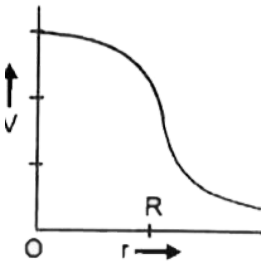
Answer: D

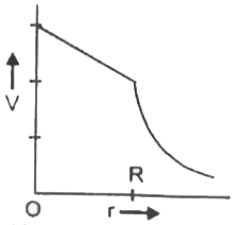
View Text Solution

14. A solid sphere of radius R is charged uniformly .The electrostatic potential V is plotted as a function of distance r from the centre of the sphere. Which of the following best represents the resulting curve ?

A. 

B. 

C. 

D. 

Answer: C

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15. a large solid sphere with uniformly distributed positive charge has a smooth narrow tunnel through its centre . A small particle with negative charge, initially at far from the sphere, approaches it along the line of the tunnel, reaches its surface with a speed u, and pass through the tunnel . Its speed at the centre of the sphere will be :

A. 0

B. u

C. $\sqrt{2v}$

D. $\sqrt{1.5v}$

Answer: D

View Text Solution

16. A spherical conductor A of radius r is placed concentrically inside a conducting shell B of radius $(Rt > r)$. A charge Q is given to A,

and then A is joint to B by a metal wire. The charge flowing from A to will be :

A. $Q\left(\frac{R}{R+r}\right)$

B. $Q\left(\frac{r}{R+r}\right)$

C. Q

D. zero

Answer: C

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17. A conducting sphere of radius R, and carrying a charge Q , is joined to an uncharged conducting sphere of radius 2 R . The charge flowing between them will be :

A. Q/4

B. Q/3

C. Q/2

D. 2Q/3

Answer: D

View Text Solution

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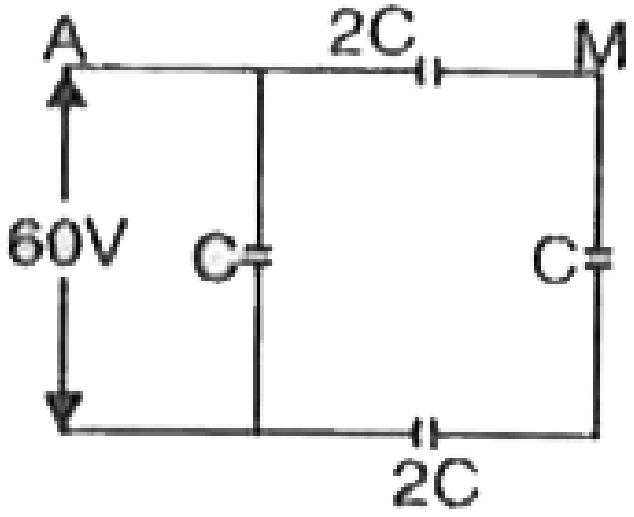
18. In the circuit shown , a potential difference of 60 V is applied across AB. The potential difference between the points M and N is :



A. 10 V

B. 15 V

C. 20 V

D. 30 V

Answer: D

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19. A spherical conductor A lies inside a hollow spherical conductor B. Charges AQ_1 and Q_2 are given to A and B respectively .

A. Charges Q_1 will appear on the outer surface of A .

B. Charge $-Q_1$ will appear on the inner surface of B .

C. Charge Q_2 will apear on the the outer surface of B .

D. harge $Q_1 + Q_2$ will apear on the inner surface of B.

Answer: A::B::D

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20. Two points are at distances a and b $(a < b)$ from a long string of charge per unit length l . The potential difference between the points is proportional to :

A. b/a

B. b^2 / a^2

C. $\sqrt{b/2}$

D. l n (b/a)

Answer: D

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21. A charged particle moves with a speed u in a circular path of radius r around a long uniformly charged conductor

A. $v \propto r$

B. $v \propto \frac{1}{r}$

C. $v \propto \frac{1}{\sqrt{r}}$

D. v is independent of r

Answer: D

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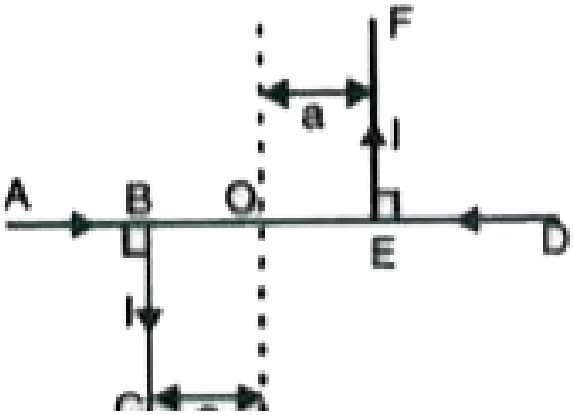
22. Two long thin wires ABC and DEF are arranged as shown. They carry currents I as shown . The magnitude of the magnetio field at O is :



A. zero

B. $\frac{\mu_0 I}{4\pi a}$

C. $\frac{\mu_0 I}{4\pi a}$

D. $\frac{\mu_0 I}{2\sqrt{2\pi a}}$

Answer: C

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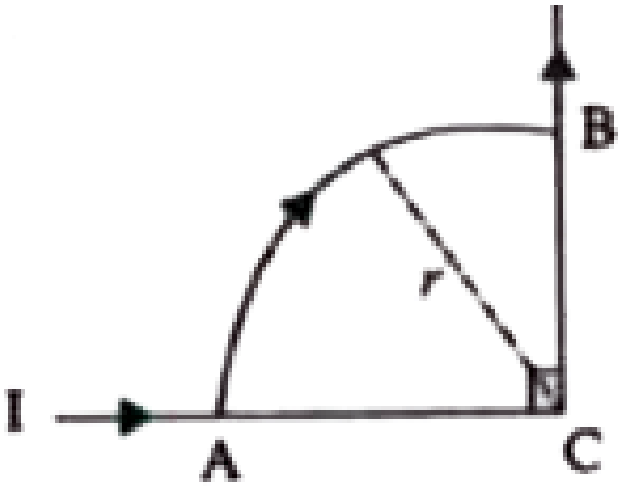
23. A wire carrying a current I is shaped as shown . Section AB is a quarter circle of radius

r . The magnetic field at C is directed



A. along the bisector of the angle ACD, away from AB.

B. along the bisector of the angle ACB, towards AB.

C. perpendicular to the plane of the paper directed into the paper

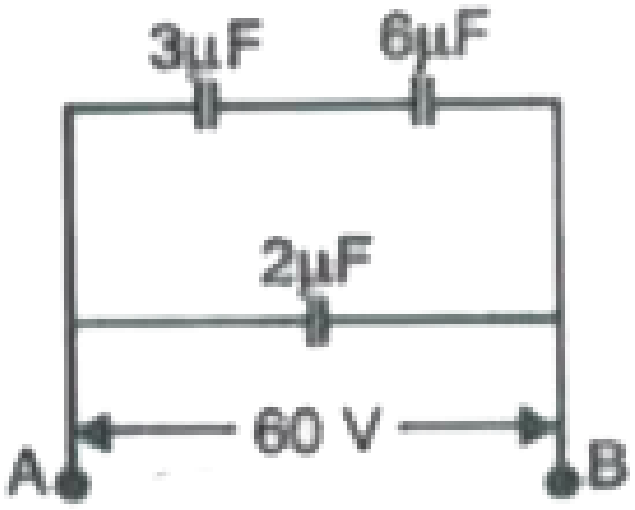
D. at an angle $\frac{\pi}{4}$ to the plane of the paper .

Answer: C

View Text Solution

24. In the circuit shown the potential difference across the $3-\mu F$ capacitor is V, and the equivalent capacitance between A and

B is C_{AB}



A. $C_{AB} = 4\mu F$

B. $C_{AB} = \frac{18}{11}\mu F$

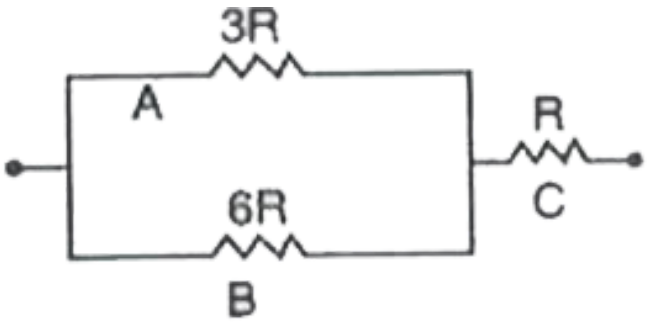
C. V = 20 V

D. V = 40 V

Answer: A::D

View Text Solution

25. The three resistances A, B and C have values 3R, 6R and R respectively . When some potential difference is applied across the network, the thermal powers dissipated by A, B and C are is the ratio



A. $2:3:4$

B. $2:4:3$

C. $4:2:3$

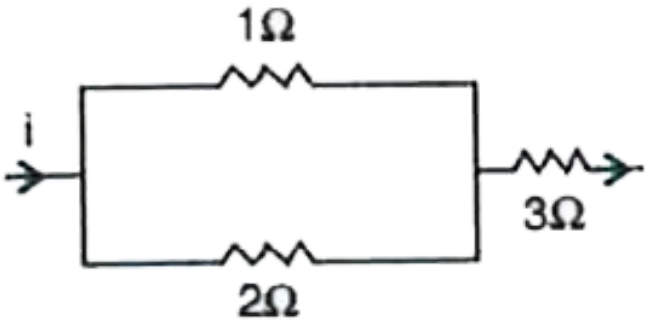
D. $3:2:4$

Answer: C

View Text Solution

26. In the circuit shown in fig. power developed across $1\Omega, 2\Omega \text{ and } 3\Omega$ resistances are in the

ratio of



A. $1:2:3$

B. $4:2:27$

C. $6:4:9$

D. $2:1:27$

Answer: D

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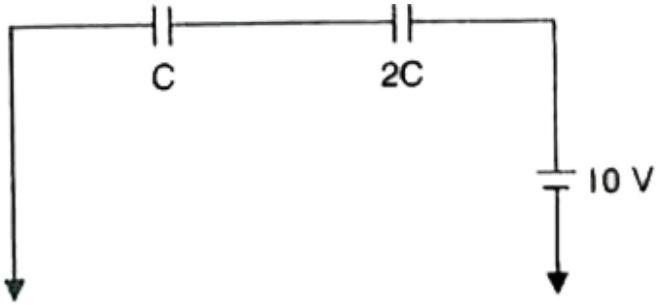
27. In the circuit shown in fig. $C = 6\mu F$. The charge stored in capacitor of capacity C is



A. zero

B. $90\mu C$

C. $40\mu C$

D. $60\mu C$

Answer: C

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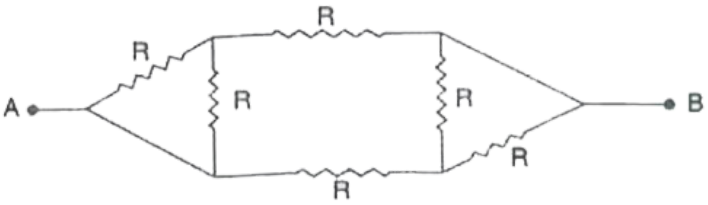
28. Equivalent resistance between A and B is :



A. $\frac{3}{4}R$

B. $\frac{5}{3}R$

C. $\frac{7}{5}R$

D. R

Answer: A

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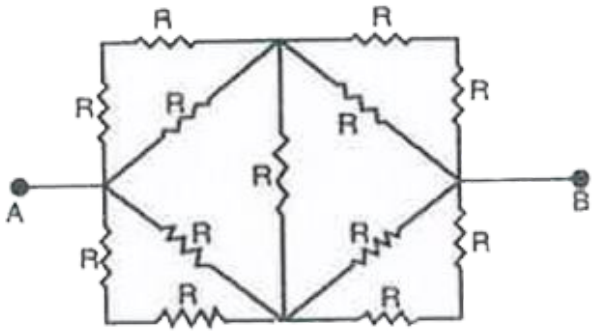
29. In the circuit shown in fig. net resistance between A and B is :



A. 2 R

B. $\left(\frac{4}{3}\right)R$

C. $\left(\frac{2}{3}\right)R$

D. R

Answer: B

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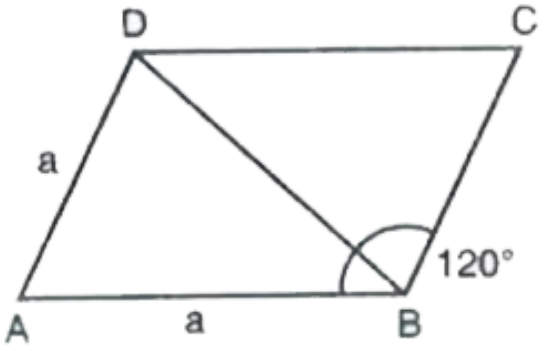
30. A charge + Q at A as shown in fig. produces electric field E and electric potential V at D. if we now put charges -2 Q and + Q at B and C

respectively , then the electric field and potential at D will be :



A. E and 0

B. 0 and V

C. $\sqrt{2}E$ and $\frac{V}{\sqrt{2}}$

D. $\frac{E}{\sqrt{2}}$ and $\frac{V}{\sqrt{2}}$

Answer: A

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