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5.1 Electric Fields

Easy

PHYSICS

IB HL

EXAM PAPERS PRACTICE

5.1 Electric Fields

Question Paper

Course	DP IB Physics
Section	5. Electricity & Magnetism
Topic	5.1 Electric Fields
Difficulty	Easy

Time allowed: 20

Score: /10

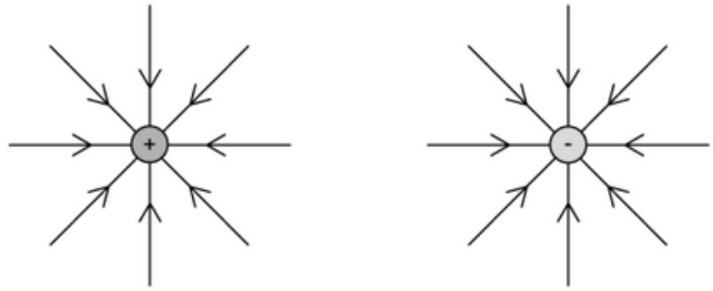
Percentage: /100

Question 1

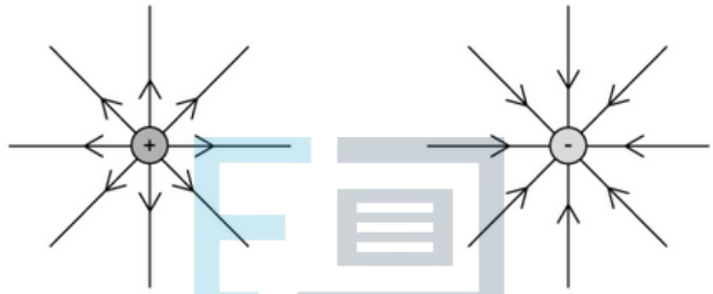
An electric field is a region of space in which an electric charge is subjected to a force. Electric fields can be represented with vector diagrams showing the direction of force around a point charge.

Select the pair of diagrams which correctly represent the field lines around a positive and negative charge.

A.

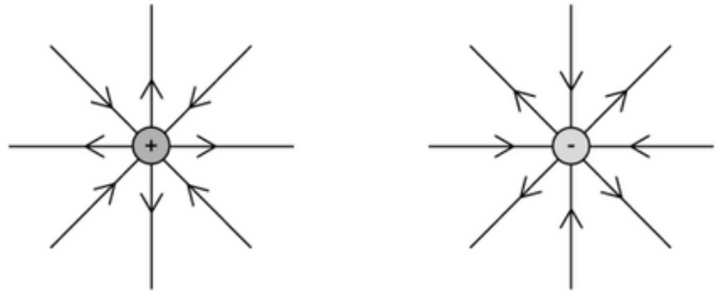


B.



C.

D.



[1 mark]

Question 2

Identify the unit defined as 'the charge carried by an electric current of one ampere in one second'.

A. Current.

B. Potential difference.

C. Coulomb.

D. Ampere.

[1 mark]

Question 3

Two different equations can be used to calculate the same physical quantity, x.

$$x = \frac{\Delta q}{\Delta t} \text{ and } x = nAvq$$

What quantity is represented by x?

A. Drift velocity.

B. Current.

C. Charge on a charge carrier.

D. Potential difference.

[1 mark]

Question 4

Select the correct quantity and unit for this definition;

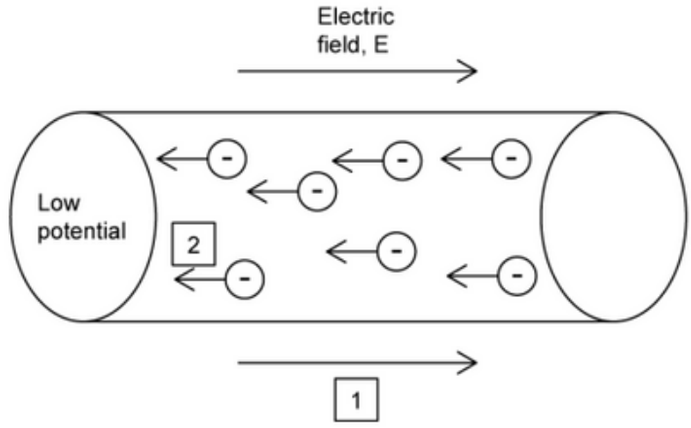
'the rate of flow of electric charge past a cross-section of material'

	Quantity	Unit
A.	charge	coulomb
B.	charge	ampere
C.	current	coulomb
D.	current	ampere

[1 mark]

Question 5

The diagram shows charged particles moving in a metallic material. Choose the line which correctly identifies the missing labels.



	1	2
A.	current	electric current
B.	voltage	drift speed
C.	voltage	electric current
D.	current	drift speed

[1 mark]

Question 6

Which of the following is a possible drift speed for delocalised electrons in a copper wire?

A. $12 \times 10^{-8}\ m\ s^{-1}$

B. $4.5 \times 10^{-4}\ m\ s^{-1}$

C. $8.6\ m\ s^{-1}$

D. $3.0 \times 10^{8}\ m\ s^{-1}$

[1 mark]

Question 7

Which statement correctly describes a property of the drift velocity, v.

A. v is indirectly proportional to current, I

B. v is directly proportional the to charge carrier density, n

C. v is directly proportional to current, I

D. v is directly proportional the to cross-sectional area of the conductor, A

[1 mark]

Question 8

Determine the energy of 4 eV in Joules.

A. 6.4×10^{-19} J

B. 6.4×10^{-13} J

C. 6.4 J

D. 2.1 J

[1 mark]

Question 9

Identify the electrical item most likely to use direct current.

A. Washing machine.

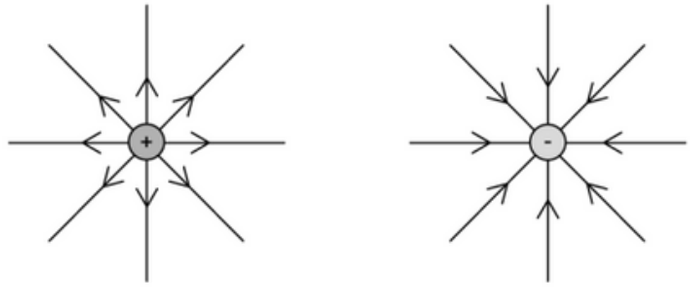
B. Laptop.

C. Reading lamp.

D. Kettle.

[1 mark]

Question 10



For electric field strength, identify the correct equation and description of the diagram.

	Equation	Description
A.	$E = \frac{F}{q}$	The strength of the electric field is **proportional** to the number of lines per unit cross-sectional area
B.	$E = \frac{F}{q}$	The strength of the electric field is **indirectly proportional** to the number of lines per unit cross-sectional area
C.	$F = \frac{E}{q}$	The strength of the electric field is **proportional** to the number of lines per unit cross-sectional area
D.	$F = \frac{E}{q}$	The strength of the electric field is **indirectly proportional** to the number of lines per unit cross-sectional area

[1 mark]