

Static Electricity

Question Paper

Level	O Level
Subject	Physics
Exam Board	Cambridge International Examinations
Unit	Electricity and Magnetism
Topic	Static Electricity
Booklet	Question Paper

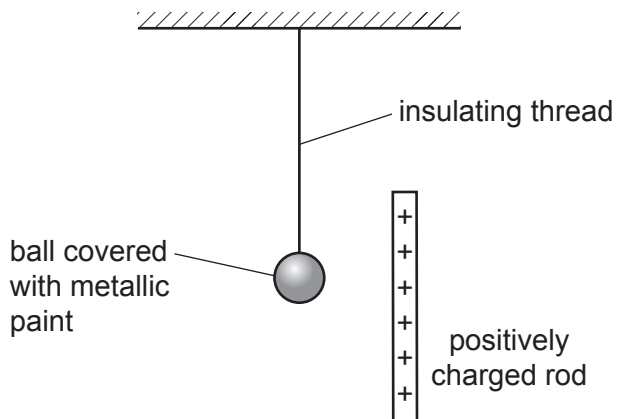
Time Allowed: 42 minutes

Score: /35

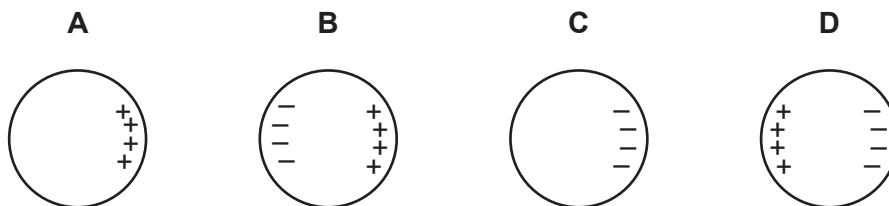
Percentage: /100

Grade Boundaries:

- 1 The diagram shows an uncharged ball coated with metallic paint. The ball is suspended from an insulating thread. It is placed near a positively charged rod.



Which diagram shows the charge distribution on the ball?

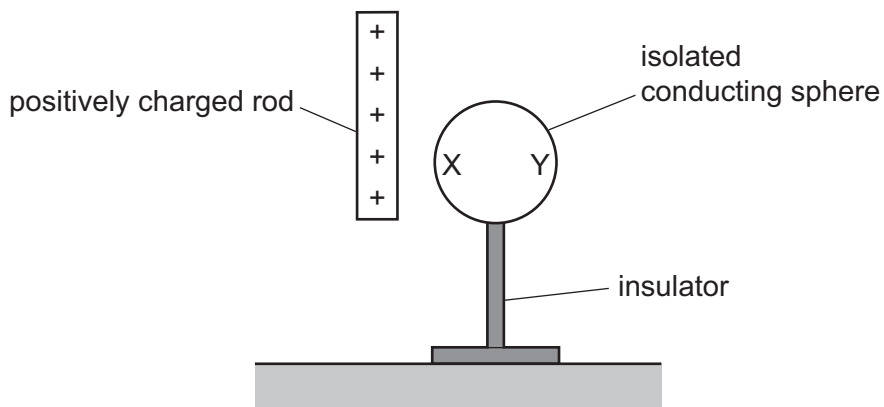


- 2 A polythene rod is rubbed with a cloth and the cloth becomes positively charged.

Which statement describes the transfer of charge?

- A** Negative charges are transferred from the cloth to the polythene.
- B** Negative charges are transferred from the polythene to the cloth.
- C** Positive charges are transferred from the cloth to the polythene.
- D** Positive charges are transferred from the polythene to the cloth.

- 3 A positively charged rod is brought near to an isolated uncharged conducting sphere.



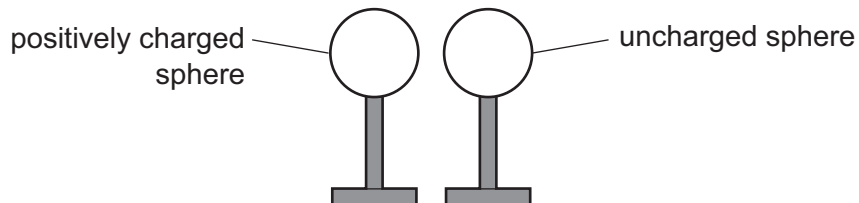
What are the charges on sides X and Y of the sphere?

- A Both X and Y are positively charged.
 - B Both X and Y are negatively charged.
 - C X is positively charged and Y is negatively charged.
 - D X is negatively charged and Y is positively charged.
- 4 A polythene rod becomes charged when rubbed with a dry woollen cloth.

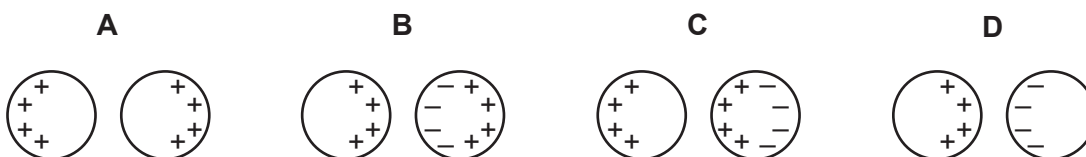
The charge caused is a result of

- A friction producing a movement of electrons.
- B friction producing a movement of protons.
- C magnetism producing a movement of electrons.
- D magnetism producing a movement of protons.

- 5 A positively charged insulated metal sphere is brought close to an uncharged insulated metal sphere.



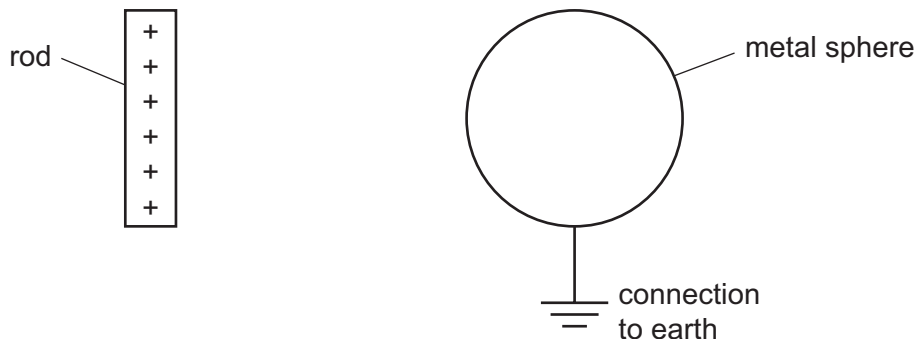
Which diagram shows the charge distribution on the spheres?



- 6 Which row correctly names an electrical conductor and an insulator?

	electrical conductor	insulator
A	aluminium	iron
B	iron	rubber
C	plastic	aluminium
D	rubber	plastic

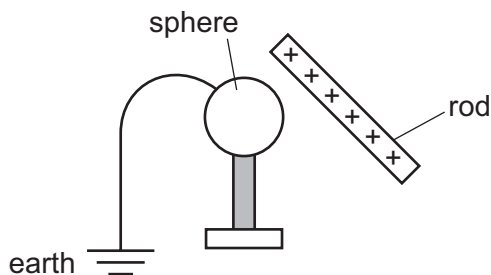
- 7 A metal sphere is connected to earth. A positively charged rod approaches the sphere and stops before touching it.



What is the movement of charge on the sphere and what is the final charge on the sphere?

	movement of charge	final charge on sphere
A	negative charge moves from earth to the sphere	negative
B	negative charge moves from earth to the sphere	neutral
C	positive charge moves from the sphere to earth	negative
D	positive charge moves from the sphere to earth	neutral

- 8 A positively charged rod is held close to an earthed metal sphere.

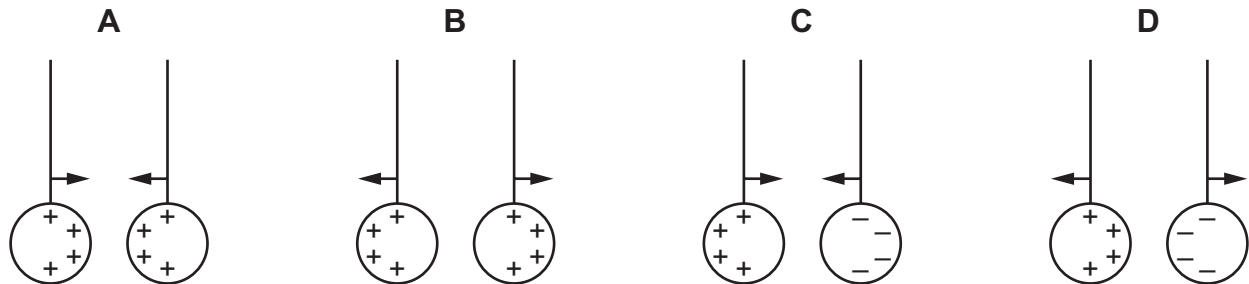


What describes the charge on the metal sphere?

- A** It is negative because electrons are attracted towards the rod.
- B** It is neutral because electrons are attracted towards the rod and protons are repelled.
- C** It is neutral because it is earthed.
- D** It is positive because protons are repelled by the rod.

9 Two charged metal spheres are suspended close to each other.

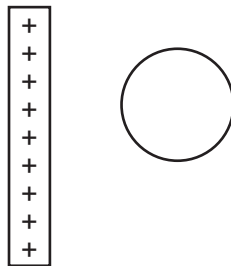
Which diagram shows the charge distribution on the spheres and the directions of the forces on the spheres?



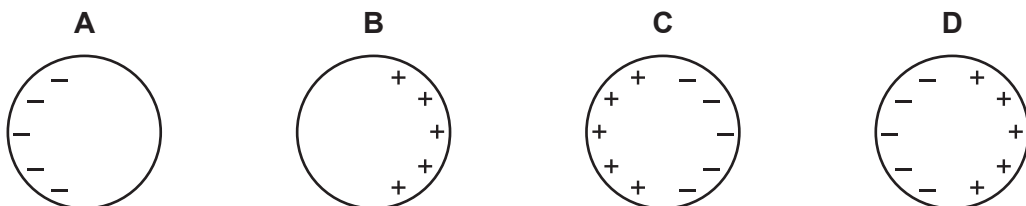
10 Which list contains only electrical insulators?

- A glass, plastic, rubber
- B glass, plastic, steel
- C glass, rubber, steel
- D plastic, rubber, steel

11 A positively-charged rod is held close to, but not touching, an isolated metal sphere.



Which diagram shows the charges that are induced on the sphere?



12 A student rubs a rod held in his hand.

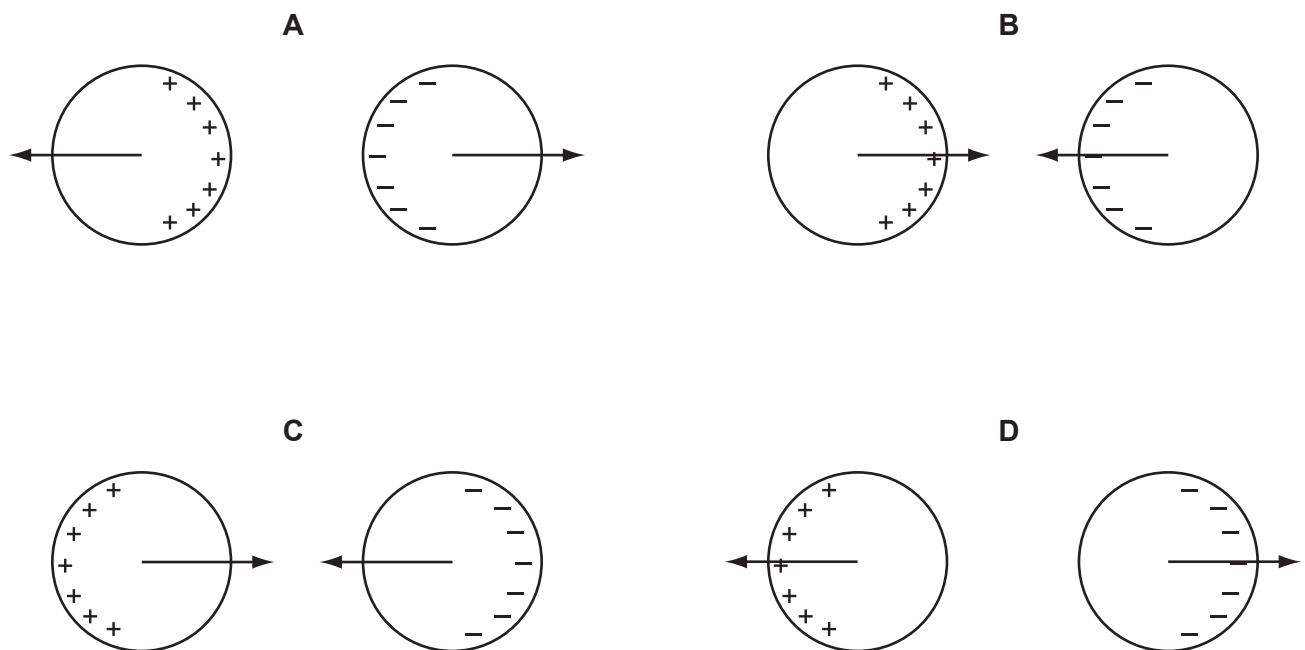
Which action causes the rod to gain a large electrostatic charge?

- A rubbing an iron rod with a steel magnet
- B rubbing an iron rod with a woollen duster
- C rubbing a polythene rod with a steel magnet
- D rubbing a polythene rod with a woollen duster

13 Two charged conducting spheres are placed close to one another.

One sphere is positively charged and the other is negatively charged.

Which diagram shows the distribution of charges and the forces acting on the spheres?



14 Which row shows a conductor and an insulator?

	conductor	insulator
A	aluminium	copper
B	aluminium	glass
C	plastic	copper
D	plastic	glass

15 Which material is best for magnetic screening?

- A** copper
- B** iron
- C** lead
- D** plastic

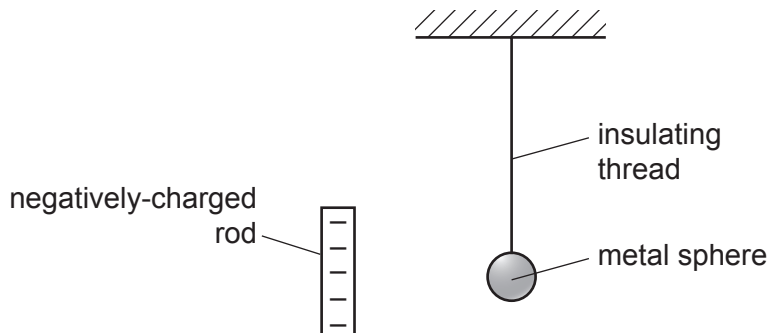
16 A polythene rod is rubbed with a duster. The duster then attracts small pieces of paper.

Are the rod and the duster charged or uncharged?

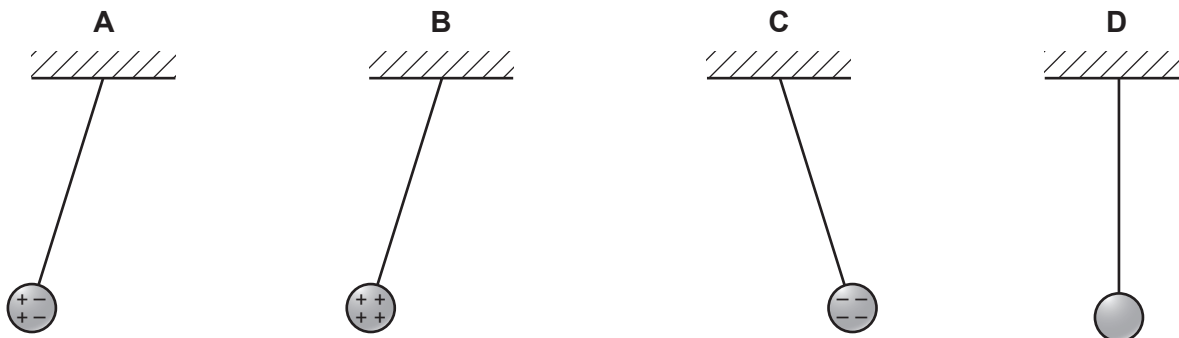
	rod	duster
A	charged	charged
B	charged	not charged
C	not charged	charged
D	not charged	not charged

17 A small uncharged metal sphere hangs from an insulating thread.

A negatively-charged rod moves close to the sphere.



Which diagram shows the charges on the sphere and its final position?



18 To charge an isolated metal sphere by induction, the following four processes are required.

- P The sphere is earthed by touching it.
- Q The earth connection is removed from the sphere.
- R A charged rod is brought close to the sphere.
- S The charged rod is removed.

19 To charge an isolated metal sphere by induction, the following four processes are required.

- P The sphere is earthed by touching it.
- Q The earth connection is removed from the sphere.
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- S The charged rod is removed.

In which order can these stages be carried out to charge the isolated metal sphere?

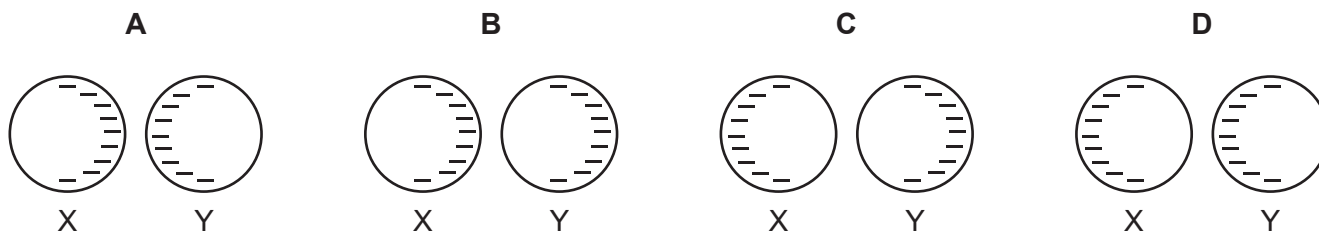
- A P → Q → R → S
- B P → R → S → Q
- C R → P → Q → S
- D R → P → S → Q

20 Two metal spheres X and Y are on insulating bases. Both spheres are negatively charged.



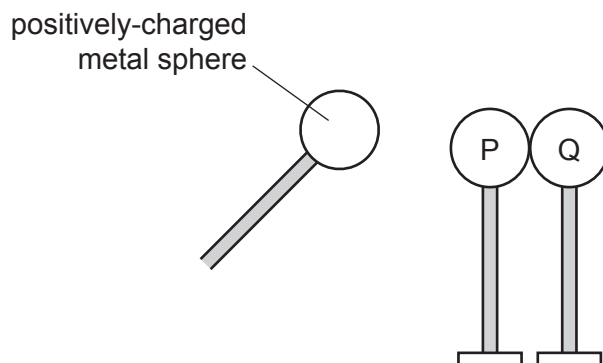
Sphere X is moved towards sphere Y until they almost touch.

Which diagram shows the final pattern of charges?



- 21 Two metal spheres P and Q are mounted on insulating stands and are touching each other. They are uncharged.

A positively-charged metal sphere on an insulating handle is brought close to P but does not touch it. This induces charges on P and Q.

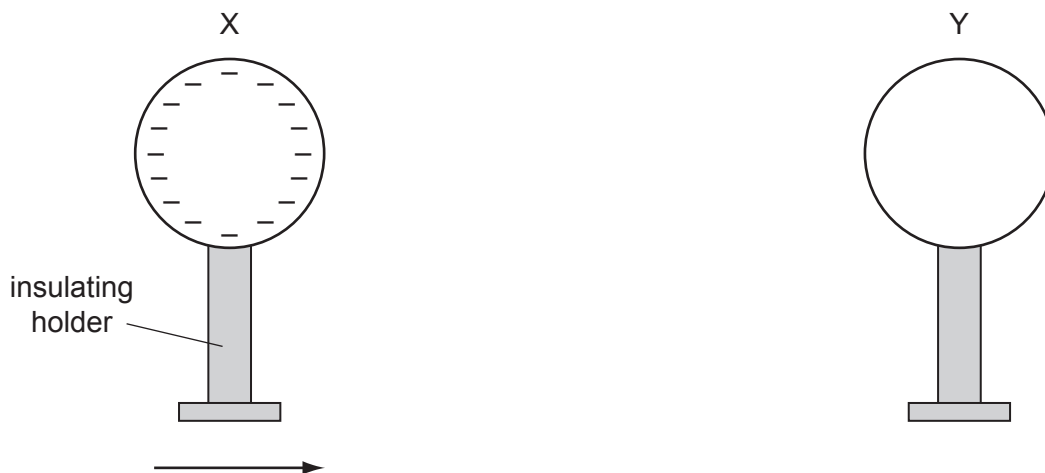


The positively-charged metal sphere is held in this position and sphere Q is moved to the right, away from sphere P.

What are the signs of the induced charges on P and Q and how do the sizes of these charges compare?

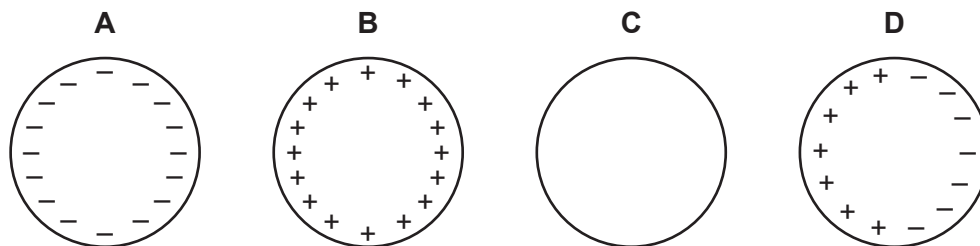
	charge on P	charge on Q	sizes of the charges
A	negative	positive	equal
B	negative	positive	unequal
C	positive	negative	equal
D	positive	negative	unequal

22 A negatively-charged sphere X is brought up to an identical uncharged sphere Y. The spheres do not touch.



Sphere Y is 'earthed' by touching it with a finger, which is then removed. Sphere X is then moved away from sphere Y.

What is the final charge, if any, on sphere Y?



23 A negatively-charged balloon is brought towards a wall.

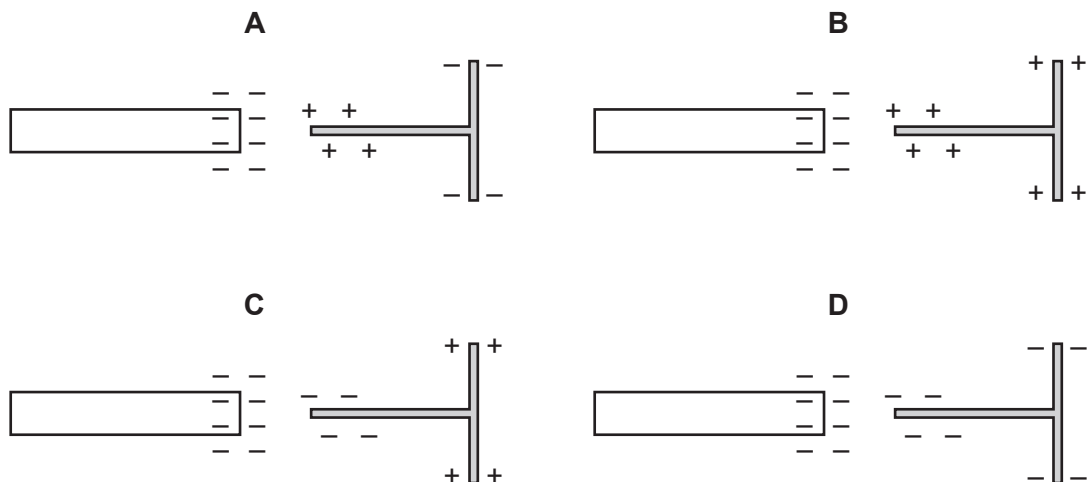
Which statement explains what happens?

- A** Negative charges on the balloon attract the negative charges in the wall.
- B** Negative charges on the balloon have no effect on the charges in the wall.
- C** Negative charges on the balloon repel the negative charges in the wall.
- D** Negative charges on the balloon repel the positive charges in the wall.

24 A negatively-charged rod is brought close to an isolated T-shaped piece of metal.

Initially, the metal is uncharged.

Which diagram shows the induced charge on the metal?



25 A perspex rod can be charged positively by rubbing it with a woollen cloth.

How does the rod gain its charge?

- A The rod gains electrons.
- B The rod gains protons.
- C The rod loses electrons.
- D The rod loses protons.

26 The current in an electric heater is 10 A. It is switched on for five minutes.

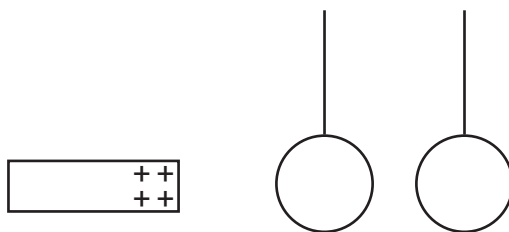
How much charge flows through the heater?

- A 0.5 C
- B 2 C
- C 50 C
- D 3000 C

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- 27 Two uncharged metal spheres, not touching one another, are suspended by means of cotton thread. A positively charged rod is brought near.



Which diagram shows what happens to the spheres?

A

B

C

D

- 28 A positively charged insulated metal sphere is brought close to, but not touching, a similar uncharged metal sphere.



Which diagram shows the charge distribution on the spheres?

A

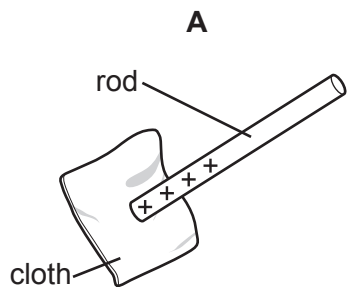
B

C

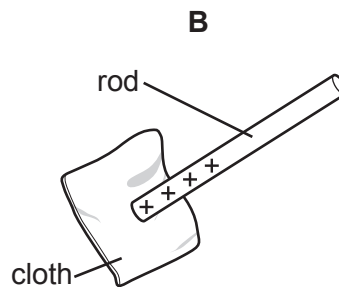
D

29 In an electrostatics experiment, a plastic rod is rubbed with a cloth. The cloth becomes negatively charged.

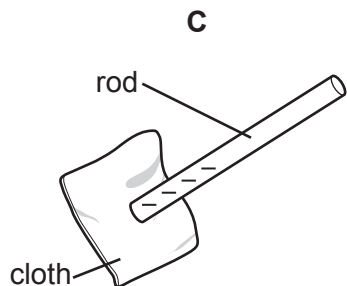
Which diagram shows the charge on the rod, and describes the movement of charge?



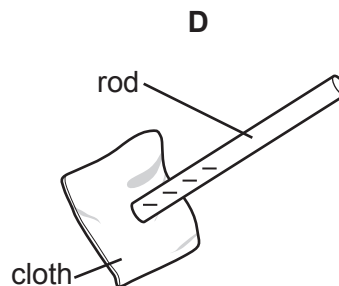
electrons move from the rod onto the cloth



protons move from the cloth onto the rod

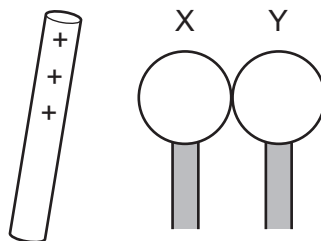


electrons move from the cloth onto the rod



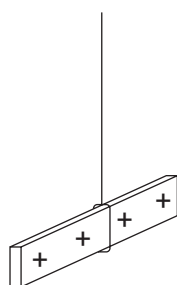
protons move from the rod onto the cloth

- 30 Two insulated and uncharged metal spheres X and Y are touching. While a positively charged rod is near X, the spheres are moved apart. After this action, X has a negative charge.

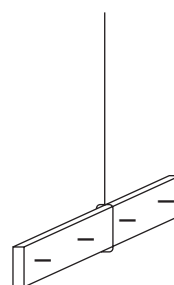


What will be the charge on Y?

- A negative and smaller than that on X
 - B negative and the same size as that on X
 - C positive and smaller than that on X
 - D positive and the same size as that on X
- 31 The diagram shows a positively charged acetate strip and a negatively charged polythene strip that are freely suspended.



acetate strip



polythene strip

Two rods **X** and **Y** are brought up in turn to these two strips. Rod **X** attracts the acetate strip but repels the polythene strip. Rod **Y** does not repel either the acetate strip or the polythene strip.

Which type of charge is on each rod?

	rod X	rod Y
A	negative	positive
B	negative	uncharged
C	positive	negative
D	positive	uncharged

32 Four processes are used to charge an isolated metal sphere.

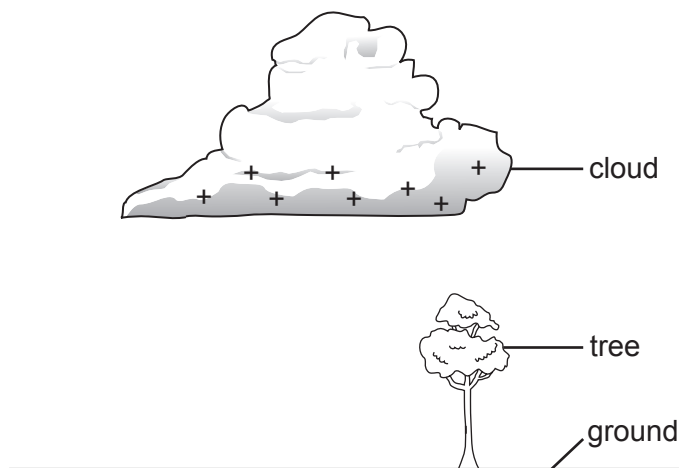
- P The sphere is earthed by touching it.
- Q The earth connection is removed from the sphere.
- R A charged rod is brought close to the sphere.
- S The charged rod is removed.

In which order should these processes be carried out to charge the sphere?

	first → last			
A	P	Q	R	S
B	P	R	S	Q
C	R	P	Q	S
D	R	S	P	Q

33 On a stormy day, a large, positively-charged cloud is above a tree.

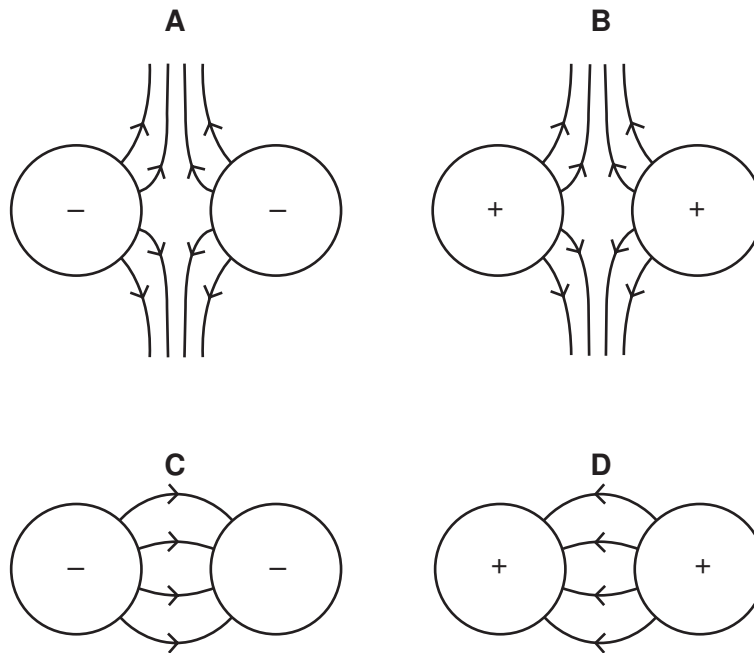
An electrical charge is induced on the tree as charged particles flow through it.



What is the charge induced on the tree and how do the charged particles move?

	charge on tree	movement of charged particles through tree
A	negative	negatively charged particles move down the tree
B	negative	negatively charged particles move up the tree
C	positive	positively charged particles move down the tree
D	positive	positively charged particles move up the tree

34 Which diagram correctly shows the electric field between two charged spheres?



35 A positively charged rod is brought close to an insulated metal sphere.

Which diagram best shows the induced charges on the sphere?

