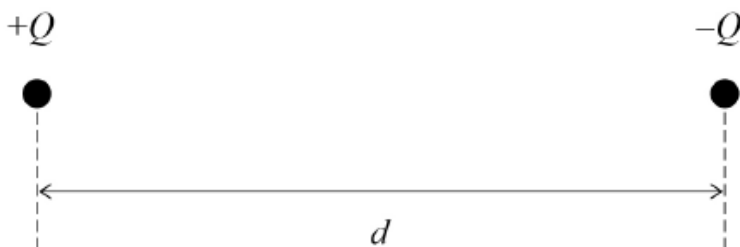


**AQA – Electric fields – A2 Physics P2**

1. June/2021/Paper\_7408\_2/No.14

The diagram shows a particle with charge  $+Q$  and a particle with charge  $-Q$  separated by a distance  $d$ .

The particles exert a force  $F$  on each other.



An additional charge of  $+2Q$  is then given to each particle and their separation is increased to  $2d$ .

What is the force that now acts between the particles?

[1 mark]

A an attractive force of  $\frac{9}{2}F$

B an attractive force of  $\frac{9}{4}F$

C a repulsive force of  $\frac{3}{2}F$

D a repulsive force of  $\frac{3}{4}F$

2. June/2021/Paper\_7408\_2/No.15

Two protons are separated by distance  $r$ .  
The electrostatic force between the two protons is  $X$  times the gravitational force between them.

What is the best estimate for  $X$ ?

[1 mark]

A  $10^{20}$

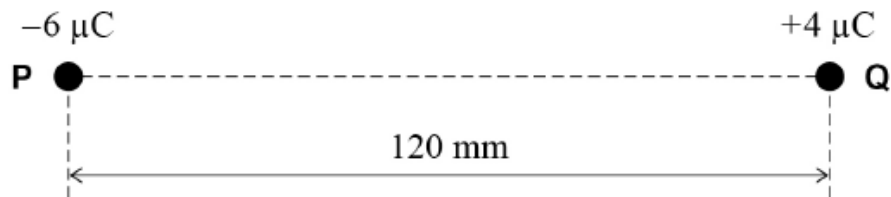
B  $10^{28}$

C  $10^{36}$

D  $10^{42}$

3. June/2021/Paper\_7408\_2/No.17

Two charged particles **P** and **Q** are separated by a distance of 120 mm.  
**X** is a point on the line between **P** and **Q** where the electric potential is zero.



What is the distance from **P** to **X**?

[1 mark]

A 40 mm

B 48 mm

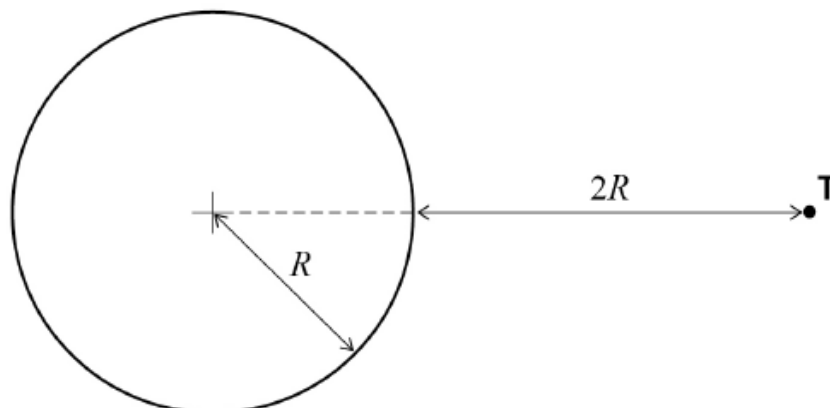
C 60 mm

D 72 mm

4. June/2021/Paper\_7408\_2/No.18

An isolated spherical conductor is charged.

The conductor has a radius  $R$  and an electric potential  $V$ . The electric field strength at its surface is  $E$ .



Point **T** is a distance  $2R$  from the surface.

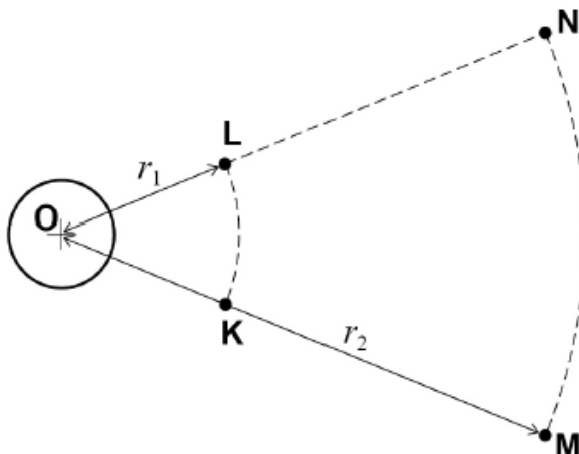
What are the electric field strength and electric potential at **T**?

[1 mark]

	Electric field strength	Electric potential	
<b>A</b>	$\frac{E}{2}$	$\frac{V}{4}$	<input type="checkbox"/>
<b>B</b>	$\frac{E}{3}$	$\frac{V}{9}$	<input type="checkbox"/>
<b>C</b>	$\frac{E}{4}$	$\frac{V}{2}$	<input type="checkbox"/>
<b>D</b>	$\frac{E}{9}$	$\frac{V}{3}$	<input type="checkbox"/>

5. June/2021/Paper\_7408\_2/No.19

O is the centre of a negatively charged sphere.



K and L are two points at a distance  $r_1$  from O.  
M and N are two points at a distance  $r_2$  from O.

Which statement is true?

[1 mark]

- A The work done moving an electron from M to K is the same as that done moving an electron from K to L.
- B The work done moving a positron from K to M is the same as that done moving an electron from K to M.
- C No work is done moving an electron from M to N.
- D No work is done moving a positron from L to N.

6. June/2020/Paper\_7408\_2/No.14

Two fixed charges of magnitude  $+Q$  and  $+3Q$  repel each other with a force  $F$ .  
An additional charge of  $-2Q$  is given to each charge.

What are the magnitude and the direction of the force between the charges?

[1 mark]

	Magnitude of force	Direction of force	
<b>A</b>	$\frac{F}{3}$	repulsive	<input type="checkbox"/>
<b>B</b>	$5F$	attractive	<input type="checkbox"/>
<b>C</b>	$5F$	repulsive	<input type="checkbox"/>
<b>D</b>	$\frac{F}{3}$	attractive	<input type="checkbox"/>

7. June/2020/Paper\_7408\_2/No.15

At a distance  $L$  from a fixed point charge, the electric field strength is  $E$  and the electric potential is  $V$ .

What are the electric field strength and the electric potential at a distance  $3L$  from the charge?

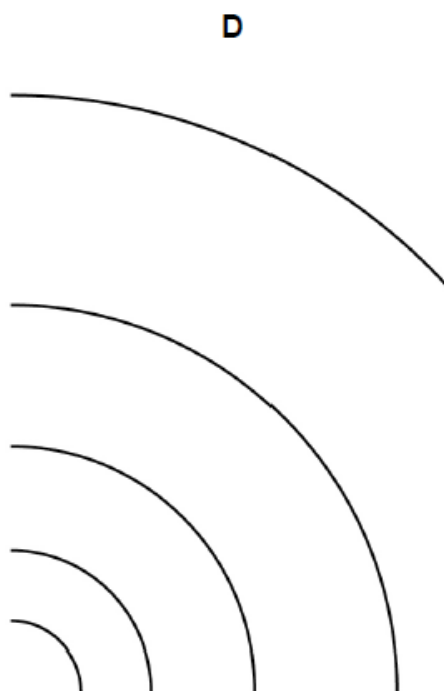
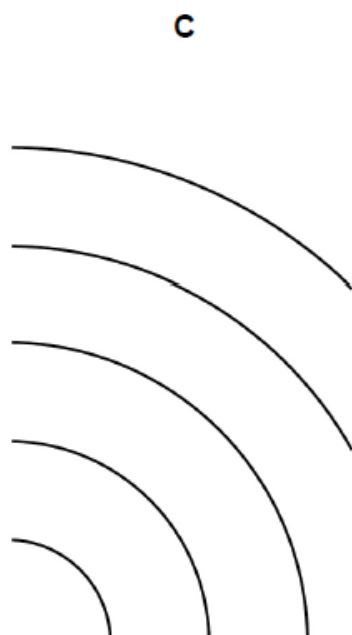
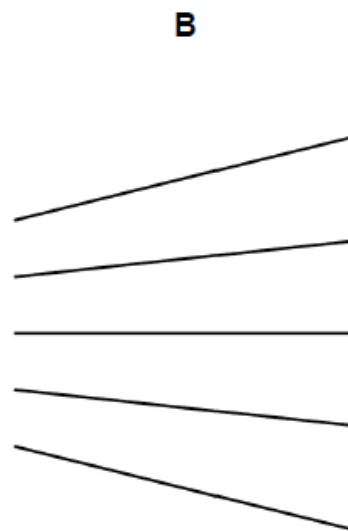
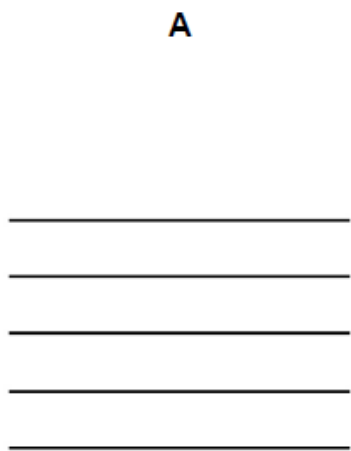
[1 mark]

	Electric field strength	Electric potential	
<b>A</b>	$\frac{E}{3}$	$\frac{V}{9}$	<input type="checkbox"/>
<b>B</b>	$\frac{E}{3}$	$\frac{V}{3}$	<input type="checkbox"/>
<b>C</b>	$\frac{E}{9}$	$\frac{V}{3}$	<input type="checkbox"/>
<b>D</b>	$\frac{E}{9}$	$\frac{V}{9}$	<input type="checkbox"/>

8. June/2020/Paper\_7408\_2/No.16

Which diagram shows lines of equipotential in steps of equal potential difference near an isolated point charge?

[1 mark]



**A**

**B**

**C**

**D**

9. June/2020/Paper\_7408\_2/No.17

A positive charge of  $2.0 \times 10^{-4} \text{ C}$  is placed in an electric field at a point where the potential is  $+500 \text{ V}$ .

What is the potential energy of the system?

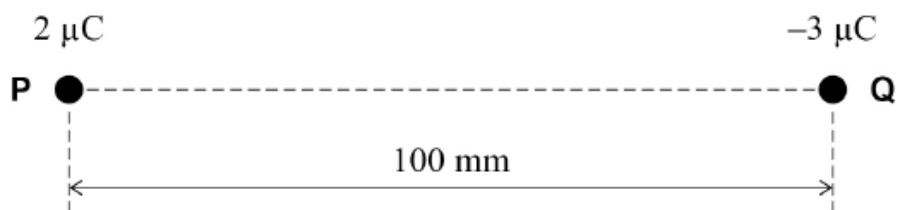
[1 mark]

- A  $1.0 \times 10^{-1} \text{ J}$
- B  $1.0 \times 10^{-1} \text{ J C}^{-1}$
- C  $4.0 \times 10^{-7} \text{ J}$
- D  $4.0 \times 10^{-7} \text{ J C}^{-1}$

10. June/2020/Paper\_7408\_2/No.18

Two charges **P** and **Q** are  $100 \text{ mm}$  apart.

**X** is a point on the line between **P** and **Q** where the electric potential is  $0 \text{ V}$ .



What is the distance from **P** to **X**?

[1 mark]

- A  $33 \text{ mm}$
- B  $40 \text{ mm}$
- C  $60 \text{ mm}$
- D  $67 \text{ mm}$