Electric Field - 2018

1. 9702/11/M/J/18/No.28

A particle has a charge of +2.0 mC and is in a vertical uniform electric field. An electric force of 1.0×10^{-2} N acts upwards on the particle.

What is the electric field strength?

A $0.20\,V\,m^{-1}$ downwards

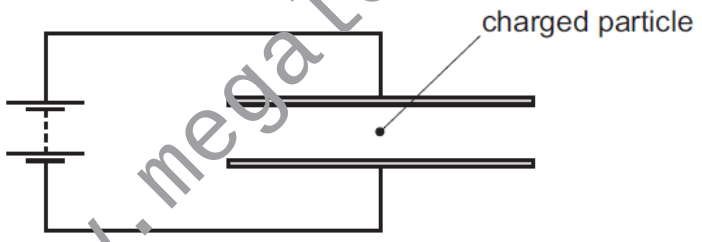
B $0.20\,V\,m^{-1}$ upwards

C $5.0\,V\,m^{-1}$ downwards

D $5.0\,V\,m^{-1}$ upwards

2. 9702/11/M/J/18/No.29

A charged particle is in the electric field between two horizontal metal plates connected to a battery, as shown. There is a force *F* on the particle due to the electric field.



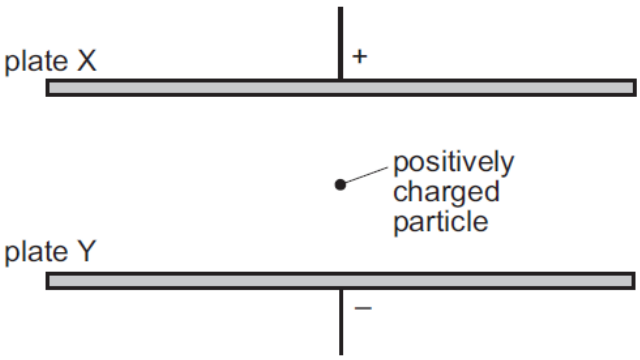
The separation of the plates is doubled.

What is the new force on the particle?

A $\frac{F}{4}$ **B** $\frac{F}{2}$ **C** F **D** $2F$

3. 9702/12/M/J/18/No.30

Two large parallel metal plates X and Y are situated in a vacuum as shown.



Plates X and Y carry equal and opposite charges.

What happens to the force on a positively charged particle as it moves from plate X to plate Y?

A It decreases because the positively charged particle is moving away from the positively charged plate.

B It decreases because the positively charged particle is moving in the direction of the electric field between the plates.

C It increases because the positively charged particle is moving closer to a negatively charged plate.

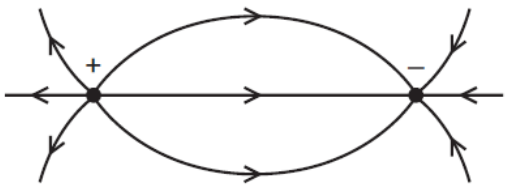
D It remains constant because the positively charged particle is in the uniform electric field between the plates.

4. 9702/12/M/J/18/No.31

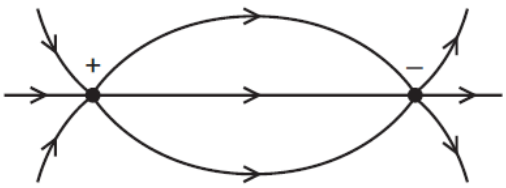
Four diagrams representing the electric field between two oppositely-charged point charges are shown.

Which diagram correctly shows the electric field lines?

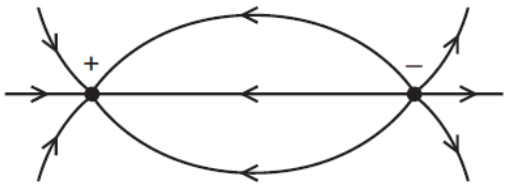
A



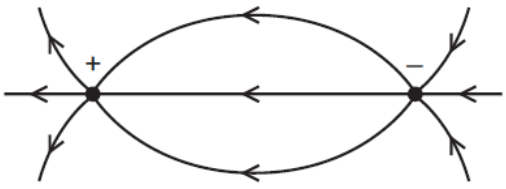
B



C

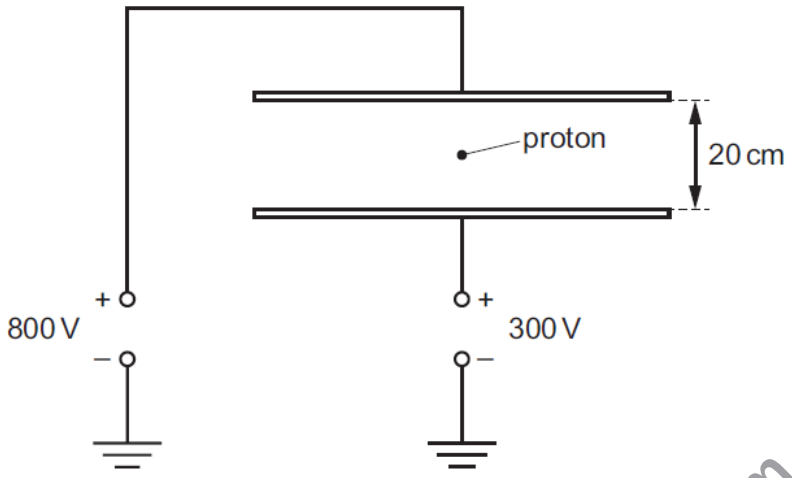


D



5. 9702/13/M/J/18/No.27

Two parallel metal plates are situated 20 cm apart in a vacuum. They are connected to two sources of potential difference as shown.



A proton is released in the space between the plates.

What is the magnitude and direction of the acceleration of the proton?

A $2.4 \times 10^{11}\,\text{m s}^{-2}$ downwards

B $2.4 \times 10^{11}\,\text{m s}^{-2}$ upwards

C $5.3 \times 10^{11}\,\text{m s}^{-2}$ downwards

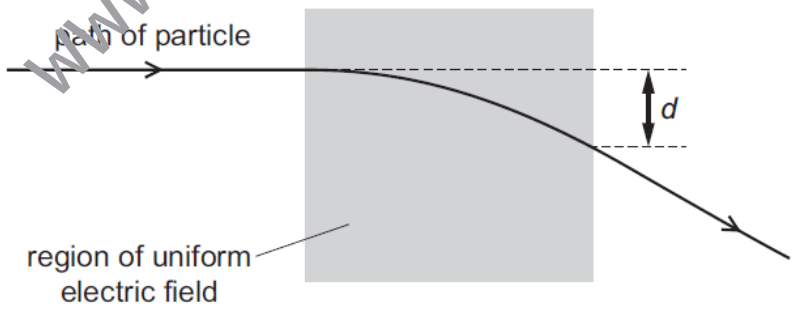
D $5.3 \times 10^{11}\,\text{m s}^{-2}$ upwards

6. 9702/13/M/J/18/No.28

A particle having mass m and charge $+q$ enters a uniform electric field with speed v.

Initially, the particle is travelling at right-angles to the electric field.

During its movement through the field, the particle is deflected through distance d, as shown.



A second particle of mass $2m$, charge $+q$ and speed v enters the electric field along the same path.

What is the distance through which this particle is deflected in the electric field?

A $\frac{d}{4}$ **B** $\frac{d}{2}$ **C** $2d$ **D** $4d$

7. 9702/13/M/J/18/No.29

What is a possible charge on a particle?

A 6.40×10^{-20} C

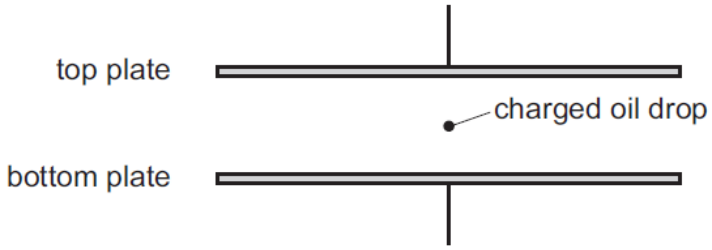
B 4.00×10^{-19} C

C 1.12×10^{-18} C

D 9.11×10^{-18} C

8. 9702/12/F/M/18/No.12

A charged oil drop is held stationary between two charged parallel plates.



Which forces act on the oil drop?

A both electric and gravitational

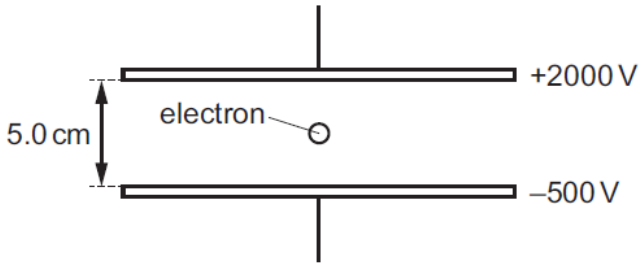
B electric only

C gravitational only

D neither electric nor gravitational

9. 9702/12/F/M/18/No.30

An electron passes into the space between two parallel plates that are 5.0 cm apart and which are maintained at electric potentials of +2000 V and –500 V, respectively.



What is the electric force on the electron?

A 1.6×10^{-15} N

B 4.8×10^{-15} N

C 6.4×10^{-15} N

D 8.0×10^{-15} N

10. 9702/12/F/M/18/No.31

Which statement about electric charges in a uniform electric field is **not** correct?

A Electric charges of the same magnitude, whether positive or negative, experience the same magnitude of force when placed in the same uniform electric field.

B The direction of the force on a positive charge placed in a uniform electric field is independent of the magnitude of the charge.

C The magnitude of the force on a positive charge placed in a uniform electric field is proportional to the magnitude of the electric field strength.

D The work done to move a positive charge a certain distance in a uniform electric field is independent of the direction of the movement.