

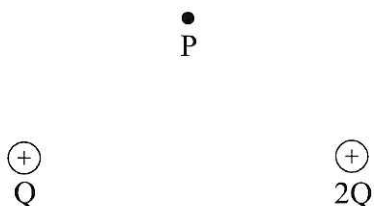
ELECTROSTATICS

PROVINCIAL EXAM ASSIGNMENT

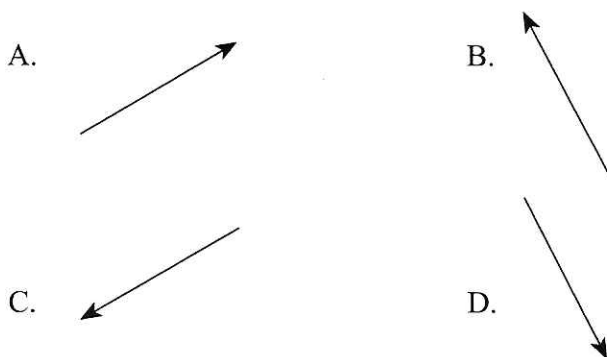
1. Which one of the following represents correct units for electric field strength?

- A. T
- B. N/C
- C. J/C
- D. $N \cdot m^2 / C^2$

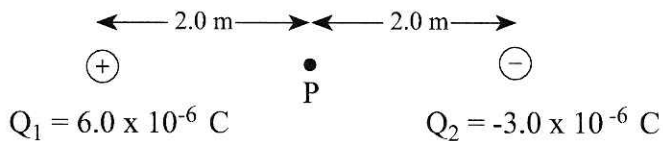
2. The diagram below shows two positive charges of magnitude Q and $2Q$.



Which vector **best** represents the direction of the electric field at point P, which is equidistant from both charges?



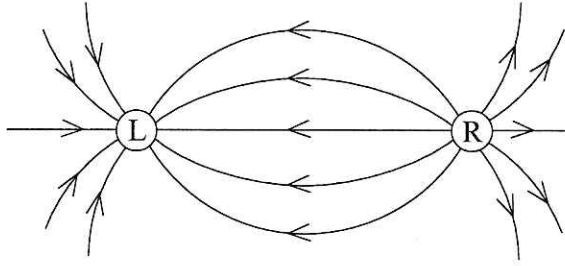
3. A $6.0 \times 10^{-6} \text{ C}$ charge is located 4.0 m from a $-3.0 \times 10^{-6} \text{ C}$ charge.



What is the electric potential at P, halfway between the charges?

- A. $-4.1 \times 10^{-2} \text{ V}$
- B. $6.8 \times 10^3 \text{ V}$
- C. $1.4 \times 10^4 \text{ V}$
- D. $4.1 \times 10^4 \text{ V}$

4. The diagram below shows the electric field near two point charges L and R.



What is the polarity of each charge?

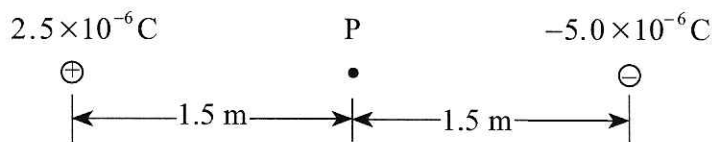
	CHARGE L	CHARGE R
A.	positive	positive
B.	positive	negative
C.	negative	positive
D.	negative	negative

5. The electric field 2.0 m from a point charge has a magnitude of 8.0×10^4 N/C. What is the strength of the electric field at a distance of 4.0 m?
- A. 2.0×10^4 N/C
B. 4.0×10^4 N/C
C. 1.6×10^5 N/C
D. 3.2×10^5 N/C
6. When a charge is accelerated through a potential difference of 500 V, its kinetic energy increases from 2.0×10^{-5} J to 6.0×10^{-5} J. What is the magnitude of the charge?
- A. 4.0×10^{-8} C
B. 8.0×10^{-8} C
C. 1.2×10^{-7} C
D. 1.6×10^{-7} C

7. What is the electric potential energy of an electron located 5.3×10^{-11} m from the proton in a hydrogen atom?
- A. -8.2×10^{-8} J
 B. -4.3×10^{-18} J
 C. -2.2×10^{-18} J
 D. -1.6×10^{-19} J
8. A negative charge in an electric field experiences a force accelerating it due south. What is the direction of the electric field?
- A. east
 B. west
 C. north
 D. south
9. A -2.3×10^{-6} C charge exerts a repulsive force of magnitude 0.35 N on an unknown charge 0.20 m away. What are the magnitude and polarity of the unknown charge?

	MAGNITUDE	POLARITY
A.	6.8×10^{-7} C	Negative
B.	6.8×10^{-7} C	Positive
C.	1.2×10^{-6} C	Negative
D.	1.2×10^{-6} C	Positive

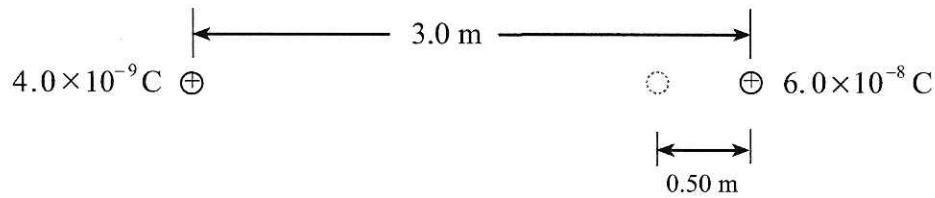
10. Two point charges, 2.5×10^{-6} C and -5.0×10^{-6} C, are placed 3.0 m apart as shown below.



What is the magnitude of the electric field at point P, midway between the two charges?

- A. 0 N/C
 B. 1.0×10^4 N/C
 C. 2.0×10^4 N/C
 D. 3.0×10^4 N/C

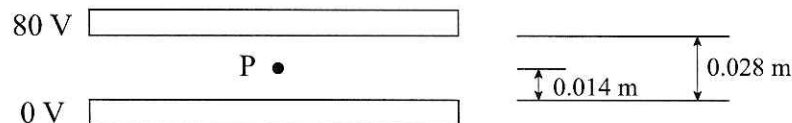
11. A $4.0 \times 10^{-9} \text{ C}$ charge is initially located 3.0 m from a stationary $6.0 \times 10^{-8} \text{ C}$ charge. How much work is required to move the $4.0 \times 10^{-9} \text{ C}$ charge to a point 0.50 m from the stationary charge?



- A. $6.0 \times 10^{-7} \text{ J}$
 B. $8.6 \times 10^{-7} \text{ J}$
 C. $3.6 \times 10^{-6} \text{ J}$
 D. $4.3 \times 10^{-6} \text{ J}$
12. Two parallel plates $4.0 \times 10^{-2} \text{ m}$ apart have a potential difference of 1000 V. An electron is released from the negative plate at the same instant that a proton is released from the positive plate. Which of the following best compares their speed and kinetic energy as they strike the opposite plate?

	SPEED OF ELECTRON AND PROTON	KINETIC ENERGY OF ELECTRON AND PROTON
A.	same	same
B.	same	different
C.	different	same
D.	different	different

13. Two long, parallel plates are separated by 0.028 m and have a potential difference between them of 80 V, as shown below.

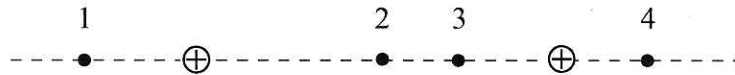


Point P is located midway between the plates. What is the potential difference between point P and one of the plates?

- A. 0 V
 B. 40 V
 C. 80 V
 D. 160 V

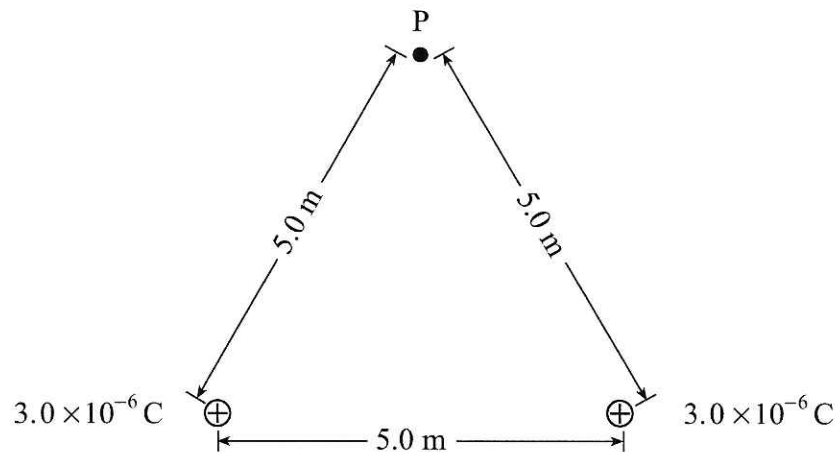
14. A particle with a charge of $2.4 \times 10^{-5} \text{ C}$ is accelerated from rest through a potential difference of $6.2 \times 10^4 \text{ V}$. If the final speed of this particle is $9.3 \times 10^3 \text{ m/s}$, what is the mass of the particle?
- A. $7.7 \times 10^{-10} \text{ kg}$
 B. $5.2 \times 10^{-9} \text{ kg}$
 C. $3.4 \times 10^{-8} \text{ kg}$
 D. $1.5 \times 10^{-1} \text{ kg}$

15. Two positive charges, equal in magnitude, are separated as shown below.



In which location would the electric field strength be zero?

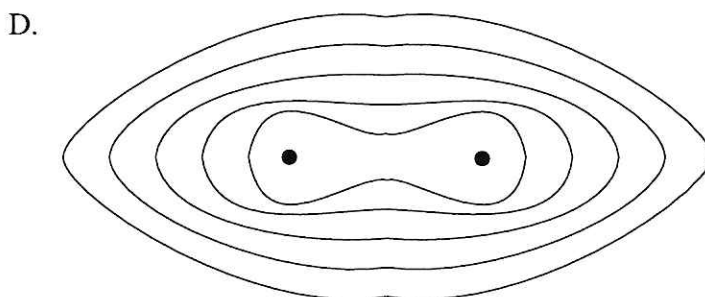
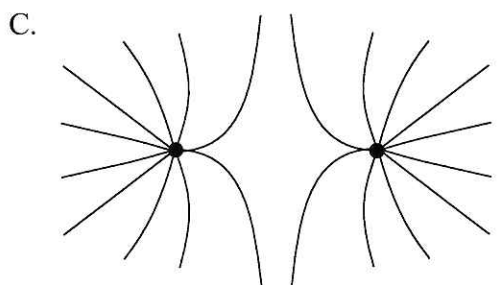
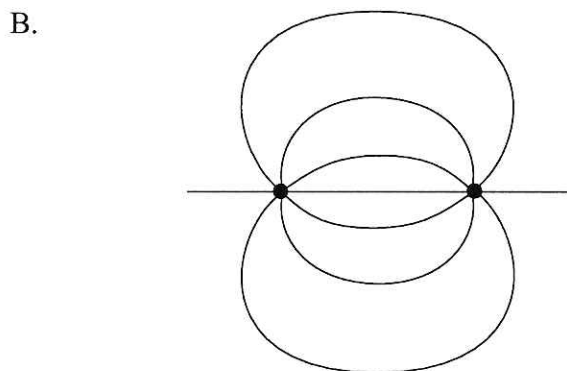
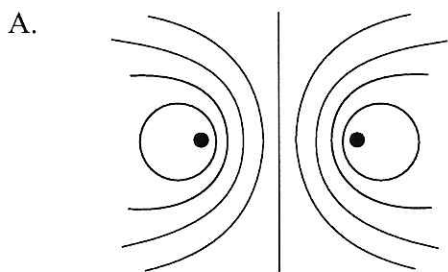
- A. 1
 B. 2
 C. 3
 D. 4
16. An electron is positioned in an electric field. The force on the electron due to the electric field is equal to the force of gravity on the electron. What is the magnitude of this electric field?
- A. $8.93 \times 10^{-30} \text{ N/C}$
 B. $5.69 \times 10^{-12} \text{ N/C}$
 C. $5.58 \times 10^{-11} \text{ N/C}$
 D. $1.44 \times 10^{-9} \text{ N/C}$
17. Two $3.0 \times 10^{-6} \text{ C}$ point charges are placed 5.0 m apart as shown below.



What is the potential at point P due to the two charges?

- A. 0 V
 B. $5.4 \times 10^3 \text{ V}$
 C. $7.6 \times 10^3 \text{ V}$
 D. $1.1 \times 10^4 \text{ V}$

18. Which of the following diagrams best shows the electric field between two equal negative charges?



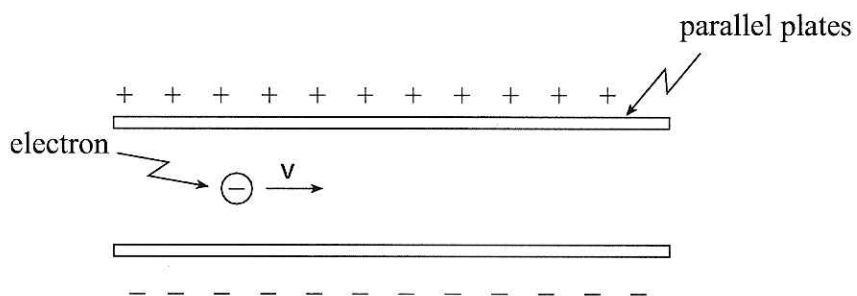
19. In a hydrogen atom, the electron and proton are separated by a distance of 5.3×10^{-11} m. What is the electric force exerted on the proton by the electron?

- A. 0 N
- B. 4.4×10^{-18} N
- C. 8.2×10^{-8} N
- D. 1.0×10^{12} N

20. A 2.5 C charge is moved from a point with a potential of 12 V to another point of potential 75 V. How much work was done on this charge?

- A. 30 J
- B. 160 J
- C. 180 J
- D. 220 J

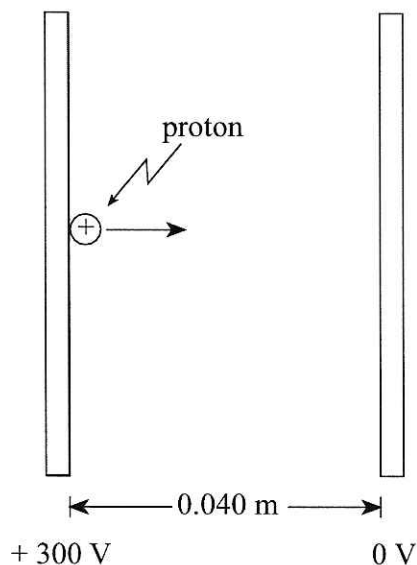
21. An electron is travelling in an electric field as shown.



Describe the electrostatic force acting on the electron while in the field.

	MAGNITUDE OF FORCE	DIRECTION OF FORCE
A.	Changing	Upward
B.	Changing	Downward
C.	Constant	Upward
D.	Constant	Downward

22. A proton initially at rest is accelerated between parallel plates through a potential difference of 300 V.



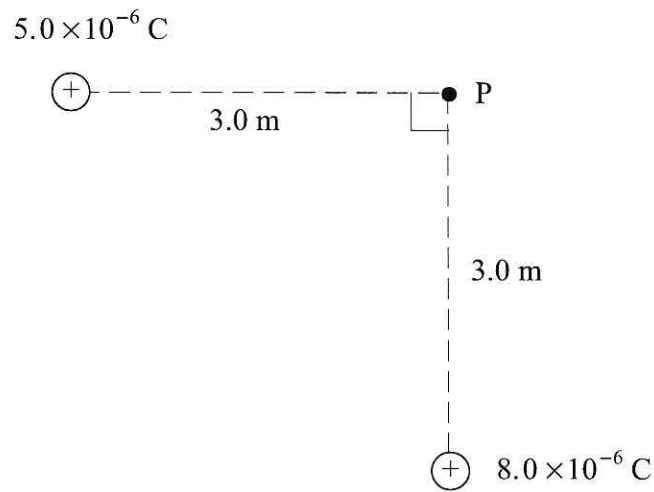
What is the maximum speed attained by the proton?

- A. $7.5 \times 10^3 \text{ m/s}$
- B. $1.7 \times 10^5 \text{ m/s}$
- C. $2.4 \times 10^5 \text{ m/s}$
- D. $1.2 \times 10^6 \text{ m/s}$

23. An electron experiences an electric force of $1.8 \times 10^{-11} \text{ N}$ at a distance of $5.0 \times 10^{-9} \text{ m}$ from the nucleus of an ion. The electron is moved farther away, to a distance of $2.0 \times 10^{-8} \text{ m}$ from the ion. What is the new electric force on the electron?

- A. $1.1 \times 10^{-12} \text{ N}$
- B. $4.5 \times 10^{-12} \text{ N}$
- C. $7.2 \times 10^{-11} \text{ N}$
- D. $2.9 \times 10^{-10} \text{ N}$

24. What is the magnitude of the electric field at point P due to the two fixed charges as shown?

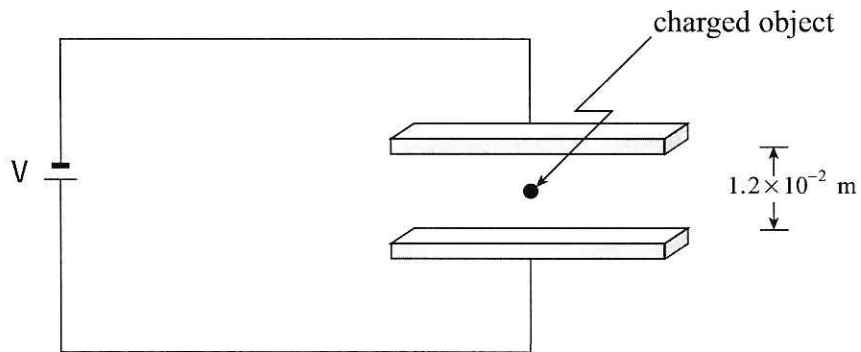


- A. $3.0 \times 10^3 \text{ N/C}$
- B. $9.4 \times 10^3 \text{ N/C}$
- C. $1.3 \times 10^4 \text{ N/C}$
- D. $3.9 \times 10^4 \text{ N/C}$

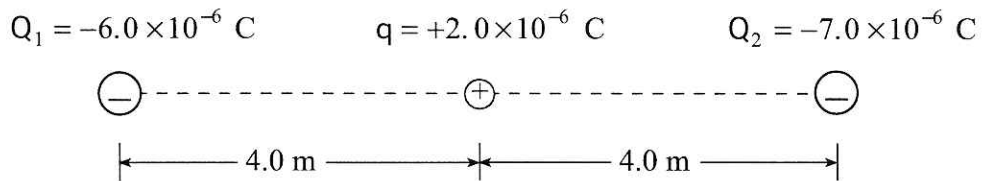
25. Which of the following is an equivalent unit for the volt?

- A. $\frac{\text{C}}{\text{s}}$
- B. $\frac{\text{J}}{\text{C}}$
- C. $\frac{\text{N}}{\text{C}}$
- D. J

26. An object with a charge of $+4.0 \times 10^{-18}$ C and a mass of 1.1×10^{-15} kg is held stationary by balanced gravitational and electric forces midway between horizontal charged plates as shown. What is the applied voltage V ?



- A. 16 V
 B. 32 V
 C. 65 V
 D. 2.7×10^2 V
27. What are the magnitude and direction of the electric force on the $+2.0 \times 10^{-6}$ C charge shown below?



	MAGNITUDE OF FORCE	DIRECTION OF FORCE
A.	1.1×10^{-3} N	Left
B.	1.1×10^{-3} N	Right
C.	1.5×10^{-3} N	Left
D.	1.5×10^{-3} N	Right