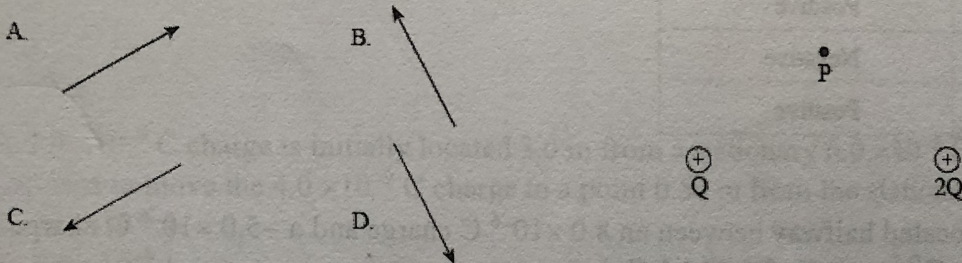


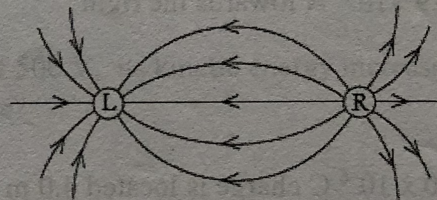
Electrostatics Review

1. 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?



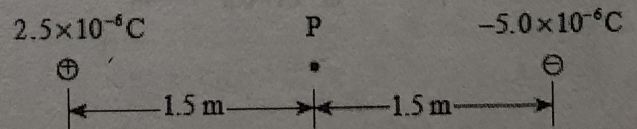
2. The diagram below shows the electric field near two point charges L and R. What is the polarity of each charge?

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

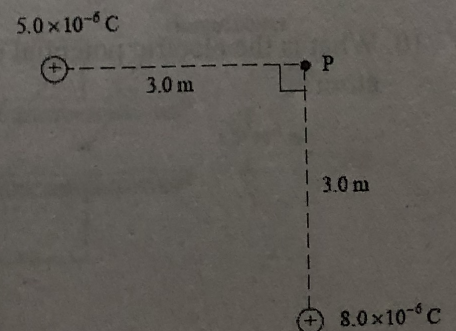


3. The electric field 2.0 m from a point charge has a magnitude of 8.0×10^4 N/C. What is the strength of the electric field at a distance of 4.0 m?

4. 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?



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



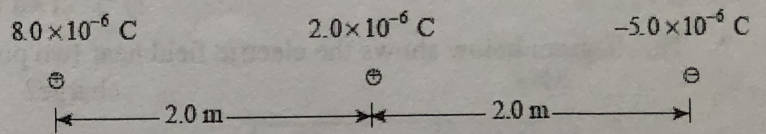
PHYSICS 12

6. 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

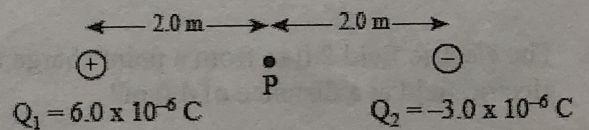
7. A 2.0×10^{-6} C charge is located halfway between an 8.0×10^{-6} C charge and a -5.0×10^{-6} C charge as shown below. Find the net force on the 2.0×10^{-6} C charge.

- A. 1.4×10^{-2} N towards the left
 B. 1.4×10^{-2} N towards the right
 C. 5.9×10^{-2} N towards the left
 D. 5.9×10^{-2} N towards the right

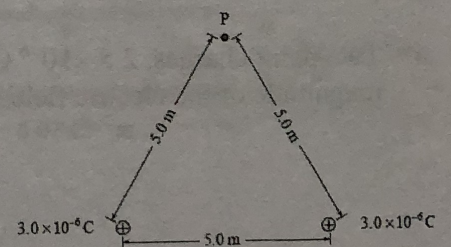


8. A 6.0×10^{-6} C charge is located 4.0 m from a -3.0×10^{-6} C charge. What is the electric potential at P, halfway between the charges?

- A. -4.1×10^{-2} V
 B. 6.8×10^3 V
 C. 1.4×10^4 V
 D. 4.1×10^4 V



9. Two 3.0×10^{-6} C point charges are placed 5.0 m apart as shown below. What is the potential at point P due to the two charges?



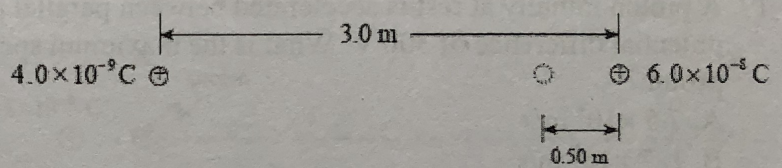
10. What is the electric potential energy of an electron located 5.3×10^{-11} m from the proton in a hydrogen atom?

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11. 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?

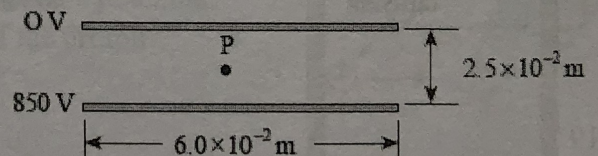
12. A $4.0 \times 10^{-9} \text{ C}$ charge is initially located 3.0 m from a stationary $6.0 \times 10^{-8} \text{ C}$ charge. How much work is required to move the $4.0 \times 10^{-9} \text{ C}$ charge to a point 0.50 m from the stationary charge?

- 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. $4.3 \times 10^{-6} \text{ J}$

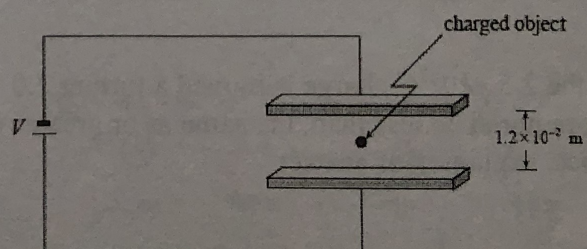


13. When a charge is accelerated through a potential difference of 500 V , its kinetic energy increases from $2.0 \times 10^{-5} \text{ J}$ to $6.0 \times 10^{-5} \text{ J}$. What is the magnitude of the charge?

14. Two parallel plates $6.0 \times 10^{-2} \text{ m}$ long are separated by $2.5 \times 10^{-2} \text{ m}$ and have a potential difference of 850 V . Point **P** is located midway between the two plates as shown below. What is the magnitude of the electric field at point **P**?



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



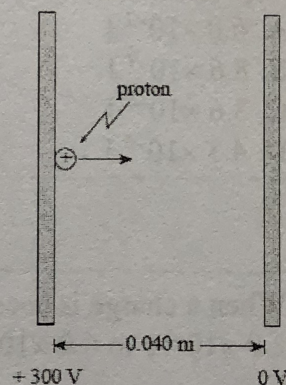
PHYSICS 12

16. Two parallel plates $4.0 \times 10^{-2} \text{ m}$ apart have a potential difference of 1 000 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

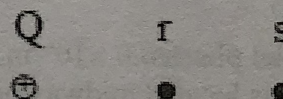
17. A proton initially at rest is accelerated between parallel plates through a potential difference of 300 V. What is the maximum speed attained by the proton?

- 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. $1.2 \times 10^6 \text{ m/s}$

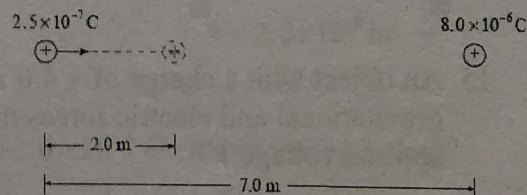


18. The diagram below shows a positive point charge Q. Which of the following describes the magnitude and direction of the electric field at points r and s?

	Magnitude of field at r and s	Direction of field at r and s
A.	same	away from Q
B.	same	towards Q
C.	different	away from Q
D.	different	towards Q



19. a) A $2.5 \times 10^{-7} \text{ C}$ charge is initially located 7.0 m from a fixed $8.0 \times 10^{-6} \text{ C}$ charge. What is the minimum amount of work required to move the $2.5 \times 10^{-7} \text{ C}$ charge 2.0 m closer as shown?



- b) If the $2.5 \times 10^{-7} \text{ C}$ charge is moved a further 2.0 m closer to the $8.0 \times 10^{-6} \text{ C}$ charge, will the additional work required be less than, the same as or greater than the work required in (a)? Using principles of physics, explain your answer.

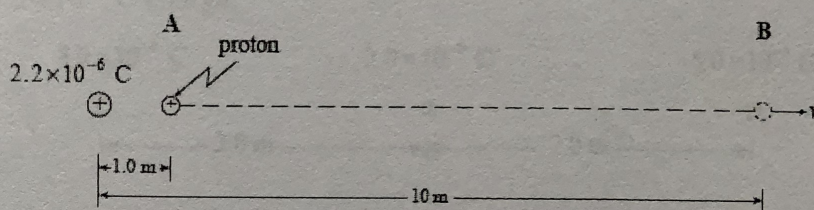
PHYSICS 12

20. 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?

21. 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?

22. A proton is located at A, 1.0 m from a fixed $+2.2 \times 10^{-6}$ C charge.

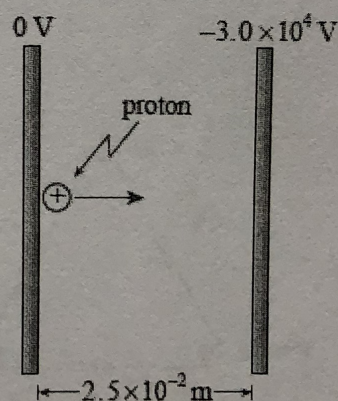
a) What is the change in potential energy of the proton as it moves to B, 10 m from the fixed charge?



b) If the proton started from rest at A, what would be its speed at B?

23. A proton is accelerated from rest between parallel plates with a potential difference of 3.0×10^4 V. What is the maximum speed of the proton?

- A. 1.3×10^1 m/s
- B. 3.8×10^5 m/s
- C. 2.4×10^6 m/s
- D. 1.5×10^7 m/s



24. 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

