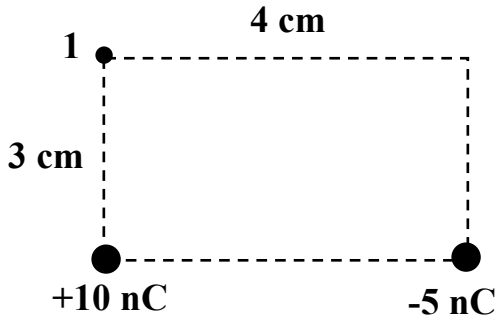
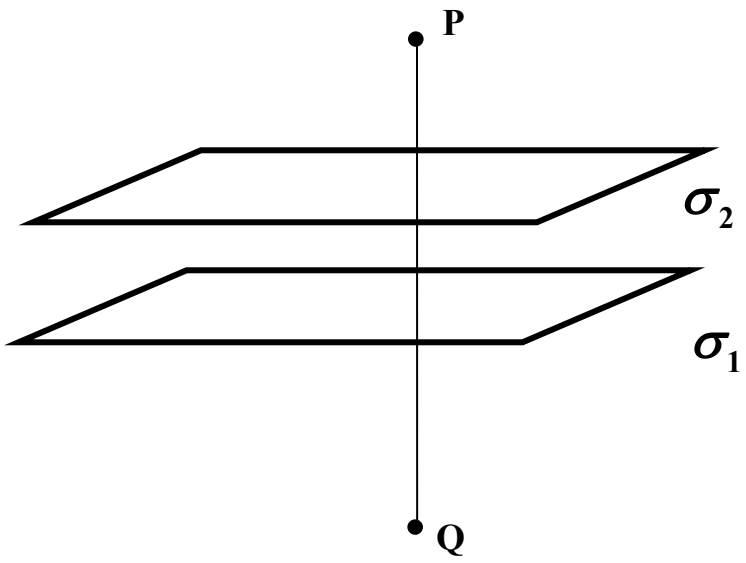
Exam 2 (practice problems)

1. What is the magnitude of electric field at point 1?



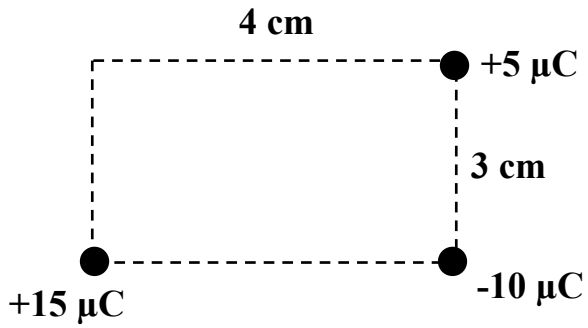
$9x10^4$ N/C

2. What is the magnitude of electric field at point P due to nonconducting infinite planes with uniform charge densities $\sigma_1 = -5\frac{\mu C}{m^2}$, $\sigma_2 = 2\frac{\mu C}{m^2}$ and point charge $Q = +10\mu C$ placed at point Q. The distance between points P and Q is 0.5 m. Line, connecting points Q and P, is orthogonal to the planes.



$1.9x10^5$ N/C

3. Find potential energy of a system of three points charges shown in the figure.

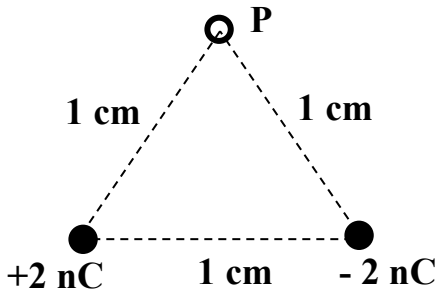


-48.7 J

4. Two 1.0 g beads, each charged to +5.0 nC, are 2.0 cm apart. A 2.0 g bead charged to -10 nC is exactly halfway between them. The beads are released from the rest. What are the speeds of the positive beads, when they are 4 cm apart?

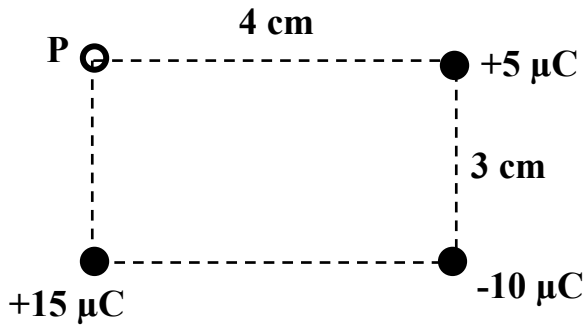
0.22 m/s

5. What is the magnitude of electric field at point P?



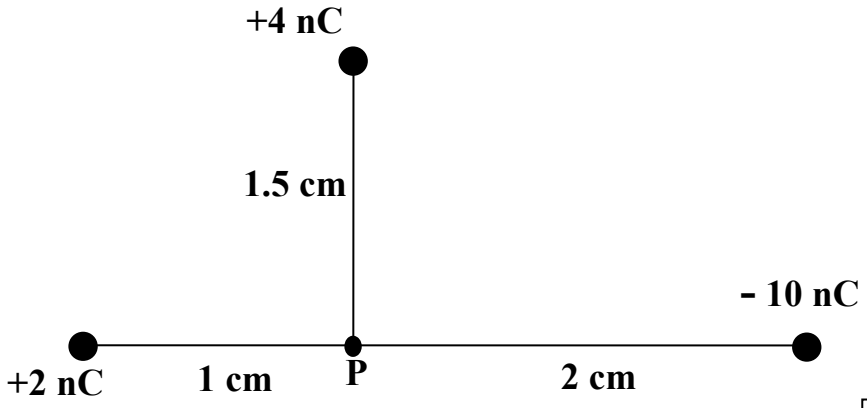
180000 N/C

6. Find the magnitude of electric field at point P.



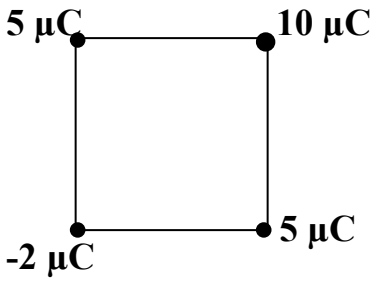
1.28×10^8 N/C

7. What is the electric potential at point P?



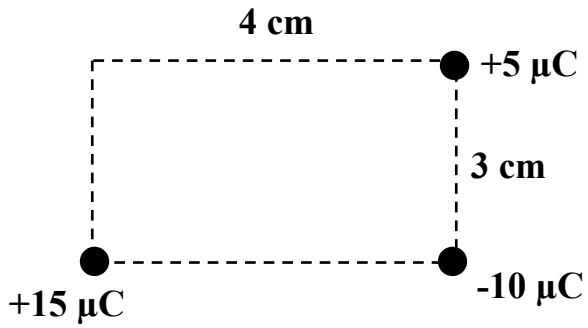
-300 V

8. Four particles 5 µC, 5 µC, -2 µC and 10 µC are placed at the vertices of a square of side 20 cm. The particle with charge 10 µC and mass 200 g is released from the rest. How fast will this particle be moving when it will be at an infinite distance from the other particles.



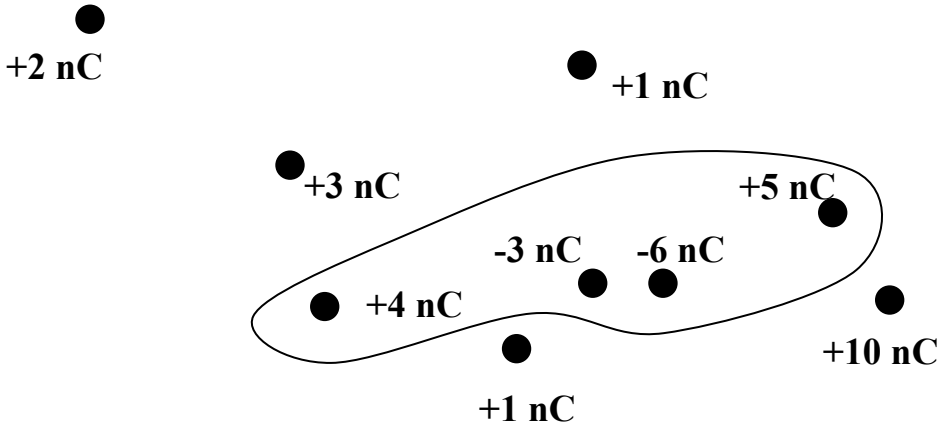
6.2 m/s

9. Find the potential energy of a system of three points charges shown in the figure.



-35.25 J

10. What is the electric flux through the surface?



0

11. Point charge ***q*** is placed at the center of insulating uniformly charged sphere of radius ***R=80 cm*** and total charge ***Q=-10 μC***. The electric potential at distance ***r = 50 cm*** from the center of the sphere is 0. What is the value of the charge ***q***?

8.15 *μC*