1. The units of potential difference are

A. J
B. J/C
C. V/m
D. N/C

Answer

1. The units of potential difference are

   A. J

   B. J/C

   C. V/m

   D. N/C

2. What are the units of the electric field?

A. V/C
B. N/C
C. V/m
D. J/C
E. Ω/m

Answer

2. What are the units of the electric field?

A. V/C
B. N/C
C. V/m
D. J/C
E. Ω/m

3. The electric potential inside a parallel-plate capacitor

A. is constant.
B. increases linearly from the negative to the positive plate.
C. decreases linearly from the negative to the positive plate.
D. decreases inversely with distance from the negative plate.
E. decreases inversely with the square of the distance from the negative plate.

Answer

3. The electric potential inside a parallel-plate capacitor

A. is constant.

B. increases linearly from the negative to the positive plate.

C. decreases linearly from the negative to the positive plate.

D. decreases inversely with distance from the negative plate.

E. decreases inversely with the square of the distance from the negative plate.

4. The electric field

A. is always perpendicular to an equipotential surface.
B. is always tangent to an equipotential surface.
C. always bisects an equipotential surface.
D. makes an angle to an equipotential surface that depends on the amount of charge.

Answer

4. The electric field

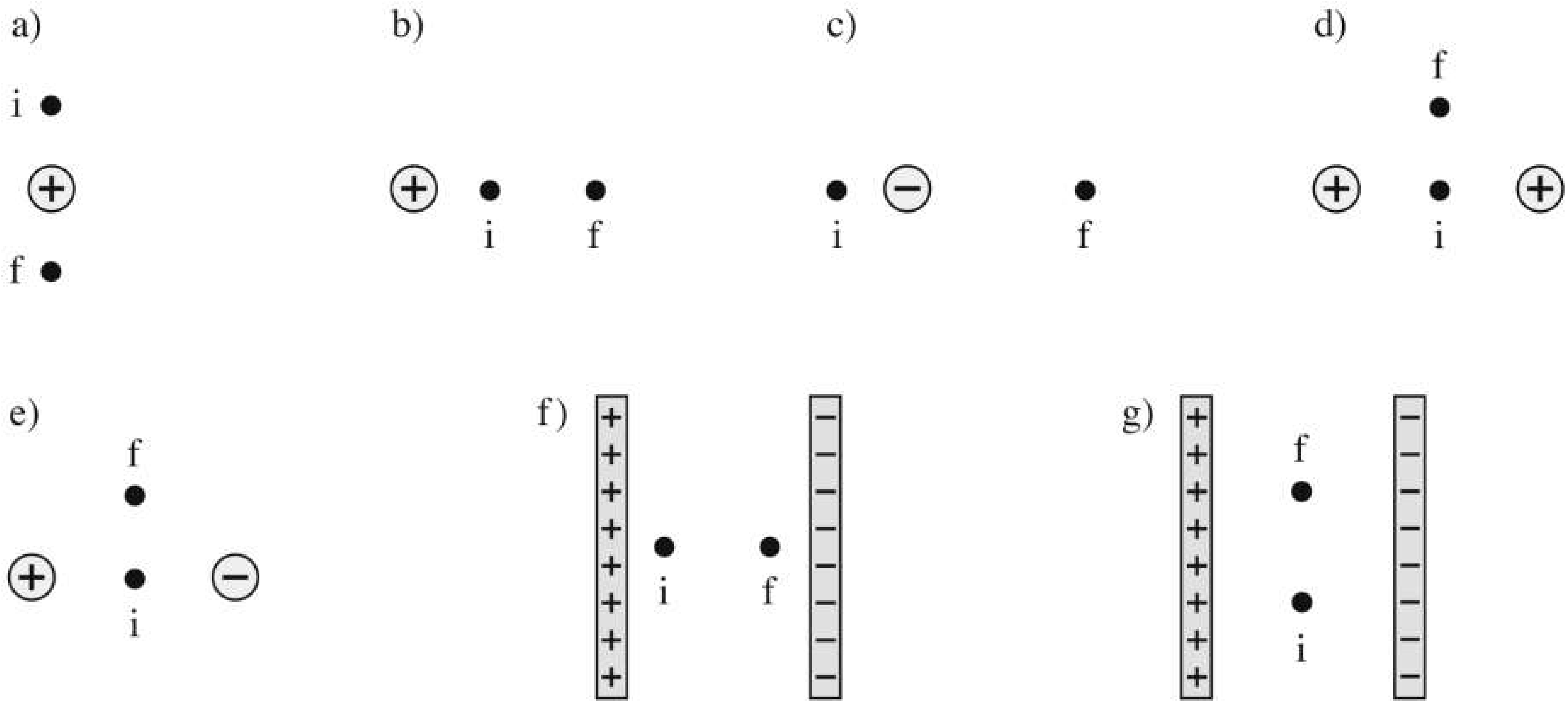
A. is always perpendicular to an equipotential surface.

B. is always tangent to an equipotential surface.

C. always bisects an equipotential surface.

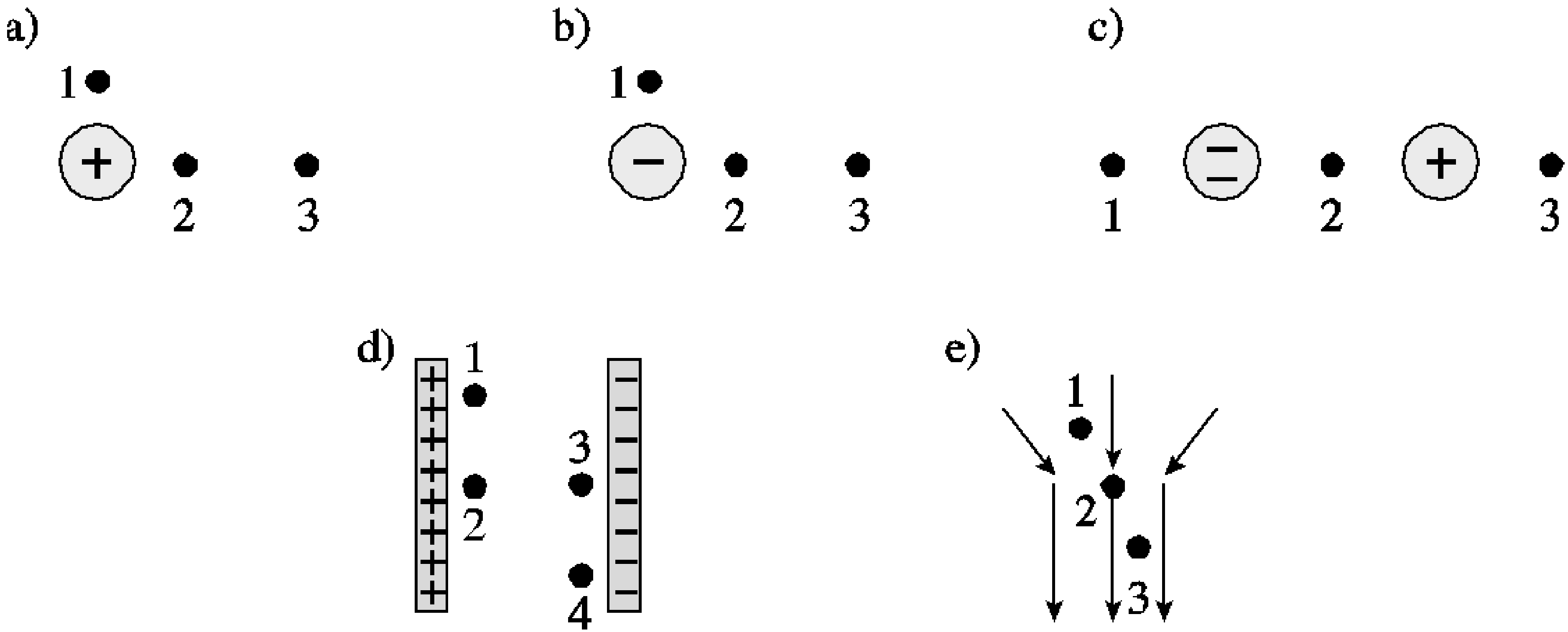
D. makes an angle to an equipotential surface that depends on the amount of charge.

Example Problem



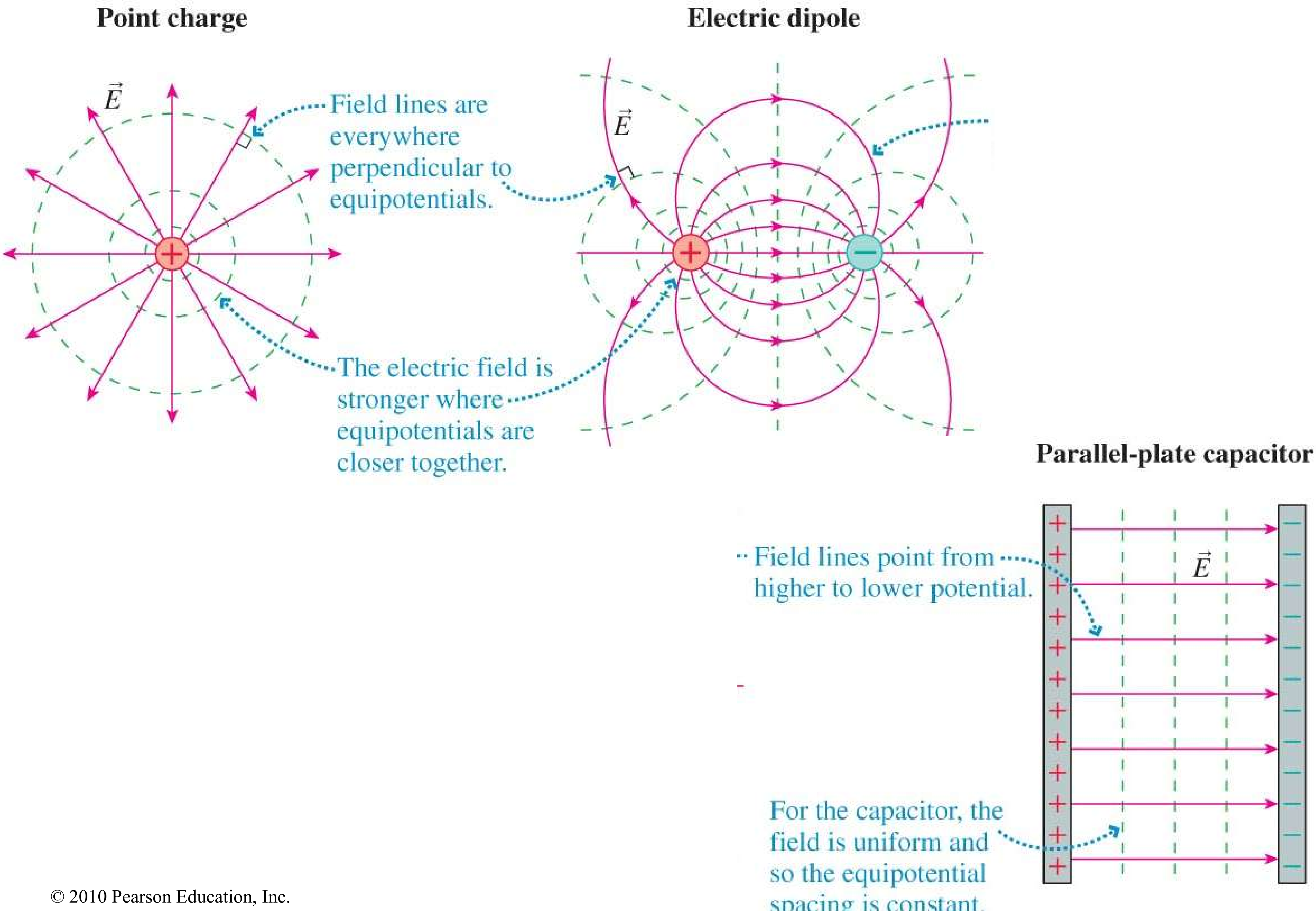
Is the change in potential energy, ΔU, of a positive particle increasing, decreasing, or staying the same as it moves from points i to f?

Conceptual Example Problem

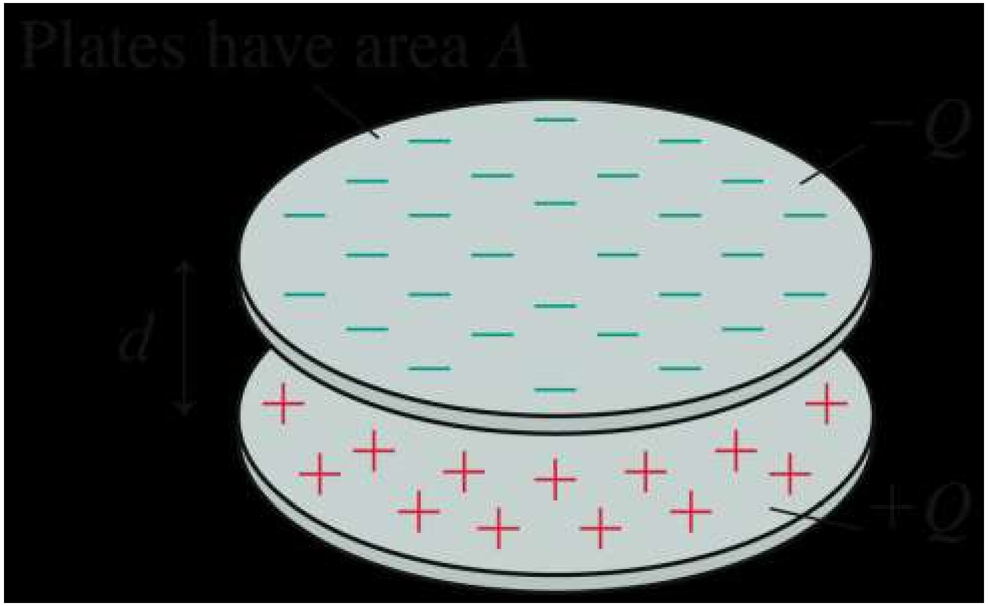


Rank in order, from largest to smallest, the electric potentials at the numbered points.

Potential and Field for Three Important Cases



The Capacitance of a Parallel-Plate Capacitor



$$Q = C\,\Delta V_C$$

$$C = \frac{\epsilon_0 A}{d}$$

Capacitance of a parallel-plate capacitor with plate area A and separation d

good for?

Store Energy

That can be quickly released

Energy stored in a Capacitor

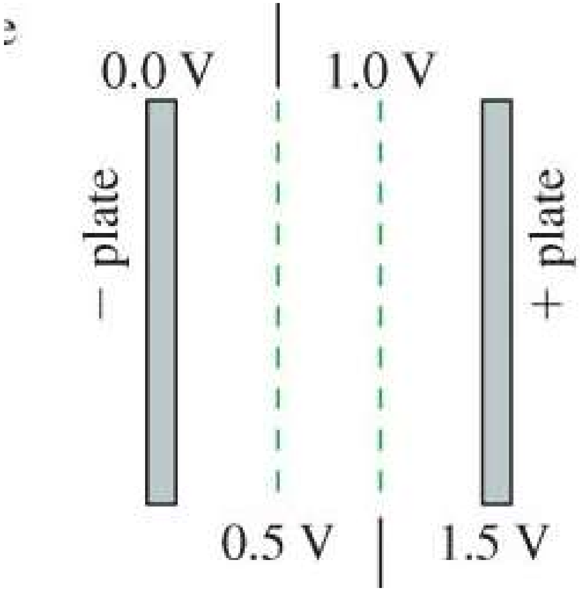
$U_C = Q\Delta V_{\text{average}}$

What would V_{average} be?

$\Delta V_{\text{average}}$ *is* $0 + \Delta V = ½\ \Delta V$

$U_C = ½\ Q\Delta V_C$

$\boldsymbol{Q = C\ \Delta V_C}$



Energy stored in a Capacitor

$U_C = ½\, Q \Delta V_C$

Plug in $\boldsymbol{Q = C\, \Delta V_C}$

$U_C = ½\, C(\Delta V_C)^2$

$$U_C = ½\, Q\Delta V_C = ½\, C(\Delta V_C)^2 = ½\, Q^2/C$$