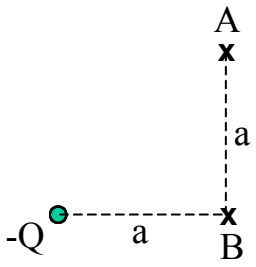
Name: _____ Sec. _____ **P212: Quiz 2 Week 4**

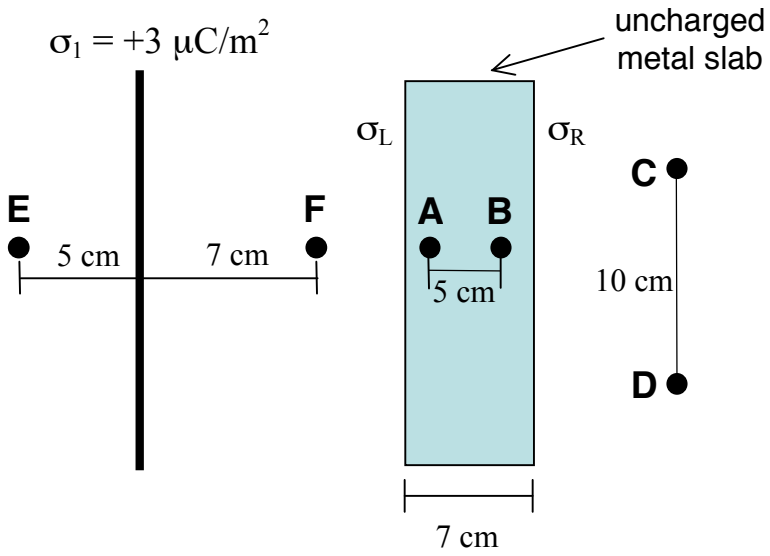
1) What is the sign of the potential difference between points A and B in the diagram below? (The charge $-Q$ is negative.) **[4]**



(a) $V_A - V_B < 0$ (b) $V_A - V_B = 0$ **(c) $V_A - V_B > 0$**

Rubric:
Correct answer (4)

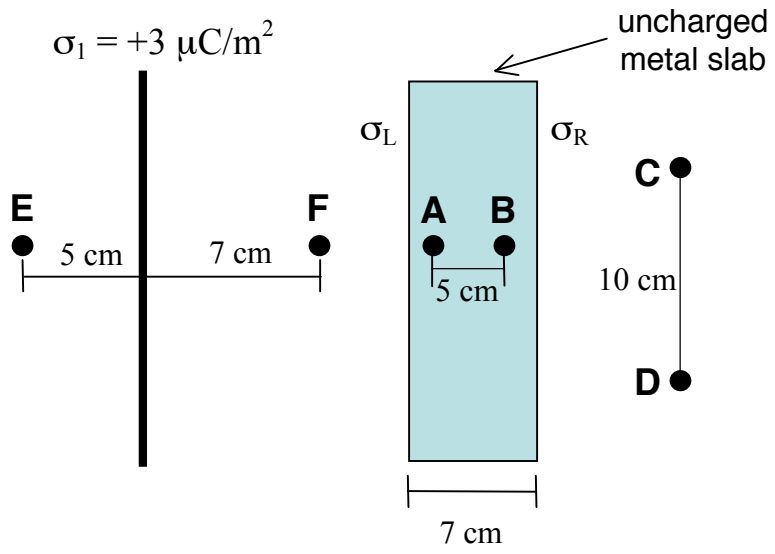
The picture below shows an infinite plane with uniform charge density $\sigma_1 = +3\ \mu C/m^2$ to the left of an uncharged metal block of infinite area and width 7 cm.



2) What is the potential difference $V_{CD} = V_C - V_D$ between points **C** and **D** which are separated by 10 cm in the vertical direction? Provide a brief but clear argument supporting your answer. **[4]**

The electric fields are in x, $E_y = 0$ so $V_{CD} = 0$

Rubric:
$V_{CD} = 0$ (2)
Explanation (2)



3) What is the potential difference $V_{AB} = V_B - V_A$ between points **A** and **B** inside the conducting slab? **[4]**

E=0 inside the conductor, so $V_{AB} = 0$

Rubric:
Correct answer $V_{AB} = 0$ (4)

4) What is the potential difference $V_{EF} = V_F - V_E$ between points **F** and **E**? **[8]**

from E to the slab S: $V_{ES} = 0.05 * E$
from the slab S to F: $V_{SF} = -0.07 * E$
since the field is opposite on the two sides of the slab
$V_{EF} = V_{ES} + V_{SF} = - 0.02*E$
$E = \sigma_1/2\varepsilon_0$
$V_{EF} = -3390$ V

Rubric:
Setup problem, 2 regions, etc (2)
Signs (2)
E-field (2)
Correct value plugged in for V_{EF} (2)