ECE110 - Quiz #2

Only non-programmable calculators are allowed.
Duration: 30 Minutes

First Name: _____ *Last Name:* _____

*Student #:*_____ *Tutorial Section:* _____

Following figure shows a parallel-plate capacitor with an area of $A = 0.12m^2$ and a separation of $d = 1.2cm$. The capacitor is charged to a voltage of $120V$ by a battery and then the battery is disconnected. After charging the capacitor a dielectric slab of thickness $b = 4mm$ with a dielectric constant of $\kappa = 4.8$ is inserted symmetrically between the plates as shown.
Determine:

a) Capacitance before the slab was inserted. *[1 Mark]*
b) Capacitance with the slab in place. *[1 Mark]*
c) Total charge before and after the slab is inserted. *[1.5 Marks]*
d) Potential difference across this capacitor. *[1.5 Marks]*