## PHYSICS 507

$3^{\text {rd }}$ HOMEWORK-SPRING 2020 Solutions
Dr. V. Lempesis
Hand in: Sunday $\mathbf{1 6}^{\text {th }}$ of March 2020, time: 23:59

1. Two concentric spherical shells have radii $a, b:(a<b)$. The two shells have opposite charges $+Q,-Q$ and the space between is empty. This is a spherical capacitor. Find:
(i) The electric field in the area between the two shells.
(ii) The potential difference between the two shells.
(iii) The capacitance of the capacitor
(iv) The capacitance expression when $b-a \ll a$.
(v) The capacitance when $b$ is very large.
(vi) The energy of the capacitor.
(12 points)
2. Find the potential in the region between the two semi-infinite charged planes which have a potential $V=0$. The planes are as shown in figure. The position of the charge is at $(a, b)$.
