Closed book. No calculators are to be used for this quiz.

Name: **Student ID:**   **Signature:**

Q. The capacitance of a parallel plate capacitor is given by $C = \epsilon_0 A/d$, where d is the plate separation and A is the plate area. When a conductor slab with the same area and unknown thickness is inserted (without touching) between the plates, the capacitance is measured to be $3C$. What is the thickness of the slab?

Hint: You can think of the system as two capacitors is series. (Why?)

PHYS 102: General Physics II - Spring 2017
Koç University, College of Sciences
Quiz 4 - March 6, 2017

Closed book. No calculators are to be used for this quiz.

Name: **Student ID:**   **Signature:**

Q. Two identical parallel-plate capacitors with capacitance C and charge Q on each are connected in parallel (such that they don't discharge after connection). Then, the distance between the plates of one capacitor is halved. Find the amount of charge transferred between the positive plates during the process.

Closed book. No calculators are to be used for this quiz.

Name: **Student ID:**   **Signature:**

Q. Two identical parallel-plate capacitors with capacitance C and charge Q each are connected in parallel (such that they don't discharge after connection). Then, the distance between the plates of one capacitor is doubled. Find the work done on the system during the process. Hint: Consider the energy stored.

Closed book. No calculators are to be used for this quiz.

Name: **Student ID:**   **Signature:**

Q. On a typical day, the electric field close to Earth's surface is approximately 150 V/m and the electric potential difference between the surface and the ionosphere (both good conductors) is 300,000 V.

(i) How much (negative) charge is stored on the Earth's surface?
(ii) What is the capacitance of the Earth-ionosphere system?

Take $R_{Earth} = 6000$ km and $1/4\pi\epsilon_0 = 9 \times 10^9$ m/F.