	YTÜ - Fen-Edebiyat Fakültesi FİZİK Bölümü			NOT TABLOSU				
				Q1	Q2	Q3	Q4	TOPLAM
Adı Soyadı								
Öğrenci Numarası		Grup No	1					
Bölümü				Sınav Tarihi		18.08.2021 11:00-14:00		
Dersin Adı	Classical Electromagnetic Theory 1 Midterm	Sınav Süresi	180 dak.	Sınav Yeri				
Dersi veren Öğretim Üyesinin Adı Soyadı	Çetin TAŞSEVEN			İmza				

YÖK nun 2547 sayılı Kanunun *Öğrenci Disiplin Yönetmeliğinin* 9. Maddesi olan *"Sınavlarda kopya yapmak ve yaptırmak veya buna teşebbüs etmek"* fiili işleyenler bir veya iki yarıyıl uzaklaştırma cezası alırlar.

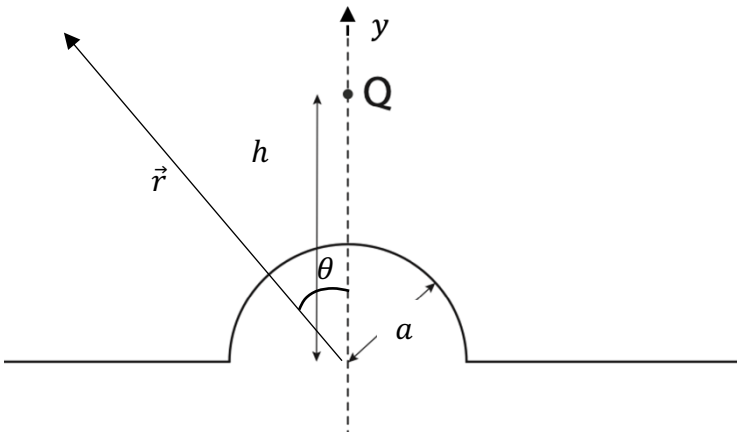
You must *show all* of *your work explicitly* and *clearly*, and must explain *your* reasoning to get full credit.

QUESTIONS

Q1. (25/100)

Consider an infinite plane grounded conductor with a hemispherical bump of radius a. A charge Q is placed distance of $y = h$ from the plane of the sheet, centered above the bump. Using method of images:

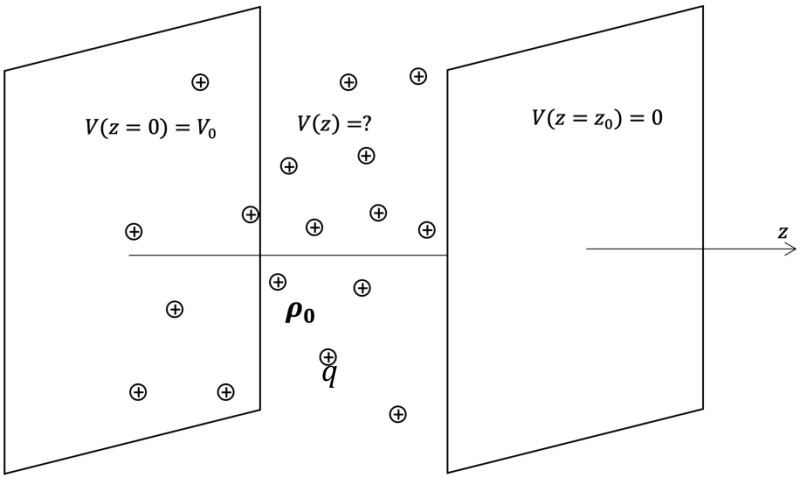
a) Find the image charge (or charges) and positions, that satisfy the boundary condition,
b) Find the potential above the conductor.
c) What is the electrostatic force on the charge.
d) What is the energy of the system.



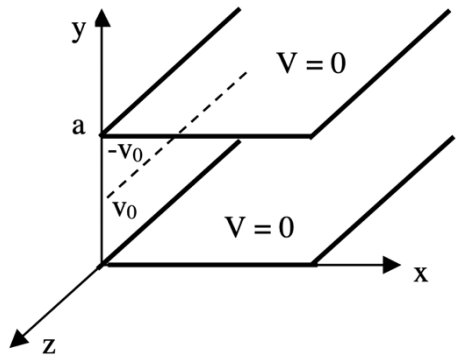
Q2. (25/100)

Two parallel plates at z=0 and z=z0 are at kept at potential of V0 and 0, respectively. The region between the plates contains a uniform charge ρ_0, which is generated at the left plate and collected at the right plate.

a) Find the potential between the plates. Hint: Solve Poisson's equation in one dimension for uniform charge density.
b) Find the electric field vector between plates.
c) Find the work requires to displace single charge from the left plate to the right plate using the definition $W = \int \vec{F} . \overrightarrow{dl}$.



Q3. (25/100) Two infinite grounded metal plates lie parallel to the xz plane, one at $y = 0$, the other at $y = a$. The left end, at $x = 0$, consists of two metal strips: one, from $y = 0$ to $y = a/2$, is held at a constant potential V_0, and the other, from $y = a/2$ to a, is at potential $-V_0$. Find the potential inside the infinite slot.



Q4. (25/100)

The potential $V(\theta) = V_0(\frac{1}{2}Cos\theta + Cos^2\frac{\theta}{2})$ is specified on the surface of a hollow sphere of radius R.

a) Find the potential inside the sphere $r \leq R$.

b) Find the potential outside $r \geq R$ the sphere.

c) Find the surface charge density of the sphere