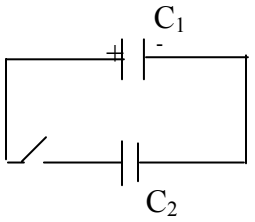
UNIVERSITY OF BAHRAIN
COLLEGE OF SCIENCE
PHYSICS DEPARTMENT

PHYCS 102
TEST 2

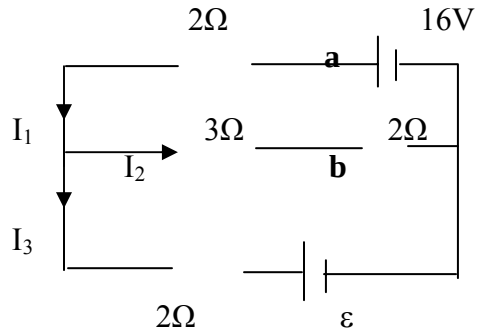
DATE: **28/11/2000** TIME:**55 MIN.**

NAME:	ID#:	SECTION:

Q1. A charged capacitor of Q =150 μc and C_1= 10 μF is connected to uncharged capacitor C_2 = 5 μF. Find the final charges on each capacitor.



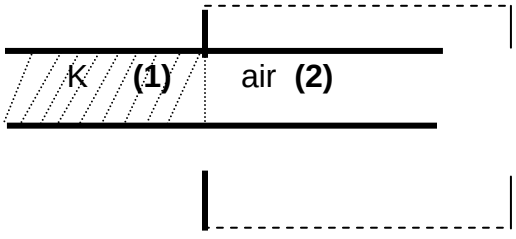
Q2. In the circuit shown $I_2 = 2A$. Find I_1, I_3, ε and V_{ab}



Q3. A parallel plate capacitor has a plate separation d = 1mm and a plate area A = 20 cm^2. Half of its volume is filled by a dielectric material of constant K=1.8. The plates are charged to a potential difference 100V. Find:

a) The capacitance .

b) The electric field inside the dielectric.

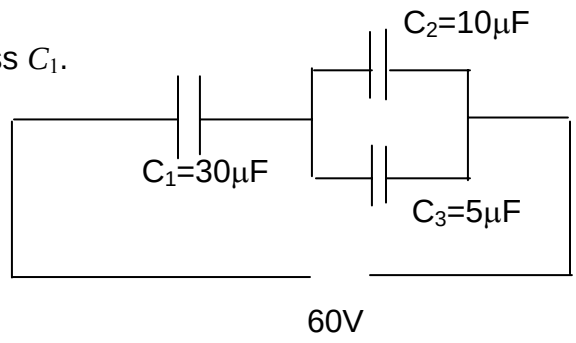


100V

Q4. For the system of capacitors shown in the figure find:

a) The equivalent capacitance.

b) The potential difference across C_1.



Q5. A 600W heater element is designed to operate on 220V. The element is made from Tungsten wire of diameter 0.5 mm. Calculate :

a) The heater resistance.

b) The current density in the wire.

c) The electric field in the wire.

d) The drift velocity of the electrons in the wire.

For Tungsten use:

Resistivity $\rho = 5.6\ \mu\Omega.cm$, Density $D = 19.25\ g/cm^3$,

Atomic mass = 184 g/mole. Consider Tungsten as a monovalent metal.

$N_{av} = 6.02 \times 10^{23}\ (mol)^{-1}$

$\varepsilon_o = 8.85 \times 10^{-12}\ C^2/N.m^2$

$e = 1.6 \times 10^{-19} C$

Good luck

3. A charged spherical shell of radius R has a total charge Q placed inside an uncharged conducting spherical shell that has an inner radius a and outer radius b. **Find :**

a) The electric field every where, i.e. in each region 1,2,3 and 4.

b) The induced surface charge densities on the inner and outer surfaces of the uncharged conducting spherical shell.