PY212 Conceptual Exercise 4

1) Consider a parallel plate capacitor with a separation between the plates “d”. The plates are pulled apart to a distance 2d while maintaining a constant potential difference between them. As the plates are pulled apart

a) The electric field between the plates
   [ ] increases   [ ] decreases   [ ] stays the same

b) The charge density of the plates
   [ ] increases   [ ] decreases   [ ] stays the same

c) The charge on each plate
   [ ] increases   [ ] decreases   [ ] stays the same

d) Capacitance of the system
   [ ] increases   [ ] decreases   [ ] stays the same

e) Work is done
   [ ] by the plates   [ ] on the plates

2) Three capacitors, labeled 1, 2, and 3, are placed in the circuit as shown. Their capacitances are:

C1 = 6 C
C2 = C
C3 = 2 C

(a) What is the equivalent capacitance of this set of capacitors?

(b) Rank the capacitors based on the charge they store, from largest to smallest.
(c) Rank the capacitors based on the potential difference across them, from largest to smallest.

(d) The capacitance of capacitor 3 is increased (one way to do this is to place a piece of insulating material, called a dielectric, between the plates). What happens to the charge stored on each capacitor?

Q1: [ ] increases [ ] decreases [ ] stays the same
Q2: [ ] increases [ ] decreases [ ] stays the same
Q3: [ ] increases [ ] decreases [ ] stays the same