**PHYS 202 … Practice Problems**

**Capacitors Part A**

1. A parallel plate vacuum filled capacitor is made using two 3.00 cm2 plates that are separated by 0.840 mm. What is the capacitance of this capacitor?
2. A parallel plate vacuum filled capacitor is made using two square plates that measure 2.40 cm on each side. The plates are separated by 1.10 mm. What is the capacitance of this capacitor?

1. A parallel plate vacuum filled capacitor is made using two rectangular plates that measure 3.10 cm by 4.60 cm. The plates are separated by 1.30 mm. What is the capacitance of this capacitor?
2. A parallel plate vacuum filled capacitor is made using two circular plates that have a radius of 4.00 cm. The plates are separated by 0.950 mm. What is the capacitance of this capacitor?

1. A cylindrical capacitor is made from two 5.00 cm long metal cylinders. The outer cylinder has a radius of 3.20 cm and the inner cylinder has a radius of 2.50 cm. If the capacitor is vacuum filled, what is its capacitance?
2. A cylindrical capacitor is made from two 5.00 cm long metal cylinders. The outer cylinder has a diameter of 3.20 cm and the inner cylinder has a diameter of 2.50 cm. If the capacitor is vacuum filled, what is its capacitance?

1. A spherical capacitor is made from two concentric spheres. The outer sphere has a radius of 3.20 cm and the inner sphere has a radius of 2.50 cm. If the capacitor is vacuum filled, what is its capacitance?
2. A spherical capacitor is made from two concentric spheres. The outer sphere has a diameter of 3.20 cm and the inner sphere has a diameter of 2.50 cm. If the capacitor is vacuum filled, what is its capacitance?

1. A 45.0 nF capacitor has a charge of 6.70 nC on its positive plate and – 6.70 nC on its negative plate. What is the potential difference between the two plates?
2. A 45.0 pF capacitor has a charge of 75.0 nC on its positive plate and – 75.0 nC on its negative plate. What is the potential difference between the two plates?

1. A capacitor has a charge of 75.0 nC on its positive plate and – 75.0 nC on its negative plate. The potential difference between the two plates is 6.80 V. What is the capacitance of this capacitor?
2. A capacitor has a charge of 5.50 nC on its positive plate and – 5.50 nC on its negative plate. The potential difference between the two plates is 12.8 V. What is the capacitance of this capacitor?

1. The plates of a 45.0 pF capacitor are at a potential difference of 34.5 V. How much potential energy is stored in this capacitor?
2. The plates of a 125 nF capacitor are at a potential difference of 14.5 V. How much potential energy is stored in this capacitor?

1. A capacitor is known to store 4.50 J of energy when connected to a potential difference of 65.0 V. What is the capacitance of this capacitor?
2. A capacitor is known to store 1.20 x 10 – 3 J of energy when connected to a potential difference of 6.50 V. What is the capacitance of this capacitor?

1. A parallel plate capacitor is made using two 6.20 cm2 plates that are separated by 0.880 mm of Polyethylene (K =

2.25). What is the capacitance of this capacitor?

1. A parallel plate capacitor is made using two square plates that measure 2.80 cm on each side. The plates are separated by 1.10 mm of Mylar (K = 3.10). What is the capacitance of this capacitor?

1. A parallel plate capacitor is made using two rectangular plates that measure 3.10 cm by 6.50 cm. The plates are separated by 1.30 mm of Neoprene (K = 6.70). What is the capacitance of this capacitor?
2. A parallel plate capacitor is made using two circular plates that have a radius of 7.20 cm. The plates are separated by

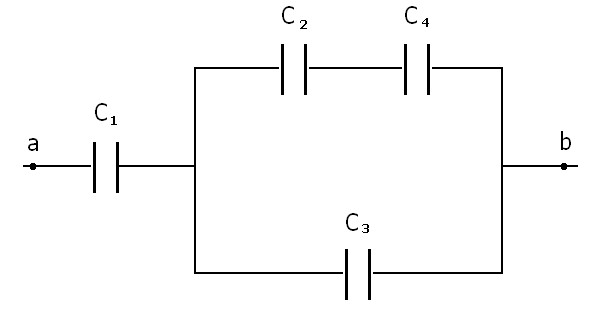
0.950 mm of Glycerin (K = 42.5). What is the capacitance of this capacitor?

1. A 45.0 nF capacitor and a 30.0 nF capacitor are connected in series. What is the equivalent capacitance?
2. A 45.0 nF capacitor and a 50.0 nF capacitor are connected in series. What is the equivalent capacitance?
3. Two 60.0 pF capacitors are connected in series. What is the equivalent capacitance?

1. Two 60.0 pF capacitors and a 40.0 pF capacitor are connected in series. What is the equivalent capacitance?
2. Three capacitors (40.0 pF, 30.0 pF, and 70.0 pF) are connected in series. What is the equivalent capacitance?
3. Three 60.0 pF capacitors are connected in series. What is the equivalent capacitance?

1. A 45.0 nF capacitor and a 30.0 nF capacitor are connected in parallel. What is the equivalent capacitance?
2. A 45.0 nF capacitor and a 50.0 nF capacitor are connected in parallel. What is the equivalent capacitance?
3. Two 60.0 pF capacitors are connected in parallel. What is the equivalent capacitance?

1. Two 60.0 pF capacitors and a 40.0 pF capacitor are connected in parallel. What is the equivalent capacitance?
2. Three capacitors (40.0 pF, 30.0 pF, and 70.0 pF) are connected in parallel. What is the equivalent capacitance?
3. Three 60.0 pF capacitors are connected in parallel. What is the equivalent capacitance?



1. Using the diagram above and the capacitances C1 = 32 nF, C2 = 24 nF, C3 = 18 nF, C4 = 12 nF; what is the equivalent capacitance between a and b?
2. Using the diagram above and the capacitances C1 = 24 nF, C2 = 32 nF, C3 = 18 nF, C4 = 12 nF; what is the equivalent capacitance between a and b?
3. Using the diagram above and the capacitances C1 = 32 nF, C2 = 24 nF, C3 = 12 nF, C4 = 18 nF; what is the equivalent capacitance between a and b?
4. Using the diagram above and the capacitances C1 = 12 nF, C2 = 18 nF, C3 = 32 nF, C4 = 24 nF; what is the equivalent capacitance between a and b?

1. A capacitor is constructed using two parallel rectangular plates that measure 4.84 x 10 – 3 m by 2.43 x 10 – 3 m separated by 7.43 x 10 – 5 m of Polypropylene. Polypropylene has a dielectric constant of 2.20 and a dielectric strength of 7.00 x 10 7 V/m.
   * + 1. What is the capacitance of this capacitor?
       2. At what potential difference will the dielectric undergo dielectric breakdown?
       3. What is the maximum potential energy that can be stored in this capacitor?

1. How many 80 pF capacitors must be connected in series to produce an equivalent capacitance of 16 pF?
2. How many 80 pF capacitors must be connected in parallel to produce an equivalent capacitance of 320 pF?

1. Show how to produce an equivalent capacitance of 120 pF using three 80 pF capacitors.
2. Show how to produce an equivalent capacitance of 100 pF using five 80 pF capacitors.
3. Show how to produce an equivalent capacitance of 280 pF using five 80 pF capacitors.
4. Show how to produce an equivalent capacitance of 56 pF using 80 pF capacitors.