**Section 13 Questions**

1. What is the electric capacitance of a capacitor known as?
   1. Electron
   2. Farquad
   3. Farad
   4. Fara
   5. Fuse
   6. Fusion
2. The electric capacitance of a capacitor is known as a \_\_\_\_\_.
   1. Fusion
   2. Fara
   3. Farquad
   4. Fuse
   5. Farad
   6. Electron
3. Most capacitors are rated in \_\_\_\_\_ or \_\_\_\_\_.
   1. Picofarads, millifarads
   2. Picofarads, microfarads
   3. Picfarads, millifarads
   4. Pifarads,microfarads
   5. Picfarads, microfarads
   6. Pifarads, millifarads
4. Most capacitors are rated in picofarads or microfarads.
   1. True
   2. False
5. The capacitance of the capacitor is usually indicated on the *\_\_\_\_* of the capacitor.
   1. Side
   2. Front
   3. Back
   4. Bottom
   5. Top
   6. None of the above
6. The \_\_\_\_\_\_\_\_\_ of a capacitor is indicated on the side of the capacitor.
   1. Capacitor
   2. Voltage
   3. Condenser
   4. Resistance
   5. Capacitance
   6. Capacity
7. Most capacitors are rated in picofarads or millifarads.
   1. True
   2. False
8. The capacitance of a capacitor is indicated on the side of the capacitor.
   1. True
   2. False
9. What is the value (besides capacitance) indicated on the side of a capacitor?
   1. Potential Voltage
   2. Working Voltage
   3. Electrons
   4. Voltage
   5. Resistance
   6. Current
10. The working voltage indicates the maximum allowable voltage that may be applied to the capacitor without damaging it.
    1. True
    2. False
11. The working voltage indicates the minimum allowable voltage that may be applied to the capacitor.
    1. True
    2. False
12. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ indicates the maximum allowable voltage that may be applied to the capacitor without damaging it.
    1. Current
    2. Resistance
    3. Potential Voltage
    4. Working Voltage
    5. Electrons
    6. Voltage
13. What factors affect capacitance? (circle all that apply)
    1. Plate size
    2. Distance between plates
    3. Dielectric material between plates
    4. Electric material between plates
    5. All of the above
    6. None of the above
14. What three factors affect capacitance?
    1. Electric material between plates
    2. Dielectric material between plates
    3. Plate size
    4. Distance between plates
    5. Incoming voltage
    6. Flow of current
15. The larger the plate, the more capacitance.
    1. True
    2. False
16. The larger the plate, the less capacitance.
    1. True
    2. False
17. The larger the plate, the \_\_\_\_ capacitance.
    1. More
    2. Less
18. The closer the plates, the more capacitance.
    1. True
    2. False
19. The closer the plates, the less capacitance.
    1. True
    2. False
20. The closer the plates, the \_\_\_\_ capacitance.
    1. More
    2. Less
21. How the dielectric material affects capacitance is rated in a term known as relative permittivity.
    1. True
    2. False
22. How the \_\_\_\_\_\_\_\_ material affects capacitance is rated in a term known as relative permittivity.
    1. Electric
    2. Kinetic
    3. Dielectric
    4. Semiconductive
    5. Conductive
    6. Static
23. How the dielectric material affects capacitance is rated in a term known as \_\_\_\_\_\_\_\_\_\_\_\_.
    1. Relative permittivity
    2. Reactive permittivity
    3. Permittivity
    4. Primitive
    5. Dielectric permittivity
    6. Electric permittivity
24. Relative permittivity is a value that compares itself to a vacuum.
    1. True
    2. False
25. Relative permittivity is a value that compares itself to a \_\_\_\_\_\_\_\_.
    1. Toaster
    2. Vacuum
    3. Therimsiter
    4. Diamond
    5. Paper Weight
    6. Air bag
26. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a value that compares itself to a vacuum.
    1. Permittivity
    2. Electric permittivity
    3. Primitive
    4. Reactive Permittivity
    5. Relative Permittivity
    6. Dielectric permittivity
27. The higher the dielectric constant, the more capacitance.
    1. True
    2. False
28. The higher the dielectric constant, the less capacitance.
    1. True
    2. False
29. The \_\_\_\_\_\_\_ the dielectric constant, the more capacitance.
    1. Higher
    2. Lower
30. The lower dielectric constant, the more capacitance.
    1. True
    2. False
31. The lower dielectric constant, the less capacitance.
    1. True
    2. False
32. What is the permittivity of an ideal vacuum?
    1. 9.854 x 10^-12 F/m
    2. 9.758 x 10^12 F/m
    3. 9.854 x 10^ -12 F/m
    4. 8.758 x 10^12 F/m
    5. 8.854 x 10^-12 F/m
    6. 8.758 x 10^12 F/m
33. Determine the amount of charge stored on either plate of a capacitor, 4.0 x 10^-6 F, when connected across 18 volt battery.

C = q/v

4 x 10^-6 F = q / 18

q = 7.2 x 10^-5 C

1. If the separation of the plates for a capacitor is 5.2 x 10^-2 m, determine the area of the plates if the capacitance is exactly 3 F.

C =εA/d

3 F = (8.854 x 10^-12 F/m)A/(5.2 x 10^-2 m)

A =1.762 x 10^10 m^2

1. A parallel capacitor is constructed of metal plates, each with an area of .7 m^2. The capacitance is 9.876 nF (9.876 x 10 ^-9 F). Determine the plate separation distance.

C = εA/ d

9.876 x 10^-9 F = 8.854 x 10^-12 F/m (.7 m^2) / d

D =6.276 x 10^-4 m = 0.6276 mm

1. A memory chip contains millions of capacitors, each coupled with a transistor, to form a “memory cell”. A typical capacitor in a memory cell may have a capacitance of 3 x 10^-14 F. If the voltage across the capacitor is 1.5 v, determine the number of electrons that must move on the capacitor to charge it. ( 1 electron = 1.602 x 10^-19 C)

C = q/v

3 x 10^-14 F = q / (1.5v)

q = 4.5 x 10^-14 C

#electrons = Total charge / Charge per electron

#electrons = 4.5 x 10^-14 C / 1.602 x 10^-19 C

#electrons = 280898.88 electrons

1. Denis has constructed a parallel plate capacitor using Teflon (2.1 = ε) as the dielectric material. The area overlap of the plates is .57 m^2, and the distance between the plates in .23 mm. When applying 5.5 V to the capacitor, what is the capacitance?

C = (8.854 x 10^-12 F/m) (εA/d)

C = (8.854 X 10^-12 F/m)[(2.1 \* .57m^2)/.23mm]

C = 4.608 x 10^-11 F = 0.04608 μF

q = Cv = (.04608 μF)(5.5V) = 0.25344 C

D = .85d = .85(.23mm)= 0.1955mm

Cnew = (8.854 x 10^-12 F/m)(εA/d)

Cnew = (8.854 x 10^-12 F/m)[(2.1 \*.57m^2)/.1955mm]

Cnew = 5.421 x 10^-11 F = 0.00005421 𝜇F

1. As capacitance \_\_\_\_\_\_\_\_\_\_\_, discharge time increases.
   1. Decreases
   2. Increases
   3. Remains constant
   4. Speeds up
   5. Slows down
   6. None of the above
2. As capacitance decreases, discharge time \_\_\_\_\_\_\_\_\_\_.
   1. Decreases
   2. Increases
   3. Remains constant
   4. Speeds up
   5. Slows down
   6. None of the above
3. On a capacitor charge plot, once the voltage reaches \_\_\_\_% of the entire charged voltage, the amount of time that has elapsed is equal to the time constant.
   1. 5.5%
   2. 10.23%
   3. 31.4%
   4. 31.6%
   5. 52.97%
   6. 63.2%
4. What is the capacitance if 𝝉=2.4s and R= 1kΩ?
   1. 0.0024μF
   2. 2400μF
   3. 2.4μF
   4. 24μF
   5. 0.24μF
   6. 0.024μF

Cp= t/R

Cp= 2.4s\*10^-3= 0.0024, convert to μF becomes 2400