There is more to practice on **ElectroMath in module 3**
Capacitors   Answers are below!

1) A capacitor is fully charged after 25 seconds to a battery voltage of 20v. The battery is replaced with a short circuit. What will be the Voltage across the capacitor after one time constant? a) 12.64v   b) 7.36v   c) 0v

2) Three 5-microfarad capacitors connected in parallel. What is there total capacitance?
a) 15   b) 5   c) 1.66

3) Three capacitors 10 microfarads, 10 nanofarads, 10 millifarads are connected in parallel. What is there total capacitance?
a) 10,01001 μF   b) 111μF   c) 1.001001μF

4) If a 1μF capacitor has a potential difference across it of 5v what is the energy stored?
a) 12.5 J   b) 12.5 μJ   c) 25 mJ

5) What must you do to make a 3 F capacitor circuit into a 2 F circuit?
a) Put a 1 F capacitor in series
b) Put a 6 F capacitor in series
c) Put a 2 F capacitor in parallel

6) The time required to fully charge a 1 μF capacitor in series with a 100k ohm resistor is
a) 500 ms   b) 100 s   c) 100 ms

7) A 50μF capacitor is fed with a current of 25 mA. How long will it take to charge it to 100V?
a) 12 minutes   b) 0.2 seconds c)   1 second

8) In a circuit C = 25 microfarads and the current flow is 40 microamps for 4 seconds. What is the voltage?
a) 6.4V   b) 12.8V c)   3.2V

9) Three 12 F capacitors are in series. The total capacitance is
a) 4 μF   b) 36 μF   c) 12 μF

10) What is the total capacitance of a parallel circuit containing three capacitors with capacitance of 0.25microfarad, .03microfarad, and 0.12microfarad, respectively?
a) 0.04 μF   b) 0.4 μF   c) 0.04 pF

11) Three 12 microfarad capacitors in parallel. The overall circuit capacitance is
a) 4 microfarads   b) 36 microfarads   c) 1 microfarads

12) A circuit has 1 megohm and 8 microfarads. What is the time constant?
a) 8 seconds   b) 40 seconds   c) 1 second

13) A 20 Picofarad capacitor with a 1 Megohm resistor takes how long to charge?
a) 20 milliseconds   b) 0.1 second   c) 100 microseconds

14) What is the value of a monolithic capacitor with 103 on it?
a) 10,000pf   b) 100,000pf   c) 1000pf

15) Total capacitance of 3 capacitors each 12mF in a parallel circuit
a) 36mF   b) 6mf   c) 12mF

16) A combination of 1 megohm and 8 microfarad would give a time constant of
a) 8 seconds   b) 40 seconds   c) 400 ms

17) A capacitor has Brown, Black and Orange bands. It's value is
a) 10 picofarads   b) 10 nanofarads   c) 100 picofarads

Capacitors   Answers are below!

18) A circuit with a capacitor has 6 volts applied to it with a charge of 2400 pico-coulombs. What would the charge be if the applied voltage was 1.5 volts ?
a) 2400 x 10^{-6}F coulombs   b) 600 x 10^{-9} coulombs   c) 600 x 10^{-12} coulombs

19) Three capacitors connected in series, each having a value of 12 picofarads, calculate the total capacitance.
a) 4 picofarads   b) 6 picofarads   c) 12 picofarads

20) A circuit with a capacitor has 6-volts applied and a charge of 2400 picocoulombs. What would be the charge if 1.2-volts were applied?
a) 4.8 nanocoulombs   b) 2400 picocoulombs   c) 600 picocoulombs

21) A power supply filter uses five series-connected 2200 F capacitors each rated at 50 V. What single capacitor could be used to replace them?
a) 440 μF at 50V   b) 440 μF at 250 V   c) 11000 μF at 250 V

ANSWERS:
1b   2a   3a   4b   5b   6a   7c   8a   9a   10b   11b   12a   13c   14a   15a   16a   17b   18c   19a   20a   21b

1) A capacitor is fully charged after 25 seconds to a battery voltage of 20v. The battery is replaced with a short circuit. What will be the Voltage across the capacitor after one time constant? a) 12.64v   b) 7.36v   c) 0v
The time required to charge a capacitor to 63.2 percent of full charge or to discharge it to 36.8 **percent** of its initial voltage is known as the **Time Constant** of the circuit   20V x 0.368 = **7.36V**
Info about charging and discharging of capacitors!

2) Three 5-microfarad capacitors connected in parallel. What is there total capacitance?
a) 15   b) 5   c) 1.66
Capacitors in parallel is $C_t = C_1 + C_2 + C_3 + ...$ $5\mu F + 5\mu F + 5\mu F = \mathbf{15\mu F}$

3) Three capacitors 10 microfarads, 10 nanofarads, 10 millifarads are connected in parallel. What is there total capacitance?
a) 10,01001 μF b) 111μF c) 1.001001μF
Capacitors in parallel is $C_t = C_1 + C_2 + C_3$ 10,000nF + 10nF + 10,000,000nF = **10,010,010nF**

4) If a 1μF capacitor has a potential difference across it of 5v what is the energy stored?
a) 12.5 J   b) 12.5 μJ c) 25 mJ
$U = 0.5$ x $\frac{Q^2}{C} = 0.5$ x Q x V $= 0.5$ x C x V^2 where Capacity is in Farad. 0.5 x 1μF is 0.000,001F x 5V x 5V= **12.5μJ**
Info about energy stored on a capacitor!

5) What must you do to make a 3 F capacitor circuit into a 2 F circuit?
a) Put a 1 F capacitor in series
b) Put a 6 F capacitor in series
c) Put a 2 F capacitor in parallel
$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + ...$ For 3F circuit to make a 2F circuit, 3x2 capacitors must be used!
Basically total capacity is smaller than the smallest capacitor when capacitors are in series!

6) The time required to fully charge a 1 μF capacitor in series with a 100k ohm resistor is
a) 500 ms   b) 100 s   c) 100 ms

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