1. What is the unit of capacitance? **Farad**

2. What is the relationship between current and voltage in a theoretical purely capacitive circuit? **Current leads voltage by 90 degrees.**

3. What is the formula for finding capacitive reactance when current and voltage of the capacitor are known? \( X_C = \frac{E_C}{I_C} \)

4. How does an increase in voltage affect the capacitive reactance of a circuit? **No effect.**

5. How does an increase in frequency affect the capacitive reactance of a circuit? **Inversely proportional.**

6. How does an increase in capacitance affect the capacitive reactance of a circuit? **Inversely proportional.**

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**Unit 5**

1. Name four losses of energy in an AC circuit that are not in a DC circuit. **Eddy current losses, dielectric losses, hysteresis losses, and skin effect.**

2. Is power in a capacitive circuit considered leading vars or lagging vars? **Leading**

3. How is the vector triangle for a capacitive circuit different from an inductive circuit? **Vars goes down instead of up.**

4. How is capacitive reactance and inductive reactance combined? **They are opposite to each other and 180 degrees out of phase so they can be subtracted.**
5. What is the formula for power factor when true power and apparent power are known? **Power Factor = True Power/Apparent Power**

6. What is the formula for power factor when the phase angle is known? **Power Factor = cosine theta.**

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**Unit 6**

1. How does a change in frequency affect the value of pure resistance? **No effect**

2. What is the term used to describe a circuit property that will oppose any change in current in that circuit? **Inductive Reactance**

3. Which circuit component has the ability to store electrical energy as a magnetic field? **Inductor**

4. Which property of a circuit will actually choke or suppress the current flow without the use of resistance? **Inductive Reactance**

5. What is the average power in a purely inductive circuit? **0**

6. What is the circuit amperage when a resistance of 15 ohms is connected in series with an inductive reactance of 10 ohms and the supply voltage is 120 V? **6.67 A**

7. What is the impedance of the circuit above? **18 ohms**

8. What is the voltage drop across the resistance in question 6? **100 V**

9. What is the voltage drop across the inductor in question 6? **66.6 V**

10. What is the term used to describe the combined resistive and reactive opposition to current flow? **Impedance**
11. What is the most common formula for true power in series circuit? True Power = \( I^2R \)

12. What is another name for wattless power? Reactive power or vars

13. What is the result of multiplying total line current by the total line voltage? Apparent Power in Volt Amps

14. What are three formulas for calculating power factor? \( PF = \cos \theta \), \( PF = \frac{\text{True Power}}{\text{Apparent Power}} \), \( PF = \frac{R}{Z} \)

15. Which Q rating would indicate a higher quality inductor, 4 or 10? 10

16. What is the term used to describe two parallel plates separated by a dielectric? Capacitor

17. What circuit device stores electrical energy as electrostatic charges? Capacitor

18. What is the formula for capacitive reactance using a value of \( C \) in farads? \( X_C = \frac{1,000,000}{2\pi fC} \). Microfarads? \( X_C = \frac{1}{2\pi fC} \)

19. What does the term DC working voltage refer to in relation to capacitors? Maximum or peak DC voltage.

20. How much power is produced in an AC circuit with both R and L when the current or voltage are 0? None

21. What happens when capacitive reactance and inductive reactance are combined? They cancel out the smaller value and the balance of the largest one remains.

22. What is the formula for impedance when a circuit contains inductive reactance, resistance, and capacitive reactance? \( Z = \sqrt{R^2 + (X_L - X_C)^2} \)

23. What is a resonant circuit? \( X_L \) and \( X_C \) are equal and cancel out leaving only resistance.
1. What is the reference vector when solving parallel AC circuits? Voltage

2. What is the formula for calculating resistances in parallel? \( \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \)

3. What is the formula for calculating the current through each resistive branch of a parallel circuit? \( I_R = \frac{E}{R} \)

4. What is the formula for calculating the current through the inductive branch of a parallel circuit? \( I_{XL} = \frac{E}{X_L} \)

5. What is the formula for calculating the total current when \( I_R \) and \( I_{XL} \) inductive are known? \( I_T = \sqrt{I_R^2 + I_{XL}^2} \)

6. What happens to overall impedance as another branch of resistance or inductance is added to a circuit in parallel? Lowers

7. What is the formula for calculating the power through each section of a parallel circuit? Power = \( I^2 R \) or \( I^2 X_L \) or \( I^2 X_C \)

8. Why is Ohm’s law typically used to calculate impedance in a parallel circuit containing capacitance and resistance? It is often easier

9. What are two formulas for calculating the power in each section of a parallel RC circuit? Power = \( I^2 R \) or Power = \( E_R I_R \)

10. What is the formula for calculating power factor in a parallel RC circuit using current? Power Factor = \( I_R / I_T \)

11. What is the effective impedance of a 50 ohm capacitive reactance and a 30 ohm inductive reactance? 20 ohm capacitive reactance

12. What is the value of vars in a resonant circuit? 0
13. What happens if the frequency changes in a resonant circuit? It is no longer resonant.

14. What is the impedance of a circuit with a resistor of 10 ohms and an inductor of 0.5 H connected to a 120 volt 60 hz supply in parallel? 9.98Ω

15. What is the current in the circuit above? 12.02

16. What is IR in question 14? 12 A

17. What is IXL in question 14? 0.637 A

18. What is the true power, vars, and apparent power in question 14? TP=1440 W Vars = 76.4 AP = 1441.9 VA

19. What is the power factor in question 14? 99.8%

20. What is the capacitive reactance of a 250 mfd capacitor at 60Hz? 10.6Ω

21. What is the capacitive reactance of a 125 mfd capacitor at 60Hz? 21.2Ω

22. Find the following values for a parallel circuit with R=6 ohms and XC=3 ohms and the supply voltage=120: Z, IT, IXC, IR, true power, reactive power, apparent power, and power factor. Z=2.68Ω, IT=44.72A, IXC=40A, IR=20A, TP=2400W, Reactive Power=4800Vars, Apparent Power=5366VA