QUIZ – ANSWER KEY

QUIZ NO: 107

TOPIC: ELECTRICAL ENGINEERING

DATE: 20/09/2022

1. If we apply a sinusoidal voltage to a circuit, the product of voltage and current is?

   [A] true power

   [B] apparent power

   [C] average power

   [D] reactive power

   Answer: B

   Explanation:-

   - If we apply a sinusoidal voltage to a circuit, the product of voltage and current is apparent power. The apparent power is expressed in volt amperes or simply VA.

2. The power factor is called leading power factor in case of ____ circuits ?

   [A] LC

   [B] RC

   [C] RL

   [D] RLC

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Answer: B

Explanation:-

The power factor is called leading power factor in case of RC circuits and not in RLC circuits and RL circuits and LC circuits.

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3. A capacitor, used for power factor correction in a single phase circuit decreases which of the following?

   [A] Power factor

   [B] Line current

   [C] Both Line current and Power factor

   [D] Neither Line current nor Power factor

   Answer: B

   Explanation:-

   We know that a capacitor is used to increase the Power factor. However, with decrease in line current the power factor is increased. Hence line current decreases.

4. A two branch circuit has a coil of resistance R_1, inductance L_1 in one branch and capacitance C_2 in the second branch. If R is increased, the dynamic resistance is going to _____?

   [A] Increase

   [B] Decrease

   [C] Remains constant

   [D] May increase or decrease

   Answer: B

   Explanation:-

   - We know that,
     Dynamic resistance = $L_1/[R_1C_2]$
     So, if R_1 is increased, keeping Inductance and Capacitance same, so The Dynamic resistance will decrease, as the denomination is increasing.

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5. For making a capacitor, the dielectric should have _____?

   [A] High relative permittivity

   [B] Low relative permittivity

   [C] Relative permittivity = 1

   [D] Relative permittivity neither too high nor too low

   Answer: A

   Explanation:-

   Relative permittivity is for ideal dielectric which is air. Achieving such a precise dielectric is very difficult.
   Low relative permittivity will lead to low value of capacitance.
   High relative permittivity will lead to a higher value of capacitance.

6. In a parallel RL circuit, 12 A current enters into the resistor R and 16 A current enters into the Inductor L. The total current I the sinusoidal source is _____?

   [A] 25 A

   [B] 4 A

   [C] 20 A

   [D] Cannot be determined

   Answer: C

   Explanation:-

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Currents in resistance and inductance are out of phase by 90°.
Hence, $I = I^2_1+I^2_2$
Or, $I = [12^2 + 16^2]^{0.5}$
Or, $I = \sqrt{[144+256]} = \sqrt{400}$
$= 20$ A.

7. Consider a series RLC circuit having resistance = 1Ω, capacitance = 1 F, considering that the capacitor gets charged to 10 V. At t = 0 the switch is closed so that $i = e^{-2t}$. When i = 0.37 A, the voltage across capacitor is _____?

   [A] 1 V
   [B] 6.7 V
   [C] 0.37 V
   [D] 0.185 V

   Answer: B

   Explanation:-

   We know that, during discharge of capacitor,
   $V_C = V_R$
   Now, $V_R = 0.67 \times 10 = 6.7$ V
   So, $V_C = 6.7$ V.

8. A circuit consists of an excitation voltage V_S, a resistor network and a resistor R. For different values of R, the values of V and I are as given, R = ∞, V = 5 volt; R = 0, I = 2.5 A; when R = 3 Ω, the value of V is _____ ?

   [A] 1 V
   [B] 2 V
   [C] 3 V
   [D] 5 V

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Answer: C

Explanation:-

When R = ∞, V = 5v,
Then, V_{oc} = 5V and the circuit is open
When R = 0, I = 2.5A
Then, I_{sc} = 2.5 and the circuit is short circuited.
So, R_{eq} = VOC/ISC
= 5/2.5 = 2 Ω
Hence the voltage across 3 Ω is 3 volt.

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9. Three inductors each 30 mH are connected in delta. The value of inductance or each arm of equivalent star is _____ ?

[A] 10 mH
[B] 15 mH
[C] 30 mH
[D] 90 mH

Answer: A

Explanation:-

We know that if an inductor L is connected in delta, then the equivalent star of each arm = LXL/L+L+L
Given that, L = 30 mH
= 30X30/30+30+30
= 900/90 = 10 mH.

10. In a series RLC circuit having resistance R = 2 Ω, and excited by voltage V = 1 V, the average power is 250 mW. The phase angle between voltage and current is _____?

[A] 75°
[B] 60°
[C] 15°
[D] 45°

Answer: D

Explanation:-

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VI cos θ = 0.25 or I cos θ = 0.25
Or, Z cosθ = 2
Or, V/I cosθ = 2
Or, cos θ = 1/√2
So, from the above equations, cos θ = 0.707 and θ = 45°.