DPP – 02

Solution

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1. Resultant voltage $= 200$ volt

Since V_1 and V_3 are $180°$ out of phase, the resultant voltage is equal to V_2

$\therefore\ V_2 = 200$ volt

2.

3. Given $X_L = X_C = 5\Omega$, this is the condition of resonance. So $V_L = V_C$, so net voltage across L and C combination will be zero.

4. At $A: X_C > X_L$

At B: $X_C = X_L$

At $C: X_C < X_L$

5. For frequency $0 - f_r, Z$ decreases hence $(i = V/Z)$ increases and for frequency $f_r - \infty, Z$ increases hence i ajecreases.

6. In non-resonant circuits Impedance

$Z = \dfrac{1}{\sqrt{\dfrac{1}{R^2} + \left(\omega C - \dfrac{1}{\omega L}\right)^2}}$, with rise in frequency Z decreases i.e.

current increases so circuit behaves as capacitive circuit.

7. At resonance $\omega L = \frac{1}{\omega C}$. Hence $V_2 = 0$

8.

9. $P = V_{\text{rms}}^2 \cos\ \phi$