

ST. LAWRENCE HIGH SCHOOL A JESUIT CHRISTIAN MINORITY INSTITUTION



27.07.20

WORK SHEET 34

Subject : PHYSICS

CLASS : XII

Topic : LCR, phasor diagram, impedance, resonance curve, resonance, bandwidth, Q-factor.

Multiple Choice Question :

Chapter : Alternating current

- 1. Consider the figure, the resistor, inductor and capacitor are in series, therefore
 - (a) the AC current in each element is same at any time ε
 - (b) amplitude and phase are same in each element
 - (c) both (a) and (b)
 - (d) Neither (a) nor (b)
- 2. In a series *L-C-R* circuit, the frequency of 10 V AC voltage source is adjusted in such a fashion that the reactance of the inductor measures 15Ω and that of the capacitor 11Ω . If $R = 3\Omega$, the potential difference across the series combination of *L* and *C* will be

- 3. The current in the series L-C-R circuit is
 - (a) $i = i_m \sin(\omega \tau + \phi)$ (b) $i = \frac{V_m}{\sqrt{R^2 + (X_c - X_L)^2}} \sin(\omega \tau + \phi)$ (c) $i = 2i_m \cos(\omega \tau + \phi)$ (d) both (a) and (b)
- 4. In a series L-C-R series AC circuit, then voltage across each of the components, L, C and R is 50 V. The voltage across the C-R combination will be
 - (a) 50 V (b) $50\sqrt{2} V$ (c) 100 V (d) zero
- 5. In an *L*-*C*-*R* series AC circuit, the voltage across each of the components, L, C and *R* is 50 V. The voltage across the *L*-*C* combination will be

(a) 50 V (b)
$$50\sqrt{2} V$$
 (c) 100 V (d) 0 V

- 6. In the given circuit, the readings of voltmeters V_1 and V_2 are 300 V each. The readings of the voltmeter V_3 and ammeter A are respectively
 - (a) 100 V, 2.0 A (b) 150 V, 2.2 A (c) 220 V, 2.2 A (d) 220 V, 2.0 A
- 7. The phenomenon of resonance is common among systems that have a tendency(a) to oscillate at a particular frequency(c) both (a) and (b)



- (b) to get maximum amplitude
- (d) neither (a) nor (b)

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- 8. At resonant frequency, the current amplitude of an *R-L-C* circuit is
 (a) minimum
 (b) maximum
 (c) may be minimum
 (d) never maximum
- 9. In an *L*-*C*-*R* series circuit, the potential difference between the terminals of the inductance is 60 V, between the terminals of the capacitor is 30 V and that across the resistance is 40 V. Then, supply voltage will be equal to
 - (a) 50 V (b) 70 V (c) 130 V (d) 10 V

10. In R-L-C series circuit with L = 1.00 mH, C = 1.00 nF two values of R are (i) $R = 100 \Omega$ and (ii) $R = 200 \Omega$. For the source applied with $V_{\rm m} = 100$ V. Resonant frequency is (a) 1 x 10³ rad/s (b) 1 x 10⁶ rad/s (c) 1.56 x 10⁶ rad/s (d) 1.75 x 10³ rad/s

- 11. Resonant circuits are used in
 - (a) the tuning mechanism of radio(b) TV set(c) both (a) and (b)(d) neither (a) nor (b)
- 12. Banddwidth of the resonant L-C-R circuit is
 - (a) $\frac{R}{L}$ (b) $R \neq 2L$ (c) $\frac{2R}{L}$ (d) $\frac{4R}{L}$
- 13. If resonant frequency of a *R*-*L*-*C* circuit is ω_0 and bandwidth is $A\omega$, then which of the following quantity is regarded as a measure of the sharpness of resonance?
 - (a) $\frac{\omega_0}{\Delta\omega}$ (b) $\frac{\omega_0}{2\Delta\omega}$ (c) $\frac{2\omega_0}{\Delta\omega}$ (d) $\frac{\Delta\omega}{2\omega_0}$
- 14. Which of the following ratio is called the quality factor, Q of the circuit?
 - (a) $Q = \frac{\omega_0 L}{R}$ (b) $Q = \frac{2\omega_0 L}{R}$ (c) $Q = \frac{\omega_0 L}{2R}$ (d) $Q = \frac{\omega_0 L}{4R}$
- 15. In an *L*-*C*-*R* circuit, capacitance is changed from *C* to 2*C*. For the resonant frequency to remain unchanged, the inductance should be change from L to
 - (a) 4L (b) 2L (c) $L \neq 2$ (d) $L \neq 4$

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