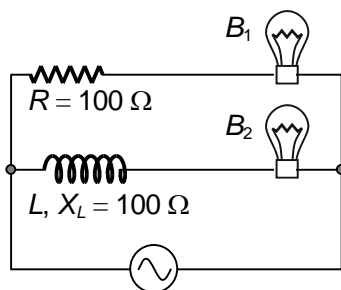


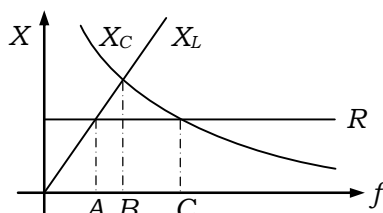
ALTERNATING CURRENT

- A 50 Hz sinusoidal ac current of peak value 1 A flows through the primary of a transformer. If the mutual inductance between the primary and secondary is 1.5 H, then the effective voltage induced in the secondary is approximately
 A) 100 V
 B) 220 V
 C) 470 V
 D) 330 V
- An alternating current having peak value 14 A is used to heat a metal wire. To produce the same heating effect, a constant current I can be used. Then the value of I must be
 A) 14 A
 B) about 20 A
 C) about 10 A
 D) 7 A
- The armature of a dc motor has 15Ω resistance. It draws a current of 1.6 A when run by 220 V dc supply. The value of back emf will be
 A) 24 V
 B) 196 V
 C) 220 V
 D) 244 V
- The number of turns in the primary and secondary of a transformer are respectively 100 and 50. If the input power and input current are respectively 60 W and 1 A, and the efficiency of the transformer is 0.95, then the output power and the output current will be, respectively
 A) 60 W, 2 A
 B) 60 W, 1 A
 C) 57 W, 2 A
 D) 57 W, 1.9 A
- If the instantaneous current in a circuit is given by $I = 2\cos(\omega t + \phi)$ amperes, the rms value of current is
 A) 2 A
 B) $\sqrt{2}$ A
 C) $2\sqrt{2}$ A
 D) zero
- In the figure two identical bulbs, each with filament resistance 100Ω are connected to a resistor $R = 100 \Omega$, and an inductor ($X_L = 100 \Omega$) as shown in fig. Then which bulb glows more

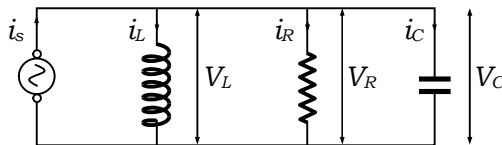


- B_1
 - B_2
 - both glow equally
 - can't be predicted
- In an ac circuit shown in figure, which ac voltmeter would show zero reading at the time of resonance

- C) there must be a resistance in the box D) the power factor is 0.707
21. A high-impedance ac voltmeter is connected in turn across the inductor, the capacitor, and the resistance in a series circuit having an ac source of 100 V(rms) and gives the same reading in volts in each case. Then this reading is
A) $100/\sqrt{3}$ volts B) 300 volts
C) 100 volts D) incomplete data
22. A coil of negligible resistance is connected in series with a $90\ \Omega$ resistor across a 120 V, 60 Hz line. An ac voltmeter reads 90 V across the resistance, then the inductance of the coil is approximately
A) 0.2 H B) 0.3 H
C) 0.4 H D) 0.7 H
23. Two coils A and B are connected in series with an ac source of emf 220 V (rms), and frequency 50 Hz. The resistance of A is $4\ \Omega$ and inductance of B is 0.02 H. The power loss in the circuit is 3 KW and power factor is 0.75. Then the resistance of coil B is
A) $0.5\ \Omega$ B) $5\ \Omega$
C) $57\ \Omega$ D) $50.7\ \Omega$
24. The fig. shows variation of R , X_L and X_C with frequency f in a series L, C, R circuit. Then for what frequency point, the circuit is inductive



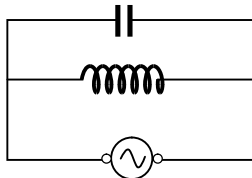
- A) A B) B
C) C D) all points
25. A 50 mH coil carries a current of 2 A. The energy stored in joule is
A) 0.1 B) 0.5
C) 1.0 D) 5.0
26. An ac source is connected in parallel with an L-C-R circuit as shown. Let I_S , I_R , I_L and I_C denotes the currents through and V_S , V_R , V_L and V_C the voltage across the corresponding components. Then



- A) $V_S = V_R + V_L + V_C$ B) $I_S = I_R + I_L + I_C$
C) $(I_R, I_L, I_C) < I_S$ D) I_L, I_C may be $> I_S$
27. A capacitor $1\ \mu\text{F}$ is charged to potential of 1 V. It is connected in parallel to an inductor of inductance 10^{-3}H . The maximum current that will flow in the circuit has the value

- A) $\sqrt{1000}$ mA
 B) 1 mA
 C) 1 μ A
 D) 1000 A

28. For the circuit shown in figure, the current through the inductor is 0.9 A while the current through the capacitor is 0.4 A. Current drawn from generator



- A) $I = 1.13$ A
 B) $I = 1.3$ A
 C) $I = 0.5$ A
 D) $I = 0.6$ A

29. When 100 V dc is applied across a solenoid, a steady current of 1 A flows through it. When 100 V ac is applied across the same solenoid, the current drops to 0.5 A. If the frequency of the ac source is $150 \frac{\sqrt{3}}{\pi}$ Hz, the inductance of the solenoid is

- (A) $\frac{1}{3}$ H
 (B) $\frac{1}{16}$ H
 (C) 1.0 H
 (D) $\frac{3}{117}$ H

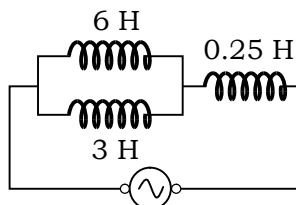
30. In a parallel $L-C-R$ circuit connected to a variable frequency 200 V source. $L = 5$ H, $C = 25 \mu\text{F}$ and $R = 400 \Omega$. What is the r.m.s. current in the circuit at resonance?

- A) 0.4 A
 B) 0.04 A
 C) 4.0 A
 D) 0.5 A

31. An ideal choke takes a current of 10 ampere when connected to an ac supply of 125 volt and 50 Hz. A pure resistor under the same condition takes a current of 12.5 ampere. If the two are connected to an ac supply of $100\sqrt{2}$ volt and 40 hertz, then the current in a series combination of the above resistor and inductor is

- A) 10 A
 B) 12.5 A
 C) 20 A
 D) 25 A

32. Three pure inductance are connected as shown in figure. The equivalent inductance of the circuit is



- A) 2.75 H
 B) 2.25 H
 C) 2.00 H
 D) 1.75 H

33. In a series $R-L$ circuit, when a dc source is replaced by an ac source of same rms voltage the current drops to half of its original value. If the angular frequency of ac source is ω then the time lag between the voltage maximum and current maximum is

