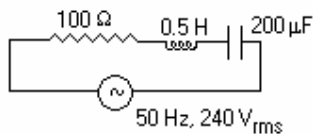
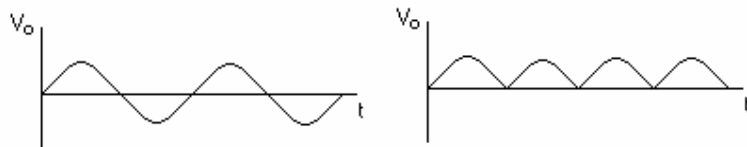


## 8.ALTERNATING CURRENTS

1. What is the relation between current and voltage in a
  - i. Purely capacitive circuit
  - ii. Purely resistive circuit
  - iii. Purely inductive circuit
2. What is a phase diagram?
3. A series RL is connected to an emf source of angular frequency  $\omega$ . By what angle does the current lead the applied emf?
4. An RC series circuit is connected to an emf source having angular frequency  $\omega$ . The current leads the source voltage by \_\_\_\_\_?
5. In an RLC series circuit, which is connected to a source of emf  $\epsilon_0 \cos \omega t$ , for what value of R will, the current lag the voltage by  $45^\circ$ ?
6. A coil has a resistance of  $60 \Omega$  and an impedance of  $100 \Omega$ . What is its reactance in ohms?
7. A  $35 \mu\text{F}$  capacitor is connected to an ac source of emf with a frequency of  $400 \text{ Hz}$  and a maximum emf of  $200 \text{ V}$ . What is the maximum current?
8. A  $45 \text{ mH}$  inductor is connected to an ac source of emf with a frequency of  $400 \text{ Hz}$  and a maximum emf of  $200\text{V}$ . What is the maximum current?
9. An RLC series circuit with  $R = 4 \Omega$ ,  $X_C = 3\Omega$  and  $X_L = 6 \Omega$ . What is the impedance of this circuit?
10. What is the impedance of the circuit shown?



11. An electric motor, under load, has an effective resistance of  $30 \Omega$  and an inductive reactance of  $40 \Omega$ . When powered by a source with a maximum voltage of  $420 \text{ V}$ , what is the maximum current?
12. An RL series is connected to an ac generator. If  $E_0 = 20 \text{ V}$  and the maximum potential difference across the resistor is  $16 \text{ V}$ , what is the maximum potential difference across the Inductor?
13. Define rms value of an ac current.
14. The rms value of a sinusoidal voltage is  $V_0/\sqrt{2}$  where  $V_0$  is the amplitude. What is the rms value of its fully rectified wave?



15. A sinusoidal voltage  $V(t)$  has an rms value of 100 V. What is the maximum value?
16. An ac generator producing 100 V (rms) at 200 rad/s is connected in series with a  $50\ \Omega$  resistor, a 400 mH inductor and a  $200\ \mu\text{F}$  capacitor. What is the rms current in amperes?
17. An ac generator producing 10 V (rms) at 200 rad/s is connected in series with a  $50\ \Omega$  resistor, a 400 mH inductor and  $200\ \mu\text{F}$  capacitor.
- What is rms voltage across the resistor?
  - What is rms voltage across the capacitor?
  - What is rms voltage across the inductor?
18. The main reason that alternating current replaced direct current for general use is: Choose correct alternative.
- AC generators do not need slip rings
  - Ac voltages may be conveniently transferred
  - Electric clocks do not work on dc
  - A given ac current does not heat a power line as much as the dc current.
19. The unit of power factor are \_\_\_\_\_.
20. A series circuit consists of a  $15\ \Omega$  resistor, 25 mH inductor and a  $35\ \mu\text{F}$  capacitor. If the frequency is 100 Hz, what is the power factor?