PHYSICS FOR YOU

ALTERNATING CURRENT

1.A capacitor acts as an infinite resistance for –

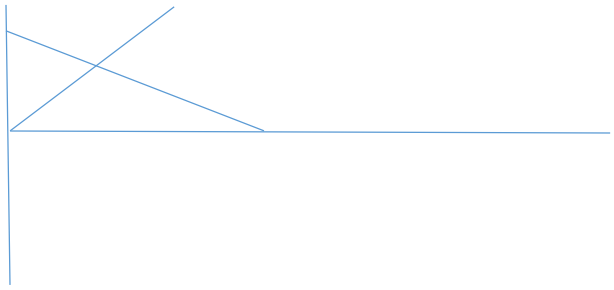
(A) DC (B) AC (C) DC as well as AC (D)neither AC or DC

2.The magnetic field energy in an inductor change from maximum to minimum value in 5.0 ms when connected to an AC source. The frequency of the source is –

(A) 20Hz (B) 50Hz (C) 200Hz (D) 500Hz

3.Which of the following plots may represent the reactance of a series LC combination?

Fig incomplete



4.A series AC circuit has a resistance of 4 ohm and a reactance of 3 ohm . The impedance of the circuit is

(A) 5ohm (B) 7ohm (C)12/7ohm (D)7/12ohm

5.Transformers are used-

(A) in DC circuits only (B) in AC circuits only (C) in both DC and AC circuits

(D) neither in DC nor in AC circuit (E) movies

6. An alternating current is given by

$i = i_1 \cos wt + i_2 \sin wt.$

The rms current is given by

(A)$(I_1+i_2)/\sqrt{2}$ (B) $|i_1 + i_2|/\sqrt{2}$ (C) $\sqrt{(i_1^2+ i_2^2)}/2$ (D) $\sqrt{(i_1^2+ i_2^2)}/\sqrt{2}$

7. An alternating current having peak value 14A is used to heat a metal wire. To produce the same heating effect, a constant current i can be used where i is –

(A) 14A (B) about 20A (C) 7A (D) about 10A

8. A constant current of 2.8A exists in a resistor. The rms current is –

(A) 2.8A (B) about 2A (C) 1.4A (D) undefined for a direct current

9.The reactance of a circuit is zero. It is possible that the circuit contains

(A)an inductor and a capacitor

(B)an inductor and no capacitor

(C)a capacitor but no inductor

(D)neither inductor nor capacitor.

10.In an AC series circuit, the instantaneous current is zero when the instantaneous voltage is maximum.

Connected to the source may be a

(A)pure inductor (B)pure capacitor (C)pure resistor (D)combination of an inductor and a capacitor.

11.The AC voltage across a resistance can be measured using

(A)a potentiometer (B)A hot wire voltmeter (C)a moving coil galvanometer

(D)a moving magnet galvanometer.

12.To convert mechanical energy into electrical energy,one can use

(A)DC dynamo (B)AC dynamo (C)motor (D)transformer

13.An AC source rated 100 V (rms) supplies a current of 10 A (rms) to a circuit.The average power delivered by the source

(A)must be 1000 W (B)may be 1000 W (C)may be greater than 1000W

(D) may be less than 1000 W .

14.A resistor 100 ohm is connected to an AC source V = (12V) sin ($250\pi\ s^{-1}$)t. Find the energy dissipated

As heat during t = 0 to t=1ms.

15.An inductance of 2H, a capacitance of 18μF and resistance of 10kΩ are connected to an AC source of 20V with adjustable frequency.(a) What frequency should be chosen to maximize the current in the circuit? (b) What is the value of this maximum current?