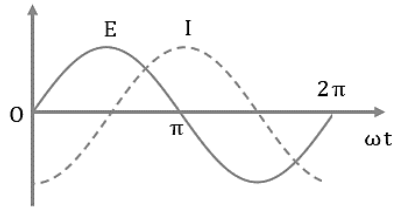
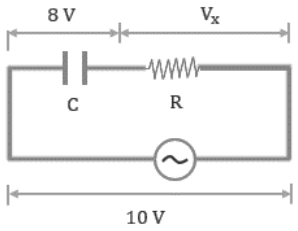
Q.1 The variation of instantaneous sinusoidal current **I** and instantaneous sinusoidal emf **E** in a circuit is as shown in figure. Which of the following statements are correct?



(A) The emf lags behind the current by $\frac{\pi}{2}$ **(B)** The current lags behind the emf by $\frac{\pi}{2}$.

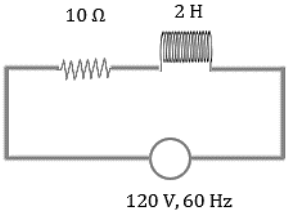
(C) The emf and the current are in phase. **(D)** The emf lags behind the current by π.

Q.2 In a series RC circuit shown in the figure, at an instant, the applied voltage is **10 V** and the voltage across the capacitor is found to be **8 V**. The phase difference between the current and the applied voltage will be –



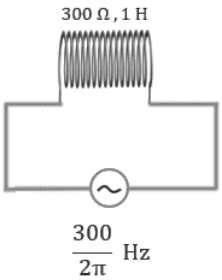
(A) $\tan^{-1}\left(\frac{4}{3}\right)$ **(B)** $\tan^{-1}\left(\frac{3}{4}\right)$ **(C)** $\tan^{-1}\left(\frac{5}{3}\right)$ **(D)** $\tan^{-1}\left(\frac{3}{5}\right)$

Q.3 An AC circuit contains a resistor of **10 Ω** and an inductor of **2.0 H**, joined in series. If an AC voltage source of **120 V**, **60 Hz** is applied across this circuit, the peak AC will be –



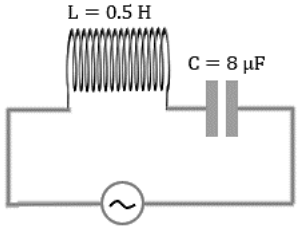
(A) 0.52 A **(B)** 0.42 A **(C)** 0.22 A **(D)** 0.32 A

Q.4 A coil of resistance **300 Ω** and inductance **1.0 H** is connected across an alternating voltage of frequency $\frac{\mathbf{300}}{\mathbf{2\pi}}$ **Hz**. Calculate the phase difference between the voltage and the current in the circuit



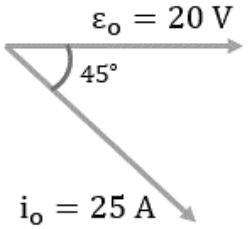
(A) π/3 **(B)** π/6 **(C)** π/4 **(D)** π

Q.5 An AC circuit consists of an inductor of inductance $\mathbf{0.5\ H}$ and a capacitor of capacitance $\mathbf{8\ \mu F}$ in series. The current in the circuit is maximum, when the angular frequency of the source is - Impedance for AC LC circuit is given by$\mathbf{Z = |X_L - X_C|}$.



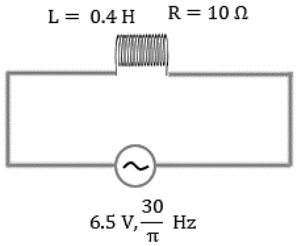
(A)500 rad/s **(B)**600 rad/s **(C)**700 rad/s **(D)**800 rad/s

Q.6 The phasor diagram of current and voltage for an AC circuit is shown in the figure. The components of the circuit will be –



(A) Only resistor **(B)**Only inductor
(C) Only capacitor **(D)**Both resistor and inductor

Q.7 A coil has a resistance of $\mathbf{10\ \Omega}$ and an inductance of $\mathbf{0.4\ H}$. It is connected across an AC source of $\mathbf{6.5\ V, \frac{30}{\pi}\ Hz}$. The average power consumed in the circuit is

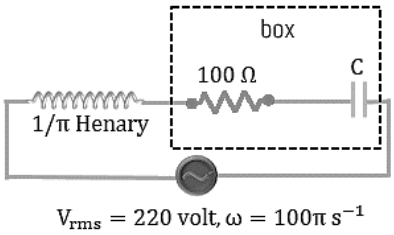


(A)0.625 W **(B)**0.325 W **(C)**0.925 W **(D)**0.125 W

Q.8 For wattles power in an AC circuit, the phase difference between the current and the voltage is -
(A)0° **(B)**90° **(C)**45° **(D)**Not possible

Q.9 In an AC circuit, the power factor
(A) Is unity when the circuit contains an ideal resistor only.
(B) Is zero when the circuit contains an ideal inductor only.
(C) Both options (A) and (B)
(D) None of these

Q.10 As shown in the figure, if the value of rms current is $\mathbf{2.2\ A}$, the power factor of the box is



(A) $\frac{1}{\sqrt{2}}$ **(B)** 1 **(C)** $\frac{\sqrt{3}}{2}$ **(D)** $\frac{1}{2}$

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(B)	(A)	(C)	(C)	(A)	(D)	(A)	(B)	(C)	(A)