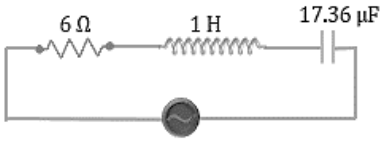
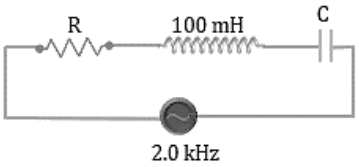
Q.1 A resistor of $\mathbf{R = 6\,\Omega}$ an inductor of $\mathbf{L = 1\,H}$ and a capacitor of $\mathbf{C = 17.36\,\mu F}$ are connected in series with an **AC** source. Find the quality factor.



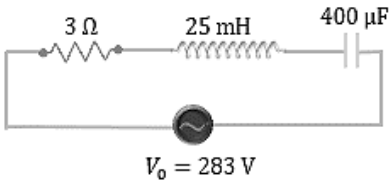
(A) 3.72 **(B)** 40 **(C)** 2.37 **(D)** 80

Q.2 An inductor of inductance **100 mH** is connected in series with a resistance, a variable capacitance and an **AC** source of frequency **2.0 kHz**. What should be the value of the capacitance so that maximum current may be drawn into the circuit?



(A) 10 Nf **(B)** 28 nF **(C)** 47 nF **(D)** 63 Nf

Q.3 A voltage of peak value **283 V** and varying frequency is applied to a series **LCR** combination in which $\mathbf{R = 3\,\Omega}$, $\mathbf{L = 25\,mH}$ and $\mathbf{C = 400\,\mu F}$. Then, the frequency (in **Hz**) of the source at which maximum power is dissipated in the above circuit, is

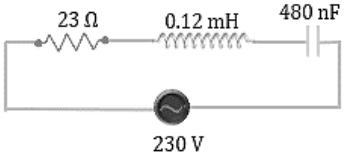


(A) 52.5 **(B)** 56.7 **(C)** 53.1 **(D)** 50.3

Q.4 A telephone wire of length **200 km** has a capacitance of **0.014 μF per km**. If it carries an **AC** of frequency **5 kHz**, what should be the value of an inductor required to be connected in series so that the impedance of the circuit is minimum.

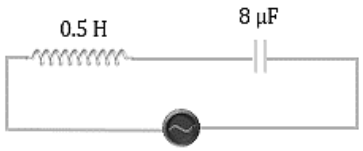
(A) 0.36 mH **(B)** 36 mH **(C)** 3.6 mH **(D)** 0

Q.5 A series **RLC** circuit has inductance of **0.12 H**, capacitance of **480 nF** and resistance of **23 Ω** is connected to a **230 V AC** supply whose frequency can be varied. What is the source frequency for which average power absorbed by the circuit is maximum? Also, find the value of maximum power.



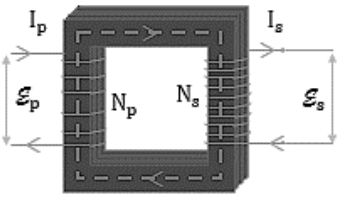
(A) 500.3 Hz, 1400 W **(B)** 580.2 Hz, 2000 W **(C)** 663.5 Hz, 2300 W **(D)** 753.5 Hz, 2800 W

Q.6 An **AC** circuit consists of an inductor of inductance **0.5 H** and a capacitor of capacitance **8 μF** in series. The current in the circuit is maximum when the angular frequency of **AC** source is,



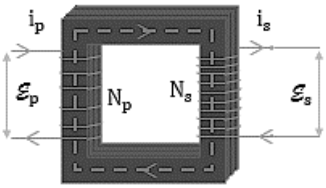
(A)500 Hz **(B)**2×10^5 Hz **(C)**4000 Hz **(D)**5000 Hz

Q.7 In a step-up transformer the turns ratio is **10**. The input current of the transformer is **12. 5 A** and the frequency is **50 Hz**. If the efficiency of the transformer is **80**%, then the frequency of the output current will be



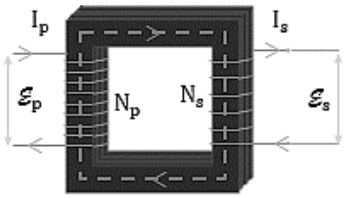
(A)500 Hz **(B)**5 Hz **(C)**40 Hz **(D)**50 Hz

Q.8 The primary and the secondary coil of a transformer have **50**and **1500 turns**, respectively. If the magnetic flux ϕ linked with the primary coil is given by $\boldsymbol{\phi = \phi_0 + 4t}$, where $\boldsymbol{\phi}$ is in **Wb**, **t** is the time in **s** and $\boldsymbol{\phi_0}$ is a constant, the output voltage across the secondary coil is



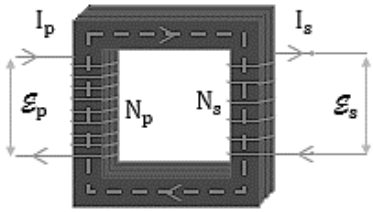
(A)120 V **(B)**220 V **(C)**30 V **(D)**90 V

Q.9 A transformer has 200 turns in primary coil and 600 turns in secondary coil. If a 220 V DC is applied across the primary coil, what will be the voltage across the secondary coil.



(A)0.4 A, 100 W **(B)**0.8 A, 200 W **(C)**0.2 A, 50 W **(D)**0.1 A, 50 W

Q.10 In a step-down transformer having primary to secondary turns ratio of **20**: **1**, the input voltage applied is **250 V** and output current is **8 A**. Assuming **100**% efficiency, calculate current in the primary coil and the output power.



(A)0.4 A, 100 W **(B)**0.8 A, 200 W **(C)**0.2 A, 50 W **(D)**0.1 A, 50 W

ANSWER KEY

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