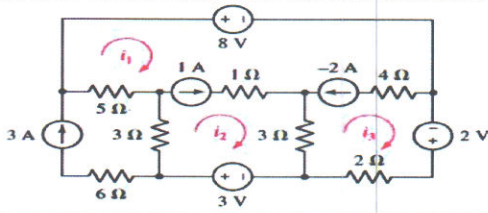


## Note:

- i. Question No. 1 shall contain 10 compulsory short answer questions (2 questions from each unit) for a total of 20 marks such that each question carries 2 marks.
- ii. In each of the questions from 2 to the last question, there shall be either/or type questions of 10marks each.

Q.No	Questions	BTL	CO	Marks
1	a) State KVL and KCL	K1	CO1	2M
	b) What are the differences between dependent and independent sources?	K2	CO1	2M
	c) Define Self and Mutual Inductance	K1	CO2	2M
	d) What is the significance of coefficient of coupling in magnetic circuits?	K2	CO2	2M
	e) Define average value and form factor	K1	CO3	2M
	f) Draw the power triangle and represent real, reactive power and apparent power	K2	CO3	2M
	g) What is the difference between series and parallel resonance?	K2	CO4	2M
	h) Define bandwidth and selectivity.	K1	CO4	2M
	i) State compensation theorem	K1	CO5	2M
	j) State Millman's theorem	K1	CO5	2M
UNIT-1				
2	a) Explain about dependent and independent sources with examples.	K1	CO1	5M
	b) A series connection of two resistors of resistances $100\Omega$ and $60\Omega$ is connected to a battery of EMF 50V and internal resistance $1\Omega$ . Determine the voltage across $60\Omega$ resistor. Recalculate the voltage across $60\Omega$ resistor when the internal resistance is neglected and also find the percentage change in the voltage.	K2	CO1	5M
(OR)				
3	a) Obtain numerical values for each of the mesh currents identified in the below circuit	K3	CO1	5M
				
	b) Explain the star-delta transformation and delta-star transformation and derive the expressions for equivalent resistances.	K2	CO1	5M
UNIT-II				
4	a) Two similar coils connected in series gave a total inductance of 600 mH and when one of the coil is reversed, the total inductance is 300 mH. Determine the mutual inductance between the coils and coefficient of coupling.	K3	CO2	5M
	b) Describe in detail the analogy between electrical and magnetic circuits.	K1	CO2	5M
(OR)				
5	a) Two coupled coils with $L_1=0.01H$ and $L_2=0.04H$ and $K=0.6$ are connected in four different ways i.e series aiding, series opposing, parallel aiding and parallel opposing. Find the equivalent inductance in each case.	K3	CO2	5M
	b) How do you use dot convention? For mutually coupled parallel coils show that	K4	CO2	5M
$L_{eq} = \frac{L_1 L_2 - M^2}{L_1 + L_2 - 2M}$				

## UNIT-III

6	a)	Find the rms value, average value and form factor of the voltage wave shown in figure 3(b).	K3	CO3	5M
		<p>Figure 3(b)</p>			
	b)	A certain inductive coil takes 15A when the supply voltage is 230 V, 50 Hz. If the frequency is changed to 40 Hz, the current increases to 17.2 A. Calculate the resistance and the inductance of the coil.	K3	CO3	5M
		(OR)			
7	a)	Find i) Average value, ii) RMS value, iii) Form factor, and iv) Peak factor. when $I_m$ is 3A.	K2	CO3	5M
	b)	A resistance of $12\ \Omega$ and an inductance of 0.025 H are connected in series across a 50 Hz supply. What values of resistance and inductance when connected in parallel will have the same resultant impedance and pf? Find the current in each case when the supply voltage is 230 V.	K3	CO3	5M
		UNIT-IV			
8	a)	Show that the resonant frequency $\omega_0$ of an RLC series circuit is the geometric mean of $\omega_1$ and $\omega_2$ , the lower and upper half-power frequencies respectively.	K2	CO4	5M
	b)	An RLC Series circuit consists of $R=1k\Omega$ , $L=100mH$ , $C=10\mu F$ . If a voltage of 100V is applied across the combination, determine resonant frequency, quality factor and bandwidth.	K2	CO4	5M
		(OR)			
9	a)	For a series resonant circuit with constant voltage and variable frequency, obtain the frequency at which voltage across the inductor is maximum. Calculate this maximum voltage when $R=50\ \text{ohms}$ , $L=0.05H$ , $C=20\ \text{micro farad}$ and $V=100\ \text{volts}$ .	K3	CO4	5M
	b)	A coil having a resistance of 10 ohms and an inductance of 0.2 H is connected in series with a $100\ \mu F$ capacitor are fed with 230 V, 50 Hz AC supply. Calculate (i) active and reactive components of current (ii) voltage across the coil. Draw the phasor diagram.	K3	CO4	5M
		UNIT-V			
10	a)	Using Thevenin's theorem, find the current flowing through 1.5 ohms resistance between A and B for the network shown in Figure	K3	CO5	5M
	b)	State and explain maximum power transfer theorem. What the applications and limitations of this theorem.	K2	CO5	5M
		(OR)			
11	a)	Find the value of R in the circuit shown in below figure 7(a) such that maximum power transfer takes place. What is the amount of this power?	K3	CO5	5M
		<p>Figure 7(a).</p>			
	b)	State and explain Superposition theorem. Is this theorem valid for power calculations? Substantiate your answer.	K2	CO5	5M