

Reg.No. \_\_\_\_\_

**Karunya UNIVERSITY**

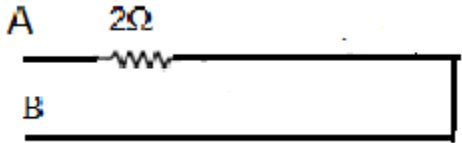
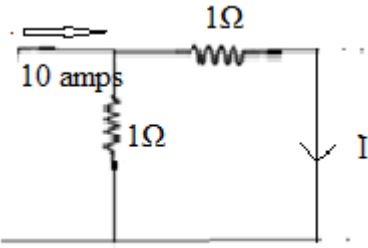
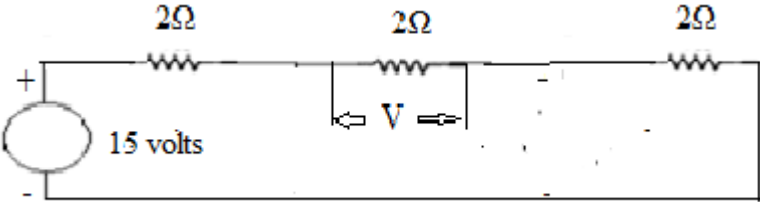
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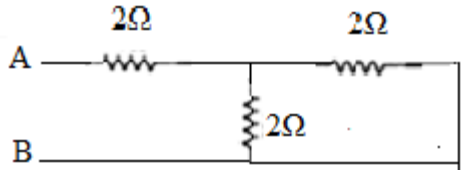
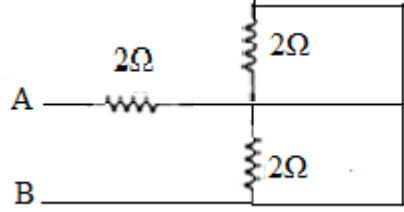
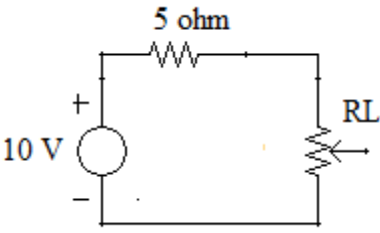
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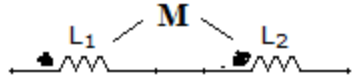
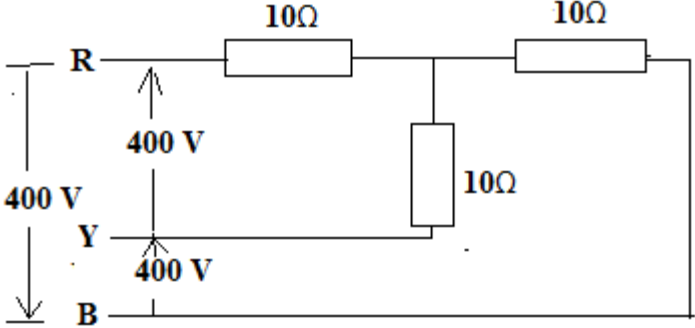
**End Semester Examination – Nov/Dec – 2016**

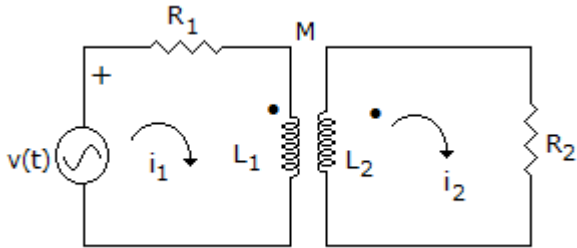
**Code : 14EE2001**  
**Sub. Name : Electric circuits & Networks**

**Semester : 2016-17 ODD**  
**Duration : 3hrs**  
**Max. marks : 100**

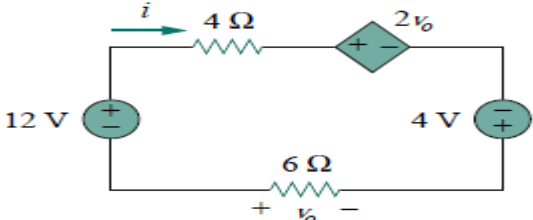
Q. No.	Questions	Course outcome	Marks
<b>PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)</b>			
1.	Which of the circuit element given below is an active element.	CO1	
	a. Voltage Source    b. Resistor    c. Inductor    d. Capacitor		(1)
2.	. _____ consumes power.	CO1	
	a. .Voltage Source    b. Resistor    c. Inductor    d. Capacitor		(1)
3.	. _____ stores energy in its electro static field.	CO1	
	a. Voltage Source    b. Resistor    c. Inductor    d. Capacitor		(1)
4.	If the power consumed in the circuit below is 8 watts, find the current through the circuit	CO1	
			
	a. 1 amps    b. 2 amps    c. 5 amps    d. ) 10 amps		(1)
5.	. _____ law states that the algebraic sum of all the currents meeting at a junction is zero	CO1	
	a. Faraday's law    b. Ohms law    c. Kirchoff's voltage law    d. Kirchoff's current law		(1)
6.	What is the value of "I" in the circuit given below	CO1	
			
	a.1 amp    b. 2 amps    c. 5 amps    d. 10 amps		(1)
7.	Find V in the circuit shown below.	CO1	
			
	a. 2 V    b. 5 V    c. 6V    d. 10 V		(1)
8.	Find $R_{AB}$	CO1	

						
	a. $2\Omega$	b. $3\Omega$	c. $4\Omega$	d. $6\Omega$		(1)
9.	Find $R_{AB}$ 				CO1	
	a. $2\Omega$	b. $3\Omega$	c. $4\Omega$	d. $6\Omega$		(1)
10.	Voltage across _____ will be in phase with current through it.				CO1	
	a. Resistor	b. Inductor	c. Capacitor	d. All of the above		(1)
11.	The operator 'j' is equivalent to _____				CO1	
	a. $1\angle 180^\circ$	b. $1\angle 90^\circ$	c. $1\angle 0^\circ$	d. None of the above		(1)
12.	A $4\Omega$ resistor, $j4\Omega$ inductive reactance and a $j4\Omega$ capacitive reactance are in series across a source voltage. What is the net impedance across the voltage source.				CO1	
	a. $4\Omega$	b. $(4+j4)\Omega$	c. $(4-j4)\Omega$	d. $(4+j8)\Omega$		(1)
13.	Super mesh circuit analysis is done when there is a _____ in the common branch of two meshes.				CO1	
	a. Ideal voltage source	b. Ideal current source	c. Practical voltage source	d. Practical current source		(1)
14.	_____ theorem is applicable to a circuit only when there are more than one source present in the circuit.				CO1	
	a. Superposition	b. Thevenin's	c. Norton's	d. Maximum power transfer		(1)
15.	In the circuit shown below, determine the value of $R_L$ at which maximum power will be transferred to the load . 				CO1	
	a. $1\Omega$	b. $2\Omega$	c. $5\Omega$	d. $10\Omega$		(1)
16.	When a series RLC circuit resonates, the supply voltage and the current through the circuit will be _____ .				CO2	
	a. In phase	b. Out of phase by $90^\circ$	c. Out of phase by $180^\circ$	d. None of the above		(1)
17.	If the current through a series RLC circuit at resonance is $I$ , current through the circuit at half power frequency will be _____.				CO2	

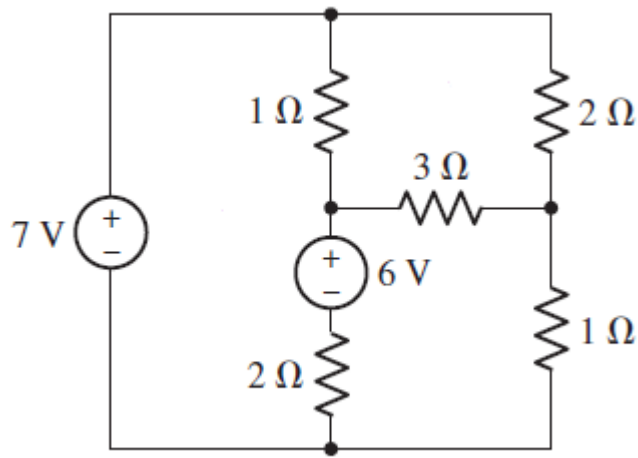
	a. $I$	b. $I/2$	c. $I/\sqrt{2}$	d. $\sqrt{2}I$		(1)
18.	The equivalent inductance of the circuit shown below, $L_{eq} =$ _____				CO1	
						
	a. $L_1 + L_2$	b. $L_1 - L_2$	c. $L_1 + L_2 - 2M$	d. $L_1 + L_2 + 2M$		(1)
19.	In a 3 phase circuit with balanced delta connected load if the line voltage is 400V, _____ will be the phase voltage				CO1	
	a. 400 V	b. $400/\sqrt{3}$	c. $400 * \sqrt{3}$	d. None of the above		(1)
20.	In the circuit shown below, what will be the phase current?				CO1	
						
	a. 23.1Amps	b. 40 Amps	c. 69.3 Amps	d. None of the above		(1)
21.	The time constant of a series RL Circuit is _____				CO2	
	a. $\tau = L/R$	b. $\tau = R^2L$	c. $\tau = RL$	d. $\tau = R/L$		(1)
22.	In a Y-connected circuit, between each line voltage and the nearest phase voltage, there is a phase angle of				CO1	
	a. $30^\circ$	b. $0^\circ$	c. $90^\circ$	d. $60^\circ$		(1)
23.	In a three-phase system, when the loads are perfectly balanced, the neutral current is				CO1	
	a. two-thirds of maximum	b. zero	c. one-third of maximum	d. at maximum		(1)
24.	In a certain Y-Y system, the source phase currents each have a magnitude of 9 A. The magnitude of each load current for a balanced load condition is				CO1	
	a. 3A	b. 12A	c. 9A	d. 27A		(1)
25.	In a Y-connected circuit, the magnitude of each line current is				CO1	
	a. Three times the corresponding phase current	b. one-third the phase current	c. Equal to the corresponding phase current	d. zero		(1)
26.	If in a Y-connected ac generator, each phase voltage has a magnitude of 90 VRMS, what is the magnitude of each line voltage?				CO1	
	a. 90 V	b. 0 V	c. 156 V	d. 180 V		(1)
27.	In two wattmeter method of power measurement if the total power is measured by one wattmeter only then P.F of the system is				CO1	
	a. 0	b. 0.5	c. 1	d. none of the above		(1)
28.	In a three-phase system, the voltages are separated by				CO1	
	a. $120^\circ$	b. $180^\circ$	c. $45^\circ$	d. $90^\circ$		(1)
29.	A resonant circuit has a lower critical frequency of 7 kHz and an upper critical frequency of 13 kHz. The bandwidth of the circuit is				CO2	
	a. 10KHz	b. 12KHz	c. 6KHz	d. 8KHz		(1)

30.	In single tuned circuit there is only one capacitor on	CO2	
	a. Primary side      b. secondary side      c. both side      d. none		(1)
31.	What is the total impedance of a 60 Hz series RLC circuit when $X_L = 7.5$ ohms, $X_C = 265.3$ ohms, and $R = 33$ ohms?	CO2	
	a. 290.8 ohms      b. 257.8 ohms      c. 259.9 ohms      d. 1989.75 ohms		(1)
32.	Time constant in R – C series circuit is _____.	CO2	
	a. C/R      b. R/C      c. RC      d. RC/2		(1)
33.	The pass band of a constant k filter with $Z_1$ and $Z_2$ as series and shunt arm impedances is given by	CO3	
	a. $-1 < \frac{Z_1}{4Z_2} < 0$ b. $-2 < \frac{Z_1}{4Z_2} < -1$ c. $1 < \frac{Z_1}{4Z_2} < 0$ d. $0 < \frac{Z_1}{4Z_2} < 1$		(1)
34.	A $47 \Omega$ resistor is in series with an inductive reactance of $120 \Omega$ across an ac source. The impedance, expressed in polar form, is	CO1	
	a. $47 \angle 68.6^\circ \Omega$ b. $120 \angle 68.6^\circ \Omega$ c. $129 \angle 31.4^\circ \Omega$ d. $129 \angle 68.6^\circ \Omega$		(1)
35.	What is the maximum value of co-efficient of coupling?	CO2	
	a. 1.2      b. 0.5      c. 0.8      d. 1.0		(1)
36.	A 2-port network using z-parameter representation is said to be reciprocal if	CO1	
	a. $Z_{11} = Z_{22}$ b. $Z_{12} = Z_{21}$ c. $Z_{12} = -Z_{21}$ d. $Z_{11} Z_{22} = -Z_{12} Z_{21}$		(1)
37.	A _____ filter significantly attenuates all frequencies below $f_c$ and passes all frequencies above $f_c$ .	CO3	
	a. low-pass      b. high-pass      c. band-pass      d. band-stop		(1)
38.	For the network of figure KVL for first loop is	CO2	
			
	a. $v(t) = R_1 i_1 + L_1 \frac{di_1}{dt} + M \frac{di_2}{dt}$ b. $v(t) = R_1 i_1 - L_1 \frac{di_1}{dt} - M \frac{di_2}{dt}$ c. $v(t) = R_1 i_1 + L_1 \frac{di_1}{dt} - M \frac{di_2}{dt}$ d. $v(t) = R_1 i_1 - L_1 \frac{di_1}{dt} + M \frac{di_2}{dt}$		(1)
39.	In a parallel circuit containing set of bulbs, if one of the bulb blew up the effective resistance offered will:	CO1	
	a. Remains same      b. Increase      c. Fluctuate      d. Decrease		(1)
40.	If $R_1$ is in series with parallel connected to $R_2$ and $R_3$ , what happens to total current if $R_2$ opens?	CO1	
	a. Increases      b. remains the same      c. decreases      d. none of these		(1)

**PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)**

41.	Determine $v_o$ and $i$ in the circuit shown in Figure.	CO1	(5)
			

42.	Find out the equivalent resistance between terminals A and B in the Figure.	CO1	(5)
43.	Use the superposition theorem to find $v$ in the circuit in Figure .	CO1	(5)
44.	State and illustrate Norton's theorem	CO1	(5)
45.	Explain dot rule for coupled coils.	CO1	(5)
46.	Find the resonant frequency , Band width and Quality factor for the ideal series RLC circuit having $L = 50 \text{ mH}$ , $C = 0.01 \text{ }\mu\text{F}$ and Supply voltage $V = 10 \text{ V}$ .	CO2	(5)
47.	Calculate the total inductance of three coupled circuit shown in the figure.	CO1	(5)
48.	A three phase balanced delta connected load of $4+j8\Omega$ is connected across a 400V, 3-phase balanced supply. Determine the phase currents and line currents assume the phase sequence to be RYB.	CO1	(5)
49.	Derive the transient response of an RC circuit when it is switched to a unit step voltage source at time $t=0$ . Assume that the initial voltage across capacitor is zero.	CO2	(5)
50.	For the given two port network find the impedance parameters.	CO2	(5)
<b>PART C( 2 X 10 = 20 MARKS) (ANSWER ANY TWO)</b>			
51.	Find the current through $3\Omega$ resistor, and the current supplied by the $7 \text{ V}$ source by mesh analysis.	CO1	(10)



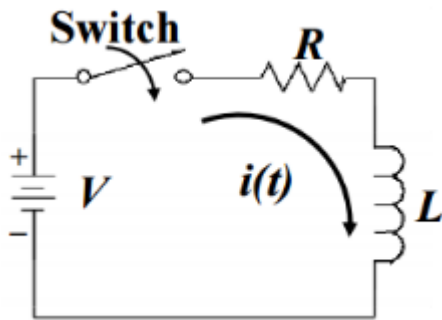
52. With the help of phasor diagram, prove that with two wattmeter readings, real power, reactive power and powerfactor of a 3 $\phi$  circuit can be calculated.
53. In the given circuit, the switch is closed at  $t=0$ . Derive the expression for transient current.

CO2

(10)

CO2

(10)



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