

Reg.No. _____

**Karunya UNIVERSITY**

(Karunya Institute of Technology & Sciences)

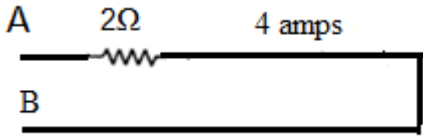
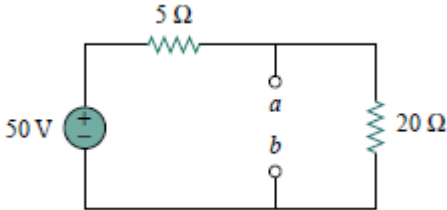
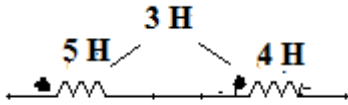
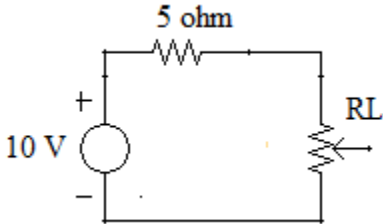
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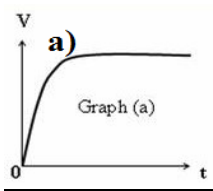
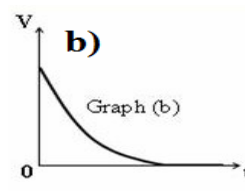
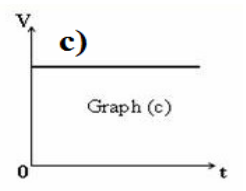
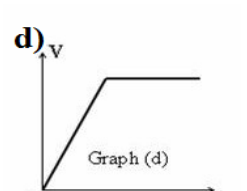
End Semester Examination – Nov/Dec – 2016

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

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

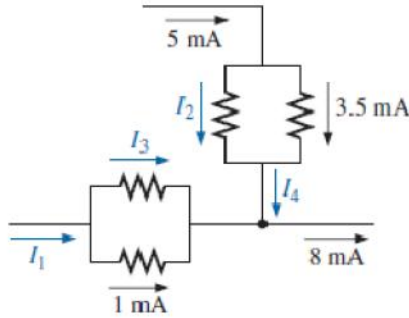
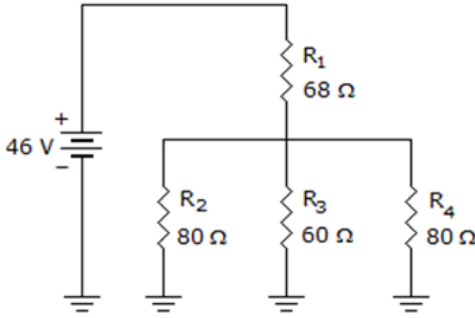
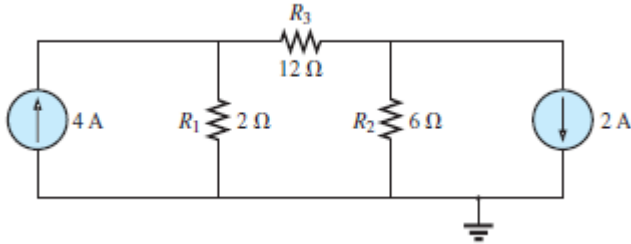
Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	Which of the circuit element given below is an active element?		
	a. Voltage Source b. Resistor c. Inductor d. Capacitor	CO1	(1)
2.	How much resistance is required to limit the current from a 12 V battery to 3.6 mA?		
	a. 33 K Ω b. 3.3 K Ω c. 2.2 K Ω d. 22 K Ω	CO1	(1)
3.	$2\angle 50^\circ$ in rectangular form is given by		
	a. $1.93-j0.52$ b. $1.93+j0.52$ c. $0.52+j1.93$ d. None of these.	CO2	(1)
4.	Ten lamps are connected in parallel across a 12 V supply. What is the voltage across each lamp		
	a. 120V b. 1.2 V c. 12V d. 1200V	CO1	(1)
5.	Find R_{AB}		
	a. 2 Ω b. 3 Ω c. 4 Ω d. 6 Ω	CO1	(1)
6.	When one of three series resistors is removed from a circuit and the circuit is reconnected, the current		
	a. Increases b. decreases by the amount of current through the removed resistor c. is zero d. decreases by one-third	CO1	(1)
7.	Find I_2 $4I_1 + 4I_2 = 2$ $6I_1 + 7I_2 = 4$		
	a. 1A b. -1A c. 10 mA d. 100 mA	CO1	(1)
8.	$(2+j2)$ in polar form is given by:		
	a. $2\angle 450$ b. $2\angle -450$ c. $2.828\angle -450$ d. $2.828\angle 450$	CO2	(1)
9.	_____ law states that the algebraic sum of all the currents meeting at a junction is zero.		
	a. Faraday's law b. Kirchoff's voltage law c. Kirchoff's current law d. Ohms law	CO1	(1)
10.	Three equal resistance of 3 Ω are connected in star .What is the resistance in one of the arms in equivalent delta circuit?		
	a. 10 Ω b. 3 Ω c. 9 Ω d. 27 Ω	CO1	(1)

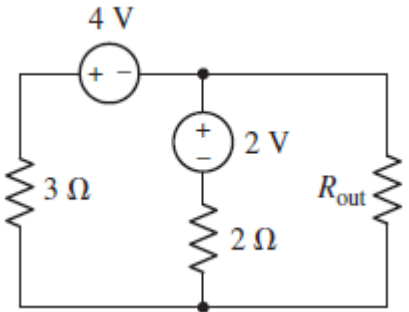
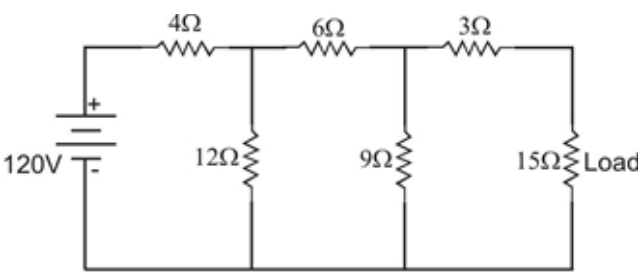
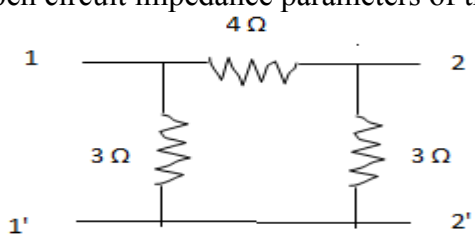
11.	Mesh Analysis is based on					
	a.KVL	b. KCL	c. None	d. Both KVL and KCL	CO1	(1)
12.	Find the voltage V_{AB} if the current through the 2Ω resistor is 4 amps					
						
	a. 5 Volts	b. 6 Volts	c. 8 Volts	d. 10 Volts	CO1	(1)
13.	_____ theorem is applicable only to a linear, bilateral net work					
	a. Superposition	b. Thevinin's	c. Norton's	d. Reciprocity	CO1	(1)
14.	Superposition Theorem is not valid for					
	a. Power responses	b.voltage responses	c.current responses	d. all the three	CO1	(1)
15.	Calculate the Thevenin's Resistance across terminals a and b of the circuit in Figure.					
						
	a. 4Ω	b. 5Ω	c. 3Ω	d. 6Ω	CO1	(1)
16.	The equivalent inductance of the circuit shown below, $L_{eq} =$ _____.					
						
	a. 9H	b. 1H	c. 3H	d. 15H	CO1	(1)
17.	In the circuit shown below, determine the value of R_L at which maximum power will be transferred to the load					
						
	a. 1Ω	b. 5Ω	c. 10Ω	d. 20Ω	CO1	(1)
18.	What theorem replaces a complex network with an equivalent circuit containing a source voltage and a series resistance?					
	a. Norton	b. Multinetwork	c.Thevenins	d. Superposition	CO1	(1)
19.	Norton's theorem is the dual of-----					
	a. Superposition	b. Thevenins	c. Millmans	d. Reciprocity	CO1	(1)
20.	Under the conditions of maximum power transfer, the efficiency is _____					
	a. 50%	b.100%	c.75%	d.90%	CO1	(1)
21.	When $X_C = X_L$ the circuit:					
	a. Draws maximum current	b. is at resonance	c. applied voltage is zero	d. draws minimum current	CO1	(1)
22.	If the value of C in a series RLC circuit is decreased, the resonant frequency					

	a. is reduced to zero	b. is not affected	c. increases	d. decreases	CO2	(1)
23.	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					
	a. 10KHz	b. 12KHz	c. 6KHz	d. 8KHz	CO2	(1)
24.	In a Y-connected circuit, between each line voltage and the nearest phase voltage, there is a phase angle of					
	a. 30°	b. 0°	c. 90°	d. 60°	CO1	(1)
25.	What is the maximum value of co-efficient of coupling?					
	a. 1.2	b. 0.5	c. 0.8	d. 1.0	CO1	(1)
26.	In a star-connected system, the relation between line voltage V_L and Phase voltage V_{ph} is					
	a. $V_L = \sqrt{3}V_{ph}$	b. $V_L = V_{ph}$	c. $V_L = \frac{V_{ph}}{\sqrt{3}}$	d. None of these.	CO1	(1)
27.	Two inductively coupled coils have self inductance $L_1 = 0.02$ H and $L_2 = 0.01$ H. If the Coefficient of coupling $K = 0.5$, The value of mutual inductance between the coil is					
	a. 0.00707 H	b. 0.00707 mH	c. 7 H	d. 700 H	CO1	(1)
28.	In a three-phase system, when the loads are perfectly balanced, the neutral current is					
	a. two-thirds of maximum	b. zero	c. one-third of maximum	d. at maximum	CO1	(1)
29.	In two wattmeter method of power measurement if the total power is measured by one wattmeter only then pf of the system is					
	a. 0	b. 0.5	c. 1	d. none of the above	CO1	(1)
30.	In a three-phase system, the voltages are separated by					
	a. 120°	b. 180°	c. 45°	d. 90°	CO1	(1)
31.	In a certain Y-Y system, the source phase currents each have a magnitude of 10 A. The magnitude of each load current for a balanced load condition is					
	a. 3A	b. 12A	c. 10A	d. 27A	CO1	(1)
32.	The time constant of RC circuit with $R=200$ ohms and $C=10$ microfarad is -----					
	a. 0.2	b. 0.002	c. 2	d. 0.4	CO2	(1)
33.	Resonant frequency of a series RLC circuit is given by					
	a. $f_r = \frac{2\pi}{\sqrt{LC}}$	b. $f_r = \frac{1}{2\pi\sqrt{LC}}$	c. $f_r = \frac{\sqrt{LC}}{2\pi}$	d. $f_r = 2\pi\sqrt{LC}$	CO2	(1)
34.	The time constant of a series RL Circuit is _____					
	a. $\tau = \frac{L}{R}$	b. $\tau = R^2L$	c. $\tau = RL$	d. $\tau = \frac{R}{L}$	CO2	(1)
35.	Which one of following graphs represents the nature of variation of the potential drop V across the resistance with time in series RL circuit?					
	a. 	b. 	c. 	d. 	CO2	(1)
36.	Which among the following is regarded as open circuit input impedance?					
	a. Z_{11}	b. Z_{12}	c. Z_{21}	d. Z_{22}	CO1	(1)
37.	If the resistance in parallel with a parallel resonant circuit is reduced, the bandwidth					

	a. Increases	b. becomes sharper	c. disappears	d. decreases	CO2	(1)
38.	How is the short circuit reverse transfer admittance (y_{12}) calculated in terms of current and voltage ratio?					
	a. V_2/I_1 (keeping $I_2 = 0$)	b. I_2/V_1 (keeping $V_2 = 0$)	c. I_1/V_2 (keeping $V_1 = 0$)	d. V_1/I_2 (keeping $I_1 = 0$)	CO1	(1)
39.	A 2-port network using z-parameter representation is said to be reciprocal if					
	a. $Z_{11} = Z_{22}$	b. $Z_{12} = Z_{21}$	c. $Z_{12} = -Z_{21}$	d. $Z_{11}Z_{22} = -Z_{12}Z_{21} = 1$	CO1	(1)
40.	A _____ filter significantly attenuates all frequencies below f_c and passes all frequencies above f_c .					
	a. low-pass	b. high-pass	c. band-pass	d. band-stop	CO3	(1)

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

41.	Find the unknown currents using KCL. 	CO1	(5)
42.	How much voltage is dropped across R_3 in the given circuit? 	CO1	(5)
43.	Determine the current through R_3 by node analysis. 	CO1	(5)
44.	State superposition theorem. Mention its applications.	CO1	(5)
45.	Find the value of R_{out} such that maximum power is delivered to it. Also, find the maximum power.	CO1	(5)

			
46.	A series-connected circuit has $R = 4\ \Omega$ and $L = 25\ \text{mH}$. (a) Calculate the value of C that will produce a quality factor of 50. (b) Find lower and higher cut-off frequencies. c) bandwidth	CO2	(5)
47.	Two coupled coils with $L_1=0.5\ \text{mH}$ and $L_2=0.4\ \text{mH}$ have a coupling coefficient $k=0.75$. Find the mutual inductance and the turns ratio. If current in the first coil is $10\sin 317t$ find the mutually induced voltage in the second coil.	CO2	(5)
48.	A balanced star connected load of $(8+j6)\ \Omega/\text{phase}$ is supplied with a balanced 3- ϕ , 400V supply. Find the a) phase current b) line current c) Real power d) reactive power e) apprant power.	CO2	(5)
49.	A series RLC circuit with $R=5\ \Omega$, $L=0.1\ \text{H}$, $C=100\ \mu\text{F}$ is applied with a step voltage of 150 volts. Find the nature of damping and write the expression for transient current.	CO2	(5)
50.	Design a constant K low pass filter having a cut off frequency of 2 KHz to operate with a terminated load resistance of 500 ohm.	CO3	(5)
PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)			
51.	Find the load current using mesh analysis.	CO1	(10)
			
52.	Derive an expression to find the output current, voltage and amplification factor of a single tuned coupled circuit	CO2	(10)
53.	Determine the open circuit impedance parameters of the π network given below.	CO2	(10)
			

ALL THE BEST