GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech (Third Semester - Regular) Examinations, November – 2024

23BEEPC23002 – Network Theory

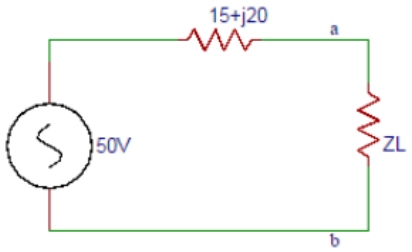
(ECE)

Time: 3 hrs Maximum: 60 Marks

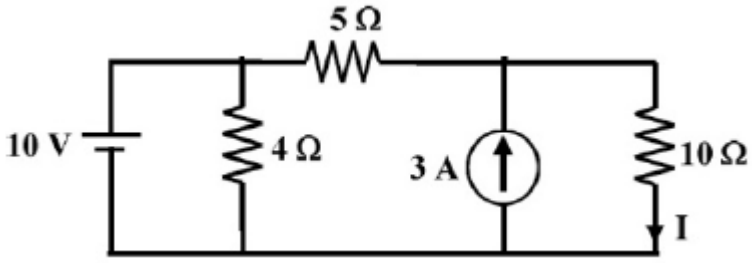
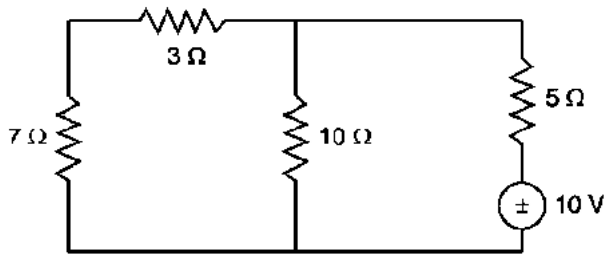
Answer ALL questions

(The figures in the right hand margin indicate marks)

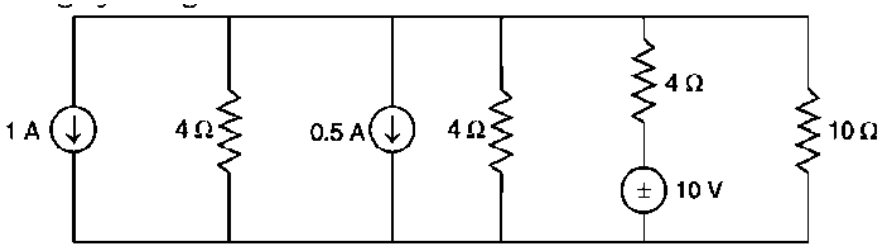
PART – A **(2 x 5 = 10 Marks)**

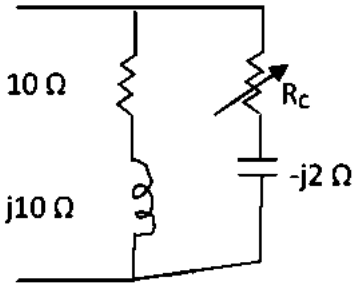
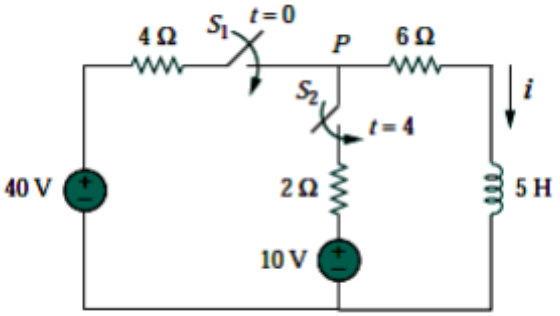
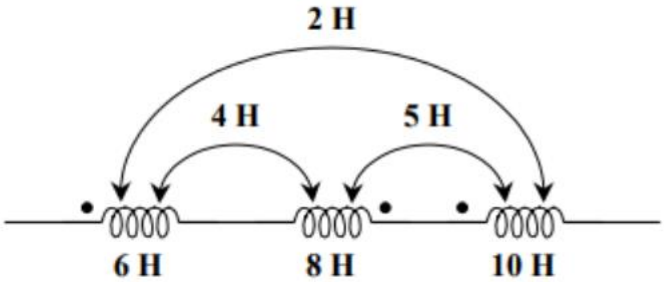
		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Define the following terms tree and co-tree.	CO1	K1
b.	A two-port device is defined by the following pair of equations $I_1 = 5V_1 + 2V_2$, $I_2 = 3V_1 + 4V_2$. Write its impedance parameters Z_{11}, Z_{12}, Z_{2l}, and Z_{22}.	CO4	K3
c.	In the circuit shown below, find the value of load impedance for which source delivers maximum power. 	CO1	K3
d.	If the value of resonant frequency is 50 kHz in a series RLC circuit with a bandwidth Of about 1 kHz, then what would be the value of the quality factor?	CO2	K3
e.	Define the coefficient of coupling.	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Find the current I using superposition theorem 	5	CO1	K4
b.	Determine current through 7Ω resistor for the circuit shown in fig. Verify Reciprocity theorem. 	5	CO1	K3
	(OR)			
c.	State and explain the maximum power transfer theorem.	5	CO1	K2
d.	Calculate the current through 10Ω and voltage drop across it for the circuit	5	CO1	K4

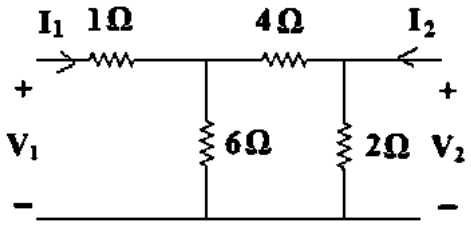
shown in fig by using Milliman's Theorem.



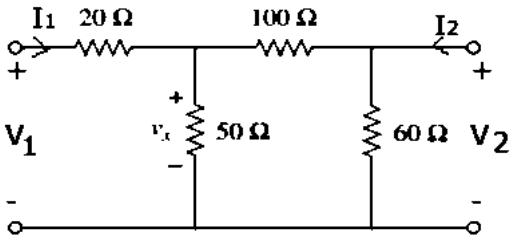
3.a.	An AC circuit is composed of a serial connection of: a resistor with resistance 50 Ω, a coil with inductance 0.3 H, and a capacitor with capacitance 15 μF. The circuit is connected to an AC voltage source with amplitude 25 V and frequency 50 Hz. Determine the amplitude of electric current in the circuit and a phase difference between the voltage and the current , total power of the circuit.	6	CO2	K3
b.	Explain about RLC Series resonance with phasor diagrams and find resonant frequency.	4	CO2	K2
	(OR)			
c.	Write short notes on Resonance and Q factor. A pure resistor, a pure capacitor and a pure inductor are connected in parallel across a 50Hz supply; find the impedance of the circuit as seen by the supply. Also find the resonant frequency.	5	CO2	K3
d.	What do you mean by dynamic impedance of a parallel resonance circuit? Calculate the value of RC in the circuit as shown in Fig. to yield resonance. 	5	CO2	K3
4.a.	At t=0. Switch 1 in the figure is closed and switch 2 is closed 4 secs later. Find i(t) for t>0. Calculate I for t= 2 secs and t= 5 secs. 	6	CO3	K3
b.	Derive the Transient Response of series RL-circuit with D.C excitation.	4	CO3	K2
	(OR)			
c.	For the three coupled coils shown in figure. Calculate the total inductance. 	6	CO5	K4
d.	Two inductors of 10mH respectively are connected together in a series combination so that their magnetic fields aid each other giving cumulative coupling. Their mutual inductance is given as 5mH. Calculate the total	4	CO5	K3

inductance of the series combination.

5.a.	Find Z-parameter of a given circuit as shown in Fig 1:	5	CO4	K3

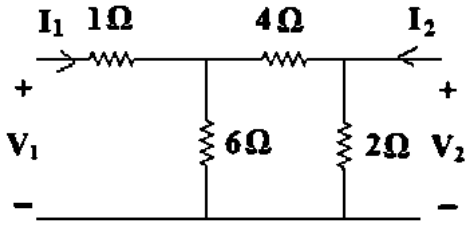


b.	Find hybrid parameter of the given circuit shown in figure.	5	CO4	K3



(OR)

c.	Find Y-parameter of a given circuit as shown in figure:	6	CO4	K3



d.	Obtain Y- and h- parameter, if the other parameters are given below A=2, B= -1, C=3, and D= -2.	4	CO4	K3
6.a.	Derive the Incidence Matrix for a given graph as shown in fig 1.	5	CO1	K3

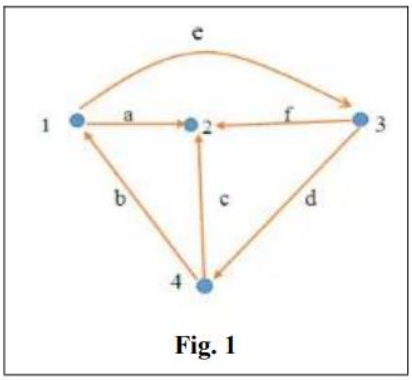


Fig. 1

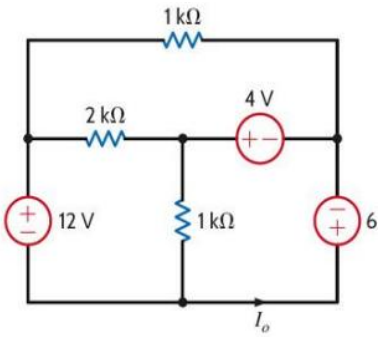


Fig.2

b.	Derive the Tie set Matrix for a given graph as shown in Fig 2.	5	CO1	K4

(OR)

c.	Compare the Incidence Matrix, Tie-Set Matrix, and Cut-Set Matrix in terms of their Applications.	5	CO1	K2
d.	**i)** How does the co-efficient of coupling affected the mutual inductance of two coils? **ii)** If two coils have self-inductance of L1=4H and L2=9H, and their mutual inductance =6H calculate the co-efficient of coupling?	5	CO5	K3

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