III- SEM -ELEC/ ELEC(PT)/E&RE/E&M/E(IC)/2019(W)/(New)

Th. 2 - CIRCUIT & NETWORK THEORY

Full Marks: 80

Time : 3 Hours

Answer any FIVE Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.	Answer ALL the Questions:	[2x10]
(a)	Define Retentivity ?	
(b)	What do you mean by Coefficient of Coupling ?	
(c)	Draw the power triangle and derive the formula for apparent power?	
(d)	State Superposition Theorem.	
(e)	What is Bilateral element ? Give at least two examples?	
(f)	Define Quality Factor.	
(g)	Define Filter in electrical circuit	
(h)	What is power factor?	
(i)	State Blondel's Theorem.	
(j)	Find the current across 5Ω resistor in the circuit as shown in Figure 1.	

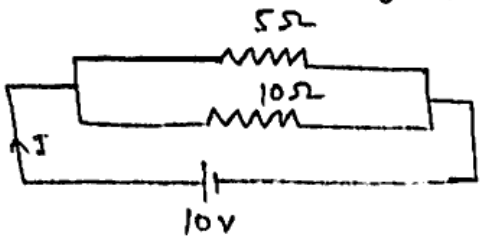

Figure 1

2.	Answer any SIX questions:	[5x6]
(a)	Explain Briefly the 3ph power measurement by 2-Wattmeter method for Star connection load only?	
(b)	Find the total inductance of the three series connected coupled coil as shown in the Figure 2.	

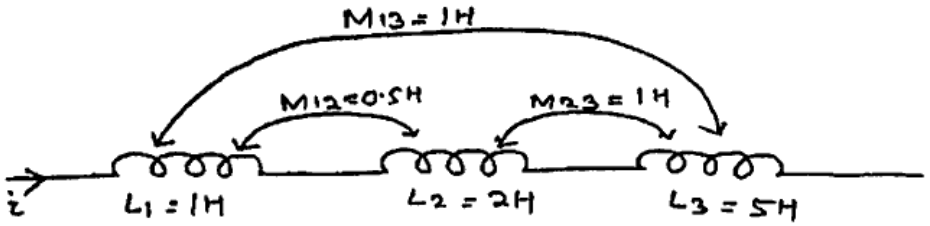

Figure 2

(c)	State and Explain Maximum Power Transfer Theorem.	
(d)	Find the current in series R-L circuit having R = 2Ω AND L = 10 H while D.C voltage of 100V is applied. What is the value of this current after 5sec of switching on ?	
(e)	Derive the Relation between Line and Phase quantities in STAR connection?	
(f)	In series RLC circuit has R = 2Ω, L = 2mH and C = 10μF. Calculate (i) Q- Factor of the circuit (ii) Bandwidth (iii) The Resonant frequency (iv) the half power frequency f1 and f2.	
(g)	The unbalanced Bridge circuit is shown in Figure 3. Find the value of current in R_l = 50Ω	

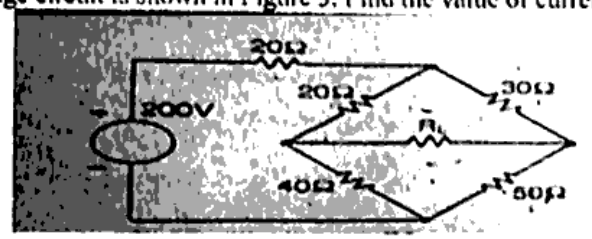

Figure 3

3.	Consider the Figure 4 as shown below. Find the voltage at different node by using SUPERNODE analysis?	[10]

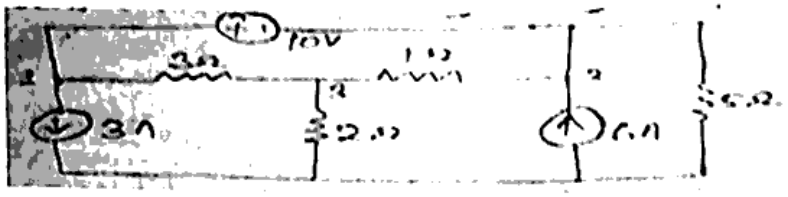

Figure 4

4.	Explain Briefly Hysteresis loop in a ferromagnetic material?	[10]
5.	Obtain the open circuit parameter (Z- Parameter) and loop quantities of the network shown in Figure 5.	[10]

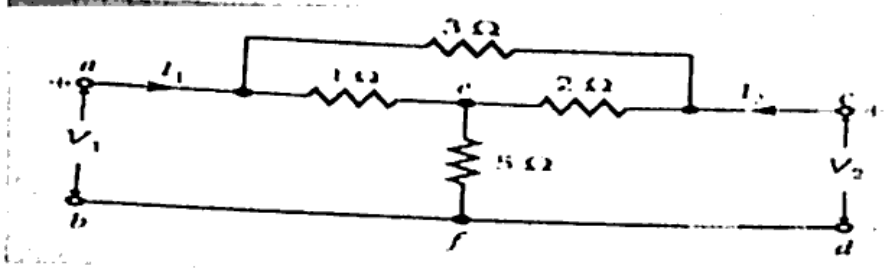

Figure 5

6.	Find the current in the 3Ω resistor for the circuit as shown in Figure 6 by using Thevinin Theorem.	[10]

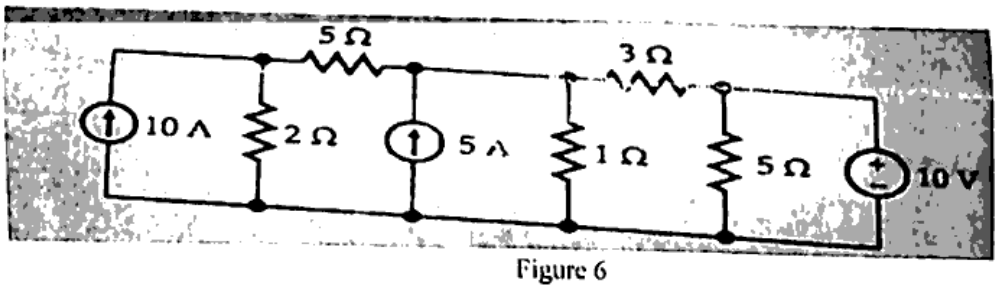

Figure 6

7.	Design a Prototype Band Pass Filter to match with a load of 600Ω and allow frequencies between 3KHZ and 6KHZ.	[10]