Department of ECE, Bennett University

EECE105L: Fundamentals of Electrical and Electronics Engineering

Tutorial Sheet-6

Topics Covered: Thevenin's Theorem, Norton's Theorem with multiple voltage or a current sources, and Maximum Power Transfer Theorem

Note: Circuits shown in fig. 8 -12 are not part of a regular tutorial sessions and are intended for those students who want to have some more challenging problems. Thus, the circuits in fig. 8 -12 will not be discussed in tutorial sessions.

1. Using Thevenin's theorem, simplify the circuits shown in Fig. 1 to Fig. 12. Assume that the load resistance is connected between nodes A and B. If the load resistance value is not specified, compute the load resistance such that maximum power is transferred to the load. Find the voltage across the load resistor and current through the load resistor and the power rating of the load resistor.

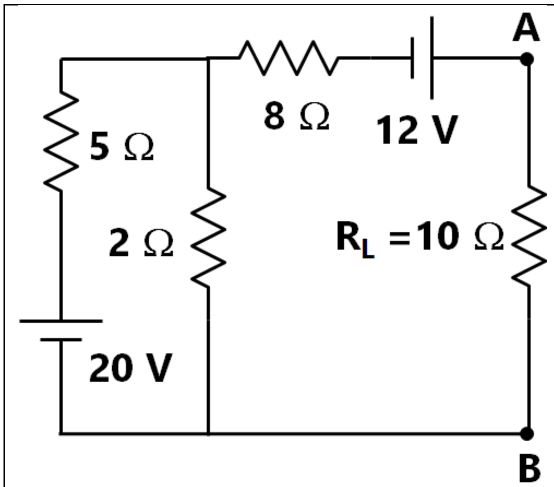

Fig. 1

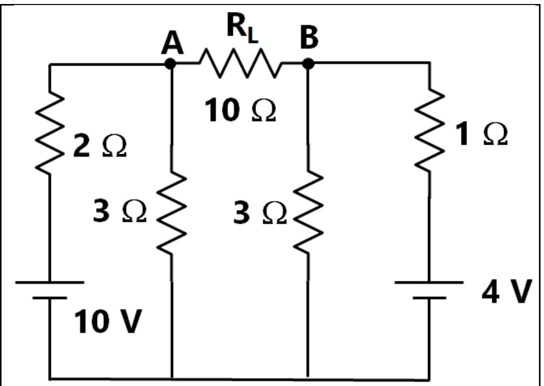

Fig. 2

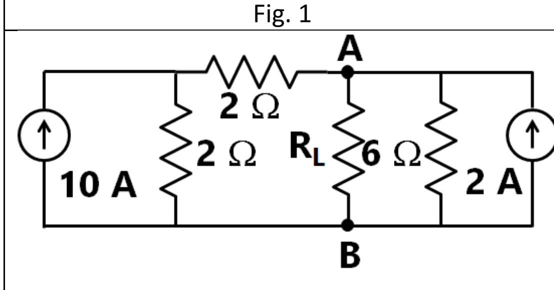

Fig. 3

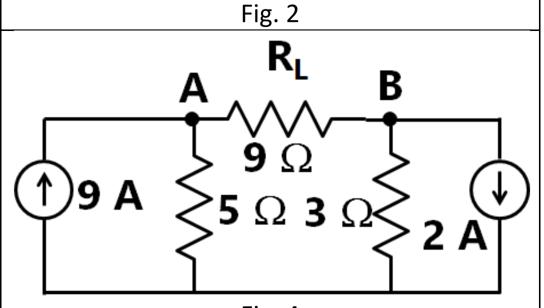

Fig. 4

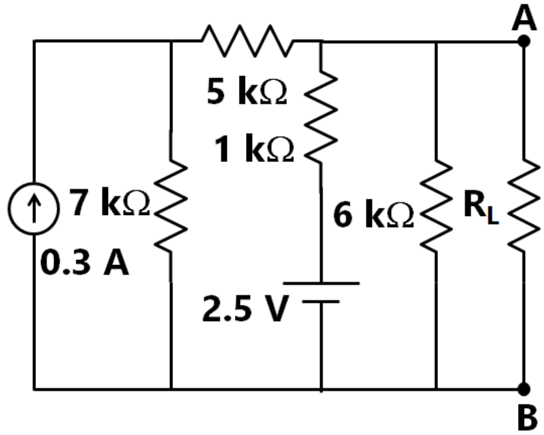

Fig. 5

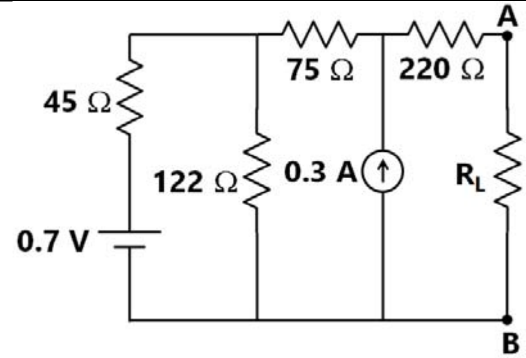

Fig. 6

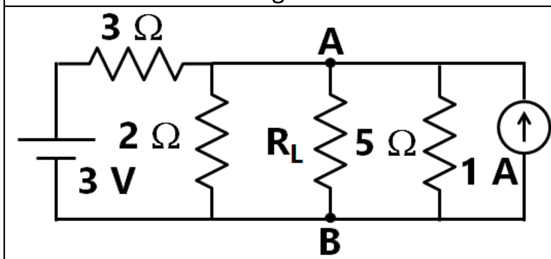

Fig. 7

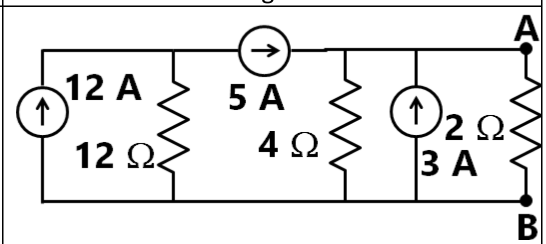

Fig. 8

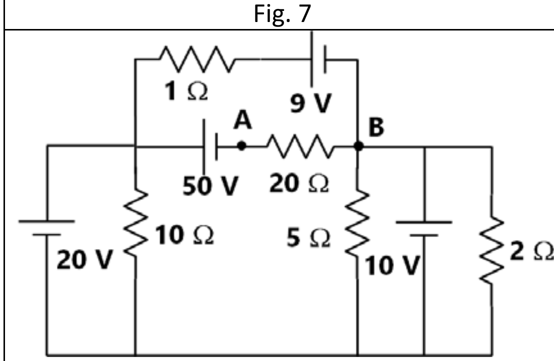

Fig. 9

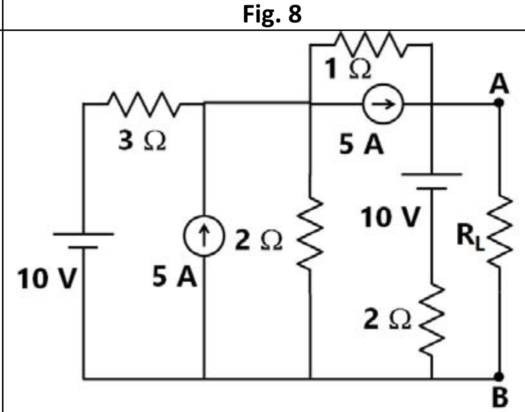

Fig. 10

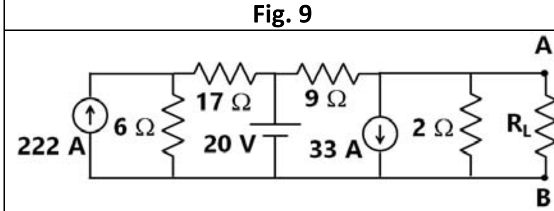

Fig. 11

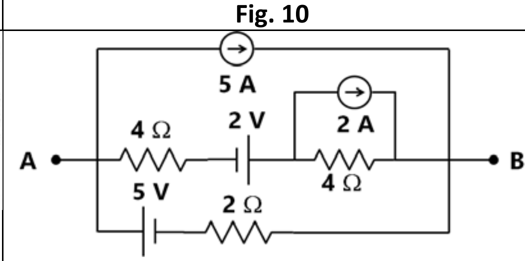

Fig. 12

2. Using Norton's theorem, simplify the circuits shown in Fig. 1 to Fig. 12. Assume that the load resistance is connected between nodes A and B. If the load resistance value is not specified,

compute the load resistance such that maximum power is transferred to the load. Find the voltage across the load resistor and current through the load resistor and the power rating of the load resistor. Compare your results from problem 1.

3. Try some of the circuits using [Circuit Sandbox simulator]().

------------- END OF QUESTIONS -------------

Answers:

Fig. No.	R_{TH} (R_N) (Ω)	R_L (Ω)	V_{TH} (V)	I_N (A)	V_L(V)	I_L (A)	P_L (W) = $V_L \times I_L$	P_{Max} (W)
Fig. 1	9.43	**10**	17.714	1.88	9.117	911.7×10^{-3}	8.31	8.32
Fig. 2	1.95	**10**	3	1.54	2.51	0.251	0.63	0.77
Fig. 3	2.4	2.4	16.8	7	8.4	3.5	-	29.4
Fig. 4	8	**9**	51	6.375	27	3	81	81.28
Fig. 5	800	800	142	0.1775	71	88.75×10^{-3}	-	6.3
Fig. 6	323	323	32.913	100.3×10^{-3}	16.4565	50.95×10^{-3}	-	0.8384
Fig. 7	0.97	0.97	1.94	2	0.97	1	-	0.97

Note: R_L in bold letters represents R_L given in the circuit.