ECE113: Basic Electronics Mid Semester Exam-2023

Date: **15/04/2023** Duration: **1Hours** Total Points: **40 Points**

Q1: The **V-I** characteristic of two elements is shown in Fig. 1. Comments about Active/Passive, Linear/Non-linear & Unilateral/Bilateral parameters in both cases. **(2*1 Points)**

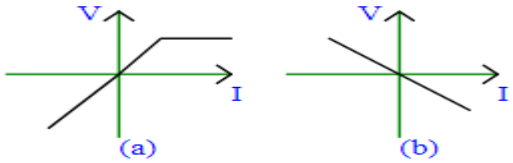

Figure 1

Q2: In Fig. 2, switch (S_1) was initially closed for sufficient time. At time **t =t_0 sec**, the switch (S_1) is opened & after time **t=(t_0+Δt_0) sec**, the switch (S_2) is closed. What will happen in the circuit at time **t=(t_0+ Δt_0) sec** ? **(2 Points)**

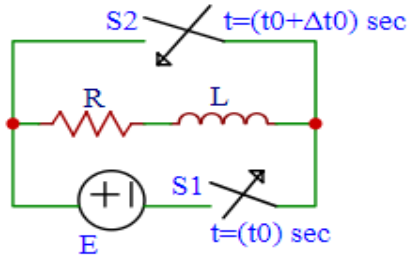

Figure 2

Q3: In Fig. 3, for C=2F, R=4 Ω & L=2H, the current I=1A. When C=1F, R=2 Ω & L=1H, the current **"I"** would be- **(3 Points)**

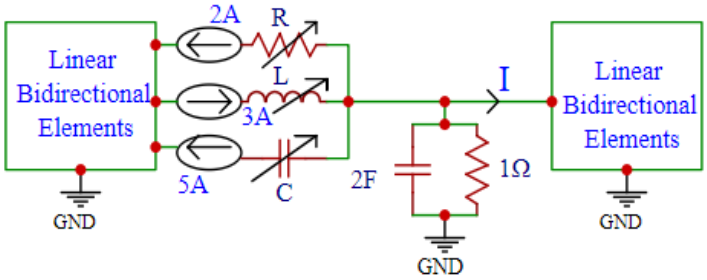

Figure 3

Q4: How many 5 µF, 100V capacitors are needed to make a capacitor of 50 µF, 500V? Explain with connection diagram as well. **(3 Points)**

Q5: Find V_{AB} in the circuit in Fig. 4 with a proper circuit diagram having all useful notation. **(6 Points)**

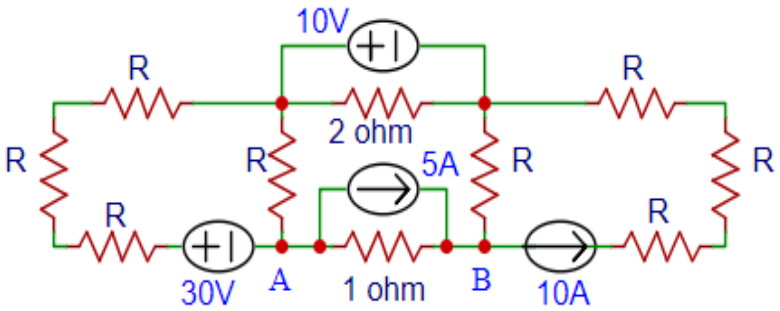

Figure 4

Q6: In the given following circuit, find out the value of current **'I'** and voltage across points 'a' & 'b' **(V_{ab})** using mesh analysis, with a proper circuit diagram. **(6 Points)**

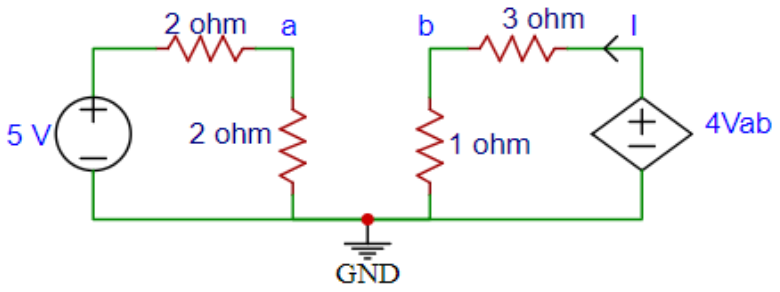

Figure 5

Q7: In the given following circuit, find out the value of voltage (**v**) across 2 Ω resistance by using super node analysis, with a proper circuit diagram. **(6 Points)**

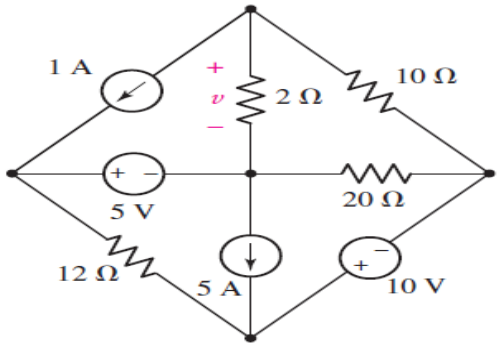

Figure 6

Q8: Develop a dual network of the network shown in Fig. 7, with proper explanation. **(6 Points)**

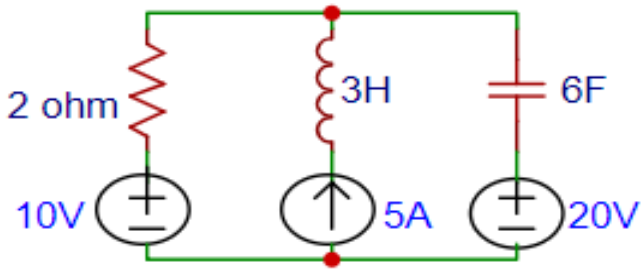

Figure 7

Q9: Find out the value of current across the inductor at **t=5 sec**, in the given following circuit in Fig. 8. **(6 Points)**

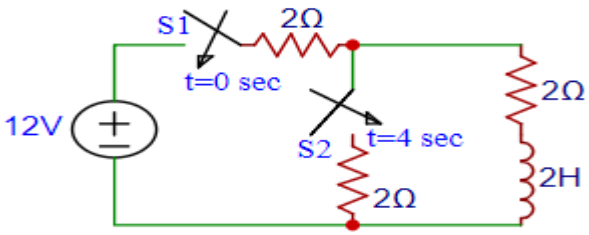

Figure 8