# INTERNATIONAL CENTRE FOR APPLIED SCIENCES
# MAHE, MANIPAL

**B.Sc. (Applied Sciences) in Engg.**

**End – Semester Theory Examinations – Nov./ Dec. 2020**

**III SEMESTER - NETWORK ANALYSIS (IEE 231)**

**(Branch: E&E)**

**Time: 3 Hours** **Date: 25 November 2020** **Max. Marks: 50**

- ✓ **Answer ALL the questions.**
- ✓ **Missing data, if any, may be suitably assumed**

**1A** Apply Mesh current analysis and find the currents $I_1$ and $I_2$ for the network shown in Fig.1A. **(5 marks)**

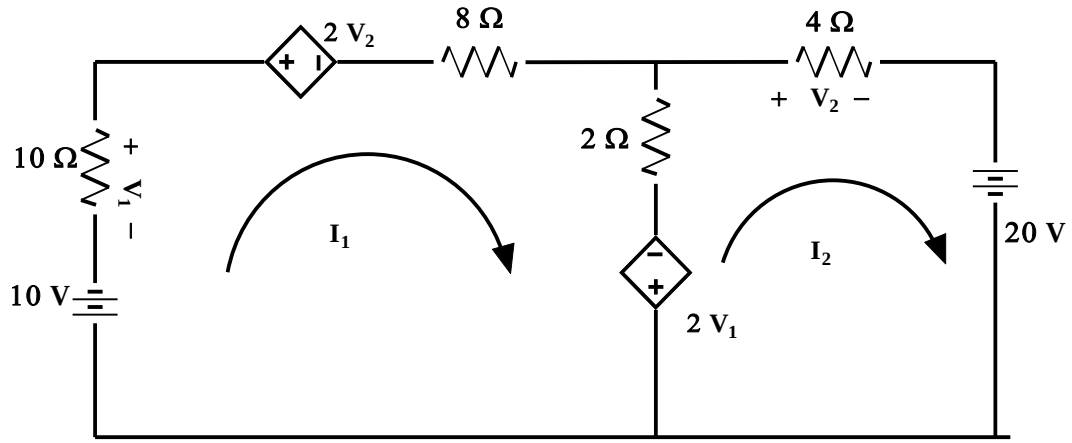



**Fig. 1A**

**1B** Apply Super Mesh analysis and find the currents $I_1, I_2$ and $I_3$ for the network shown in Fig.1B. **(5 marks)**

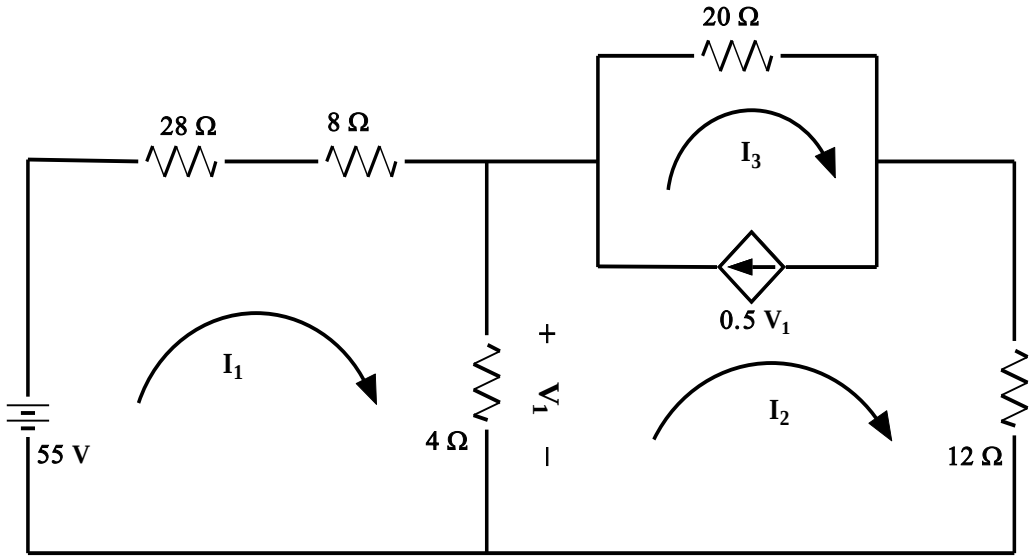
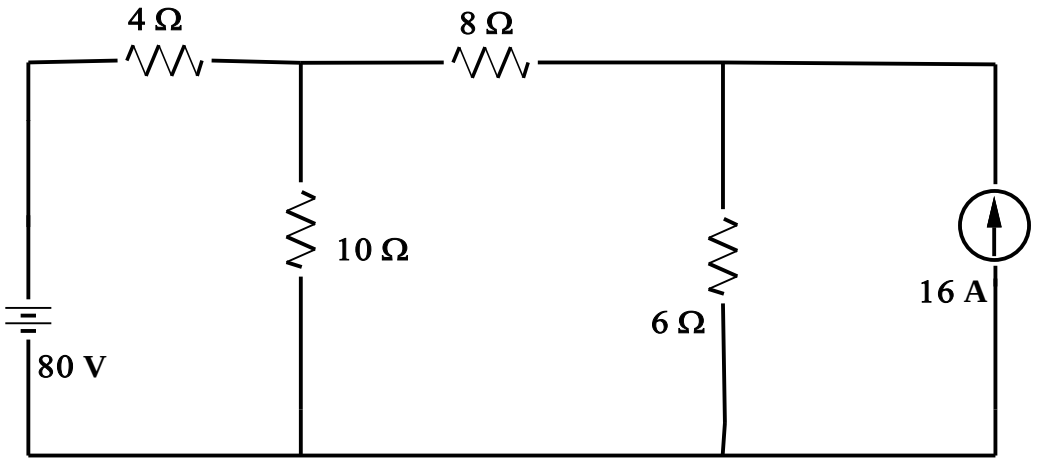



**Fig. 1B**

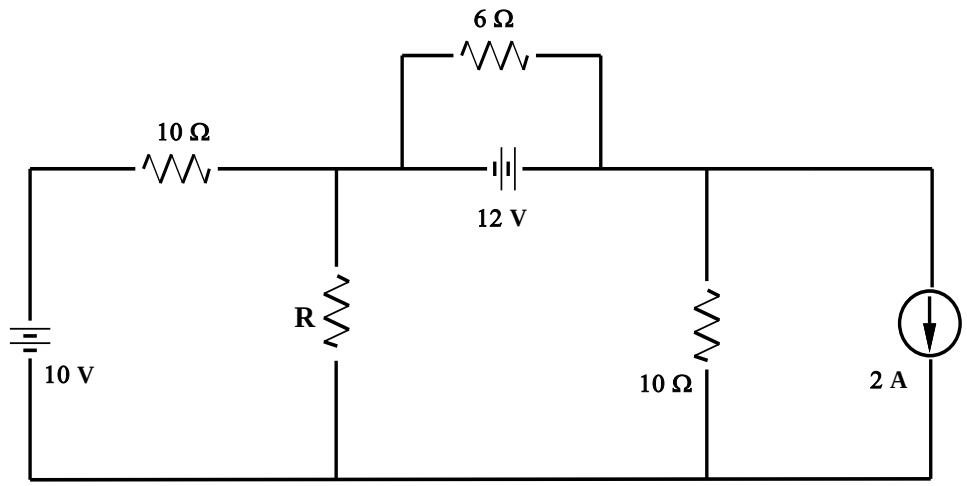
**2A** Apply Superposition theorem and find the current through 8Ω resistor for the circuit shown in Fig.2A.




**(5 marks)**

**Fig. 2A**

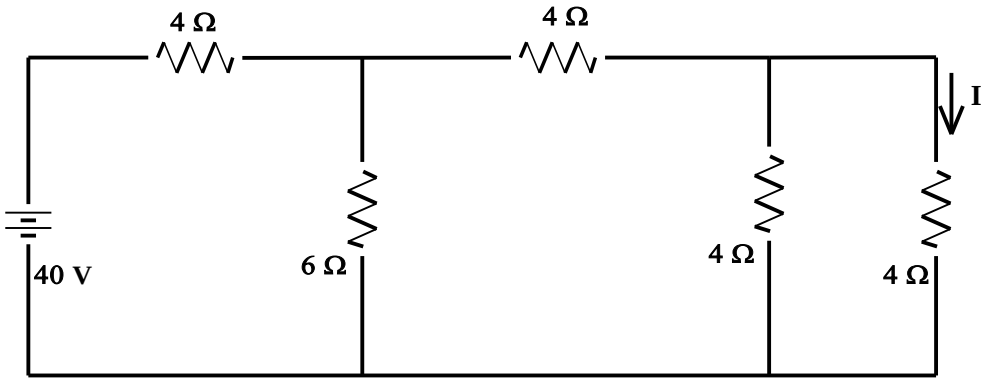
**2B** Find the maximum power transferred to the resistor 'R' for the circuit shown in Fig.2B.




**(5 marks)**

**Fig. 2B**

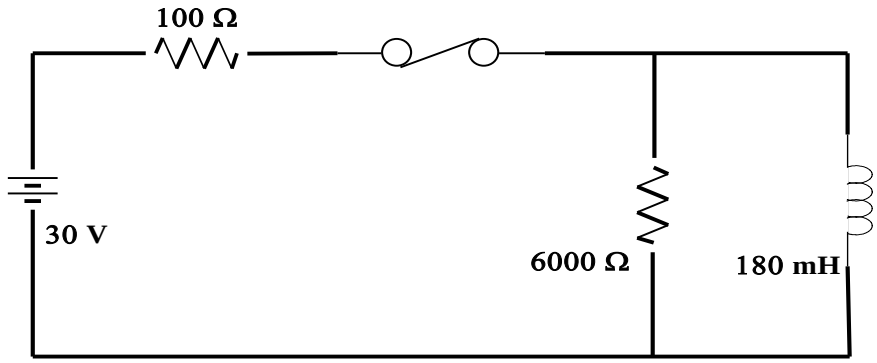
**3A** State Reciprocity theorem and prove it for the linear, bilateral circuit shown in Fig.3A.




**(5 marks)**

**Fig. 3A**

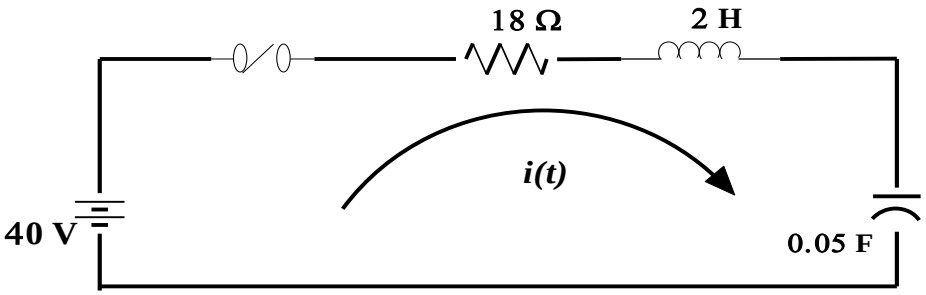
**3B** For the network in Fig.3B steady state is reached with the switch closed. The switch is opened at $t = 0$. Find the expression for current inductor current $i_L(t)$ and inductor voltage $v_L(t)$ using time domain analysis.




**(5 marks)**

**Fig. 3B**

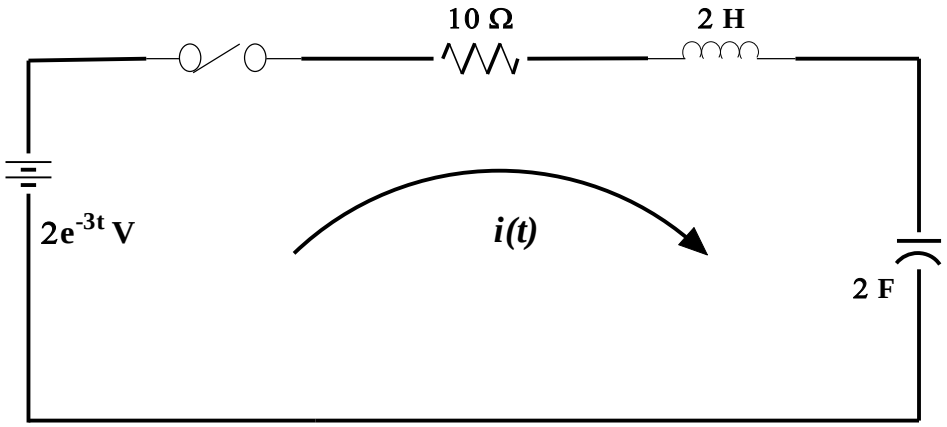
**4A** In the network shown in Fig. 4A switch is closed at $t = 0$. Find the expression for current $i(t)$ for $t > 0$ using time domain analysis.




**(5 marks)**

**Fig. 4A**

**4B** Apply Laplace Transform to find $i(t)$ and $\frac{d}{dt}i(0^+)$ for the network shown in Fig.4B. Assume the circuit is initially at rest and switch closes at $t = 0$.




**(5 marks)**

**Fig. 4B**

**5A** In the network shown in Fig. 5A switch is closed at $t = 0$. Find $i_2(t)$.

Network is un-energized before switch is closed.

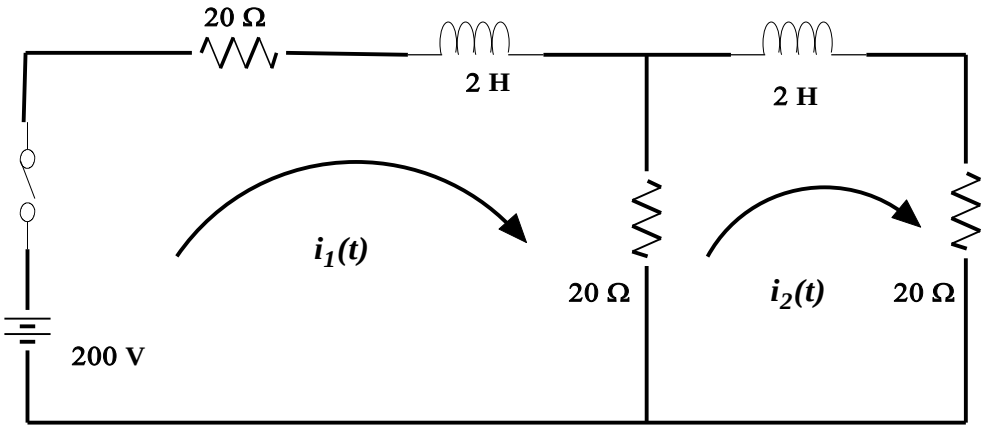



**Fig. 5A**

**(5 marks)**

**5B** Apply Laplace Transform to find the current $i(t)$ for the circuit shown in Fig. 5B.

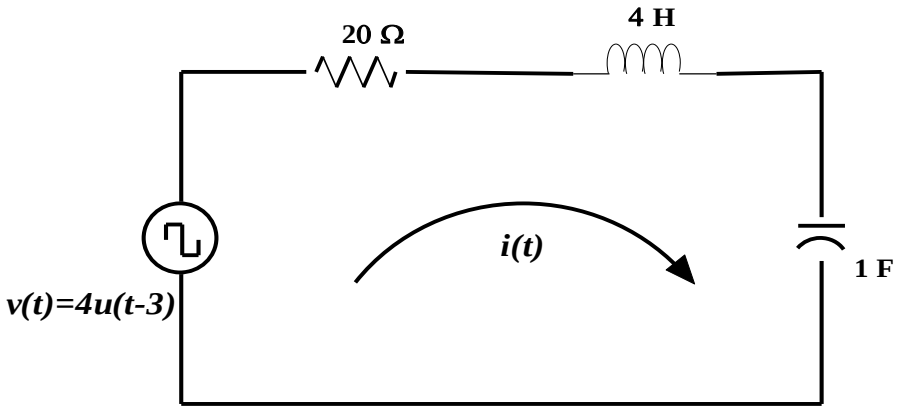



**Fig. 5B**

**(5 marks)**

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