**Name:**
**ID:**

**EE 281 - Midterm Examination 1**
**November 3rd, 2014**

**1) a)** Find the equivalent resistance between terminals ***a*** and ***b***. (10 pts)

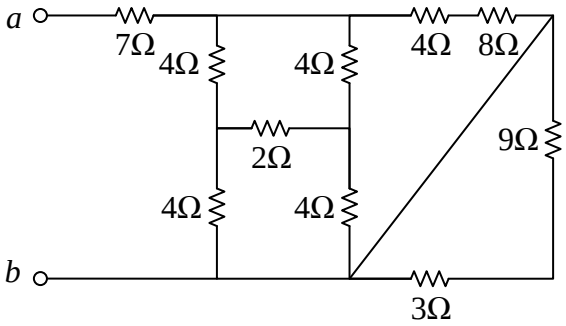



**Fig** 1.1

**b)** Find the equivalent resistance between terminals ***a*** and ***b***. Note that the same resistor pattern goes to the infinity (10 pts)

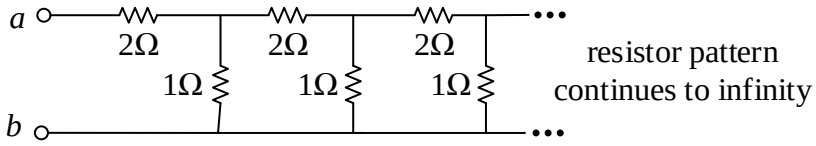



**Fig** 1.2

**2) a)** Write the node voltage equation for the essential node voltage, ***e***, using only the given parameters. (10 pts)

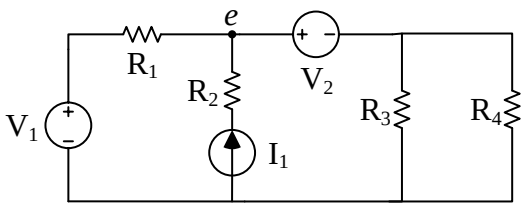



**Fig.** 2.1

**b)** Write the two mesh current equations necessary to analyze the given circuit, using only the given parameters. (10 pts)

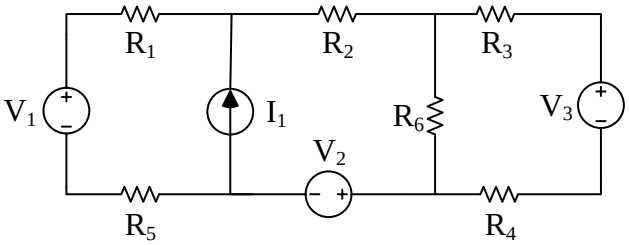
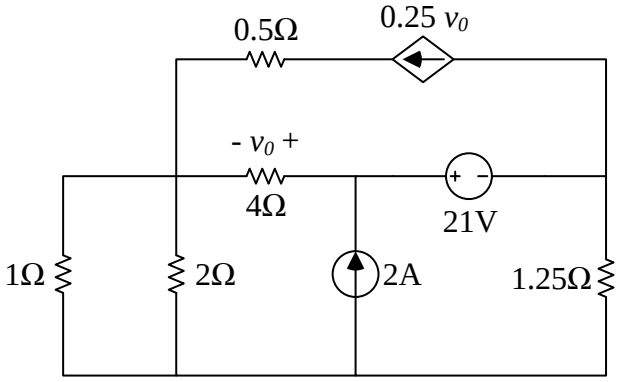



**Fig.** 2.2

**3)**




**a)** Find $v_0$ using node voltage analysis method. (10 pts)

**b)** Find $v_0$ using mesh current analysis method. (10 pts)

**c)** Find the power absorbed/generated by each element. (10 pts)

**4)**

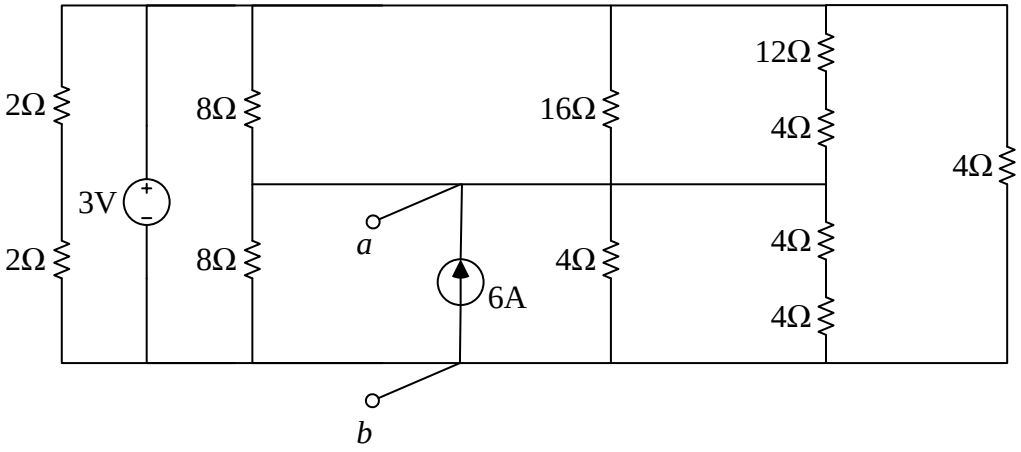



**Fig.** 4.1

**a)** Consider the given circuit in Fig. 4.1. The circuit given in Fig 4.2 is the equivalent of the original circuit of Fig. 4.1. Find R1, R2 and R3. (15 pts)

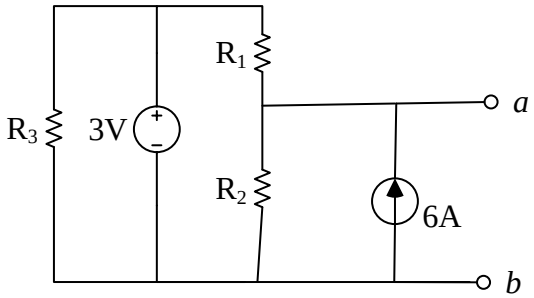



**Fig.** 4.2

**b)** Find the Norton and Thevenin equivalents of the circuit given in Fig. 4.1, as seen between terminals *a* and *b*. Note that circuits of Fig. 4.1 and 4.2 are equivalent. (15 pts)