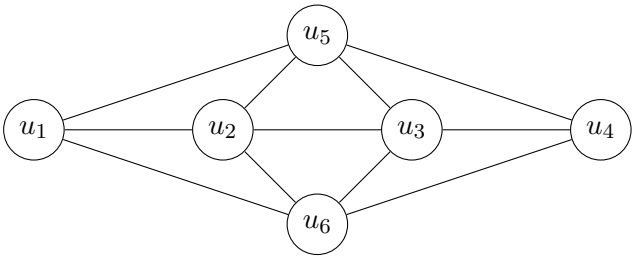
Name: _____

Directions: Show all work. No credit for answers without work.

1. Let G be the following graph.



(a) **[1 point]** What is the degree of u_5?

(b) **[2 points]** Compute $\sum_{v \in V(G)} d(v)$.

(c) **[1 point]** Show that the 6-cycle C_6 is a subgraph of G.

(d) **[2 points]** Find two vertex-disjoint 3-cycles in G.

2. **[2 parts, 2 points each]** Let $\Sigma = \{a, b\}$. Let A be the language $\{w \mid w$ has an even number of a's$\}$ and let B be the language $\{w \mid w$ has an odd number of b's$\}$.

   (a) Give an NFA for AB. Make your NFA as simple as possible.

   (b) Convert your NFA to a DFA and then simplify.