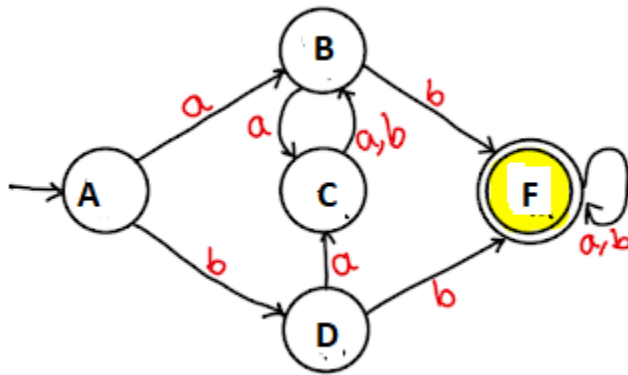


Final

Name _____

1. (15 points) Minimize following DFA:



2. (30 points)

- (i) Give a DFA, M_1 , that accepts a Language L_1 that contains even number of 0's. (Hint: only 2 states)
- (ii) Give a DFA, M_2 , that accepts a Language L_2 that contains even number of 1's.
- (iii) Give acceptor for Reverse of L_1
- (iv) Give acceptor for complement of L_2
- (v) Give acceptor for L_1 union L_2
- (vi) Give acceptor for L_1 intersection L_2
- (vii) Give acceptor for $L_1 - L_2$

3. (15 points) Given the following grammar with production rules numbered from 1 to 8,

- { 1. $S \rightarrow 0A$,
- 2. $S \rightarrow 1A$,
- 3. $S \rightarrow A0$,
- 4. $S \rightarrow AB$,
- 5. $S \rightarrow 0$,
- 6. $S \rightarrow 0A1$,
- 7. $A \rightarrow 1$,
- 8. $S \rightarrow \lambda$ }

- (i) Indicate which of the rules satisfy the conditions for a context-free grammar
(Sample answer: Production rules 1,5,8)

- (ii) Indicate which of the rules satisfy the conditions for a left linear grammar
- (iii) Indicate which of the rules satisfy the conditions for a right linear regular grammar
- (iv) Indicate which of the rules satisfy the conditions for a linear grammar

4. (20 points) Use pumping lemma to show that the language $L = \{a^{m+1}b^m c^m\}$ is not context-free.
5. (20 points) Create a PDA that recognizes the following context free language with terminals $\{a, b\}$: $L = \{a^{n+1}b^n | n \geq 1\} \cup \{b^n a^{n+2} | n \geq 1\}$.
- (i) Describe your algorithm
 - (ii) Give the description as a complete 7-tuple with a transition diagram
 - (iii) Show configuration sequences on **aaabb** leading to acceptance.

