Attendance Problems 6: Due November 5

Answer these questions throughout the upcoming week and bring this completed sheet to CS103A next week. This will count as your attendance for Week 6. Circle the correct choice for each question, briefly justifying your answer.

Lecture 14: Finite Automata, Part I

1) Let Σ = \{a, b\}. Which of the following is a language over Σ?
   A) ε
   B) abba
   C) \{Ø, \{a\}, \{b\}, \{a, b\}\}
   D) \{ε\}
   
   Explanation:

2) Which of the following is NOT true about DFAs?
   A) Every DFA is defined relative to some alphabet Σ
   B) Every state in a DFA must have exactly one transition defined for each character in Σ.
   C) Every DFA must have a unique start state.
   D) Every DFA must have a unique accepting state.

   Explanation:

Lecture 15: Finite Automata, Part II

3) What is a regular language?
   A) It's a language where there's a DFA that accepts all strings in the language.
   B) It's a language where there's a DFA that rejects all strings not in the language.
   C) Both of the above.
   D) None of the above.

   (Hint: Careful, this one is tricky – can you design a DFA that accepts all strings? Can you design a DFA that rejects all strings? What does that tell you?)

   Explanation:
Lecture 16: Finite Automata, Part III

4) Which of the following languages best represents \{a, b\}*?

A) \{\varepsilon, a, b, aa, ab, ba, bb, aaa, aab, aba, abb, baa, bab, bba, bbb, ... \}
B) \{\varepsilon, aa, aaa, aaaa, aaaaa, ..., b, bb, bbb, bbbb, bbbbb, ... \}
C) \{\varepsilon, ab, aabb, aaabbb, aaaaaabbb, ... \}
D) \{\varepsilon, ba, bbba, bbbaba, bbbbbbaa, bbbbbbbba, ... \}
E) \{\varepsilon, a, ab, abb, abbb, ..., aa, aab, aabb, aabbb, ... \}

Explanation:

5) Which of the following languages best represents the language \{a\}* \cup \{b\}*?

A) \{\varepsilon, a, b, aa, ab, ba, bb, aaa, aab, aba, abb, baa, bab, bba, bbb, ... \}
B) \{\varepsilon, a, aa, aaaa, aaaaa, ..., b, bb, bbb, bbbb, bbbbb, ... \}
C) \{\varepsilon, ab, aabb, aaabbb, aaaaaabbb, ... \}
D) \{\varepsilon, ba, bbba, bbbaba, bbbbbbaa, bbbbbbbba, ... \}
E) \{\varepsilon, a, ab, abb, abbb, ..., aa, aab, aabb, aabbb, ... \}

Explanation:

6) Which of the following languages best represents the language \{a\}*\{b\}*?

A) \{\varepsilon, a, b, aa, ab, ba, bb, aaa, aab, aba, abb, baa, bab, bba, bbb, ... \}
B) \{\varepsilon, a, aa, aaaa, aaaaa, ..., b, bb, bbb, bbbb, bbbbb, ... \}
C) \{\varepsilon, ab, aabb, aaabbb, aaaaaabbb, ... \}
D) \{\varepsilon, ba, bbba, bbbaba, bbbbbbaa, bbbbbbbba, ... \}
E) \{\varepsilon, a, ab, abb, abbb, ..., aa, aab, aabb, aabbb, ... \}

Explanation: