1) What is the regular expression for the language accepted by the following DFA?

\[ 1^* (01)^* 00 (0 + 1)^* \]

\[ 1^* 0 (10)^* 0 (0 + 1)^* \]

\[ (0 + 1)^* 00 (0 + 1)^* \]

\[ (0 + 1)^* 01 (0 + 1)^* \]

2) Which of the following strings can be generated by the regular expression \((1 + 01)^* 0^+\)?

- \(\epsilon\)
- 100101
- 001010
- 111010111000
3) What is the language accepted by the following regular expression? 

- Set of binary strings where every 0 is followed by a 1
- Set of binary strings having an odd no. of 0's
- Set of binary strings with at least a single 0
- Set of binary strings with more 1's than 0's

4) Which of the following statements are necessarily true?

- There exists a DFA which has infinitely many states.
- There exists a DFA which accepts a language containing infinitely many strings.
- For every NFA with 'n' states, there exists an equivalent DFA with 'n' states.
- There exists a DFA which accepts only finitely many strings.

5) Which of the following equivalences are true?

- $\emptyset^* = \epsilon$
- $\epsilon^* = \emptyset$
- $\emptyset + \epsilon = \epsilon$
- $\emptyset \cdot \epsilon = \epsilon$
6) What is the equivalent Regular expression for the following DFA?

![DFA Diagram]

- $(01^*0 + 10^*1)^*(01^* + 10^*)$
- $(01^*0 + 10^*1)^*(1^* + 0^*)$
- $(01^*0 + 10^*1)^*(11^* + 00^*)$
- $(11^*0 + 00^*1)^*(01^* + 10^*)$

7) Let $P$, $Q$ and $R$ be regular expressions such that the number of strings in the language generated by $P$ is $p$, $Q$ is $q$ and $R$ is $r$. What is the number of strings in the language generated by the following regular expression?

$(P + 0)(Q + P)(R + P)^*$

- $(p+q)(r+p)$
- $pq + qr + rp$
- $pq + qr + 2^r$
- Infinite

8) Let $R$, $S$ and $T$ be regular expressions. Which of the following identities are correct? (More than one can be correct)

- $(RS + R)^* R = R(SR + R)^*$
- $(R^* + S^*)^* = R^* + S^*$
- $(R + S)^* S = (RS)^*$
- $(R + S)^* = (R^* S^*)^*$
9) Which of the following DFA(s) is/are equivalent to the NFA given below?
10. Let $L_1$, $L_2$, and $L_3$ are three languages out of which $L_1$ and $L_3$ are regular. Which of the following imply that $L_3$ is regular? (More than one can be correct)

- $L_3 = L_2 \cup L_3$
- $L_3 = L_1 (L_1 \cup L_1)^* L_3$
- $L_3 = L_3^*$
- $L_3 = \{ w \in L_2 : w \}
