Solution of the Assignments

1 Week 1

1. Since text editor, elevator and control unit have finitely many states hence option"d".
2. TFA is not relevant to automata theory hence it is not a finite automata.
3. Since by notation final states are denoted by double corcle around the state, hence q_5, q_6 are final states.
4. By definition of automata (Q, Σ, δ, q_0, F) forms an automata.
5. The transition table contains first column as input state and rest of the columns corresponds to the alphabet. Clearly the first option is the transition table.
6. By definition of Σ^* is set of all strings over an alphabet Σ.
7. String in option"a" ends at q_3 and rest of the strings end at q_4. Hence it will accept"011110".
8. This follows by definition of $\hat{\delta}$.
9. $q_0 \xrightarrow{1} q_3 \xrightarrow{0} q_1 \xrightarrow{1} q_2 \xrightarrow{1} q_2$
10. Any string starting with 1 gets trapped in the state q_1 which is the final state.
11. Strings ending with 1 will never end at q_0 or q_1. Irrespective of current state for the input 0 the transition is to q_1 and for the current state q_1 and input 1 the transition is to q_2 hence q_2 should be the final state.
12. Since all the options"a,b,c" are true about regular language option"d" is correct.
13. In order to reach the final state the string must start with"1" else it will be trapped and in addition to that it must be of even length, hence option"c".
14. It can't be 0 else it won't be DFA anymore, A is not in alphabet but 1 is. So "b" is the correct option.

15. $q_1 \xrightarrow{1} q_2, q_3$
hence it is not deterministic.