



Some of the questions below is followed by some suggested answers. Select the one that is the best of the choices offered. Only one choice is allowed. [1 mark each]

- Which of the given statements is correct?
  - a. The family of regular languages is not closed under intersection and union.
  - b. The family of regular languages is closed under intersection and union.
  - c. The family of regular languages is not closed under concatenation, but it is closed under union.
  - d. The family of regular languages is closed under concatenation, but it is not closed under star-closure.
- Which of the given statements is correct?
  - a. A language is considered finite if there is a cycle in the path from initial to final states.
  - b. A language is considered finite if there is no cycle in the path from initial to final states.
  - c. A language is considered finite if there is a cycle in the path from initial to final states.
  - d. A language is considered empty if there is a path from initial to final states.
- For the alphabets  $\Sigma = \{a, b, c\}$ , and  $\Gamma = \{0, 1\}$ , a homomorphic function  $h$  is defined such that  $h: \Sigma \rightarrow \Gamma$   $h(a) = (02)$ ,  $h(b) = (10)$ ,  $h(c) = (03)$ .  
 What is the homomorphic image of the language  $L = \{ab, cbba\}$ ?
  - a.  $\{cbba, ab\}$
  - b.  $\{03101002, 0210\}$
  - c.  $\{0210, 03101002\}$
  - d.  $\{1002, 03101002\}$
- Consider  $L_1 = \{\text{sunday, monday, tuesday, friday}\}$  and  $L_2 = \{\text{day}\}$ , then  $L_1 \cup L_2 =$ 
  - a.  $\{\text{sunday, monday, tuesday, friday}\}$
  - b.  $\{\text{day}\}$
  - c.  $\{\text{sun, mon, tuex, fri}\}$
  - d.  $\{\text{sunday, monday, friday}\}$
- Given the following NFA, which regular expression matches this automaton:



