

بسمه تعالى
امتحان شماره يك نظریه زبان(تستی)
21/12/1384

1. which of the following is a partition of the set $A=\{a,b,c,d\}$?

- 1) $\{\{a,b\}, \{a,c,d\}\}$ 2) $\{\{a,b\}, \{c\}\}$
3) $\{\{a,b\}, \{c,d\}\}$ 4) $\{\{a,b\}, \{c,d\}, \{\}\}$
5) هیچکدام
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2. $B=\{a,b, \{a,b\}\} - \{a,b\}$. B is:

- 1) $\{\}$ 2) $\{a,b, \{a,b\}\}$
3) $\{a,b\}$ 4) $\{\{a,b\}\}$
5) هیچکدام
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3. Let $A=\{a,b,c,d,e\}$. How many elements are there in 2^A (the power set of A)?

- 1) 1 2) 5 3) 25 4) 32 5) هیچکدام
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4. Let $A=\{a,b\}$. $A \cap \Phi$ is:

- 1) $\{\}$ 2) $\{a,b\}$ 3) $\{a\}$ 4) $\{b\}$ 5) هیچکدام
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5. Let $A=\{a,b\}$. $A \times \{\}$ is :

- 1) $\{\}$ 2) $\{(a,\Phi), (b,\Phi)\}$
3) $\{(\Phi,a), (\Phi,b)\}$ 4) $\{a,b\}$
5) هیچکدام
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6. The reflexive transitive closure of the binary relation $R=\{(a,d),(d,c),(c,a),(d,d)\}$

Over the set $A=\{a,b,c,d\}$ is :

- 1) $\{(a,a),(a,c),(c,c),(c,d),(d,a),(d,d)\}$
2) $\{(a,a),(a,c),(a,d),(c,a),(c,c),(c,d),(d,a),(d,c),(d,d)\}$
3) $\{(a,a),(a,c),(a,d),(b,b),(c,a),(c,c),(c,d),(d,a),(d,c),(d,d)\}$
4) $\{(a,a),(a,b),(a,c),(a,d),(b,a),(b,b),(c,a),(c,b),(c,c),(c,d),(d,a),(d,b),(d,c),(d,d)\}$
5) هیچکدام
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7. Let $A = \{a, b\}$. Every relation from A to A is a subset of $A \times A$. How many distinct relations are there from A to A ?

- 1) 2 2) 4 3) 8 4) 16 5) هیچکدام(5)
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8. The relation $R = \{(a, a), (a, c), (b, c), (c, b)\}$ over the set $A = \{a, b, c\}$ is:

- 1) transitive 2) reflexive 3) symmetric 4) anti symmetric 5) هیچکدام(5)
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9. Let $f : A \rightarrow B$ be a function such that its inverse $f^{-1} : B \rightarrow A$ is also a function. f must be:

- 1) 1-1 and into 2) 1-1 and onto
3) many-one and into 4) many-one and onto
5) هیچکدام(5)
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10. Let $\sum = \{\lambda\}$. Then \sum^* is:

- 1) $\{\lambda\}$ 2) $\{\lambda\}$ 3) $\{a\}$ 4) $\{b\}$ 5) هیچکدام(5)
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11. Let $L = \{\lambda, a\}$ and let $\sum = \{a, b\}$. $M = L \sum^*$. M is:

- 1) $\{\lambda, a\}$ 2) $\{\lambda, b\}$ 3) $\{a, b\}$ 4) $\{a, b\}^*$ 5) هیچکدام(5)
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12. Let \sum be a finite alphabet such that $|\sum| > 0$. Then \sum^* is:

- 1) empty 2) finite
3) countably infinite 4) uncountably infinite
5) هیچکدام(5)
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13. Which of the following languages does the regular expression $(a+b)(a+b+\lambda)^*$ stand for:

- 1) $\{a\}^*$ 2) $\{b\}^*$ 3) $\{\lambda\}^*$ 4) $\{a, b\}^*$ 5) هیچکدام(5)
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با توجه به ماشین محدود نا معین زیر به سوالات 14 تا 17 پاسخ دهید.

Let $M = (Q, \sum, \delta, s, F)$ be an NFA, where

$Q = \{q_0, q_1, q_2\}$, $\sum = \{a, b, c, d\}$

$\delta = \{(q_0, a, q_0), (q_0, \lambda, q_1), (q_1, b, q_1), (q_1, c, q_1), (q_1, \lambda, q_2), (q_2, d, q_2)\}$

$s = q_0, F = \{q_0, q_1, q_2\}$

14. Teh regular expression that corresponds to the language accepted by M is:

- 1) $(abcd)^*$ 2) $(a+b+c+d)^*$ 3) $a^* b^* c^* d^*$ 4) $a^* (b+c)^* d^*$ 5) هیچکدام
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15. The $\delta^*(q_0, \lambda) = ?$:

- 1) $\{q_0\}$ 2) $\{q_1, q_2\}$ 3) $\{q_0, q_1, q_2\}$ 4) $\{q_0, q_1\}$ 5) هیچکدام
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16. The $\delta^*(q_1, \lambda) = ?$:

- 1) $\{q_1\}$ 2) $\{q_1, q_2\}$ 3) $\{q_0, q_1, q_2\}$ 4) $\{q_0, q_1\}$ 5) هیچکدام
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17. Let C be a configuration of M s.t. $(q_0, abcd) \Rightarrow^* C$. C could be :

- 1) (q_0, cd) 2) (q_0, d) 3) (q_0, λ) 4) (q_1, d) 5) (q_1, λ)
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18. Let A = {M : M is a DFA} and B = {M : M is a NFA}. Then A is:

- 1) a superset of B 2) the power set of B
3) a subset of B 4) disjoint with B (i.e. $A \cap B = \emptyset$)
5) هیچکدام
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19. Let $L = \{x x^R y : x, y \in \{a, b\}^*\}$. L is equal to: ($\sum = \{a, b\}$)

- 1) $\{x x^R : x \in \{a, b\}^*\}$.
2) $\{x : x \# x^R \in \{a, b\}^*\}$.
3) $\{x : x \in \{a, b\}^*\}$.
4) $\{xx : x \in \{a, b\}^*\}$.
5) هیچکدام
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20. Let $L = \{xy x^R : x, y \in \{a, b\}^*\}$. L is equal to ($\sum = \{a, b\}$)

- 1) $\{x x^R : x \in \{a, b\}^*\}$.
2) $\{x : x \# x^R \in \{a, b\}^*\}$.
3) $\{x : x \in \{a, b\}^*\}$.
4) $= \{xx : x \in \{a, b\}^*\}$.
5) هیچکدام

پاسخنامه ي امتحان شماره ي يك نظریه ي زبان

شماره ي سؤال	جواب
1	3
2	4
3	4
4	1
5	1
6	3
7	4
8	5
9	2
10	1
11	3
12	3
13	5
14	4
15	3
16	2
17	4
18	3
19	3
20	3

