2022 形式语言自动机期末模拟试卷

**题型仅供参考，与期末考试不一定相同,

1. Give a DFA accepting the language that meets the following requirements over the alphabet {0,1}.
The number of 0s is even and don’ t end in 01

2. Give a NFA accepting the following language. $\{xwx^R|x,w\in\{0,1\}^+\}$

3. Write a regular expression accepting the strings that represent a number divisible by 5 in binary.

4. Prove that the language $\{a^m b^n c^{2k} d^{2z}|z\neq m+n+k\}$ is not regular with pumping lemma.

5. Convert to a DFA the following NFA:

		0	1	2
Start	q0	{q0, q1}	{q0, q2}	{q0, q2}
	q1	{q0, q3}	∅	{q2}
	q2	∅	{q1, q3}	{q1, q2}
*	q3	{q2, q3}	{q3}	{q0}

6. Give a context-free grammar over $\{1,2,3,+,*,(,),\emptyset,\varepsilon\}$ for all regular expressions over alphabet {1,2,3}.

7. Construct CNF equivalent to the following grammar:
$S\rightarrow aBB|bAA$
$B\rightarrow aBa|aa|\varepsilon$
$A\rightarrow bbA|\varepsilon$

8. Design a PDA for L(M) = $\{1^n0^n|n\geq 1\}\{1^n0^{2n}|n\geq 1\}$

9. Prove the language L= $\{x\#y|x,y\in\{0,1\}^* \text{and } y \text{ is a substring of } x\}$ is not CFL with pumping lemma; Alphabet $\{0,1,\#\}$.

10. Design Turing machine to compute n^2. (start from 0^n to 0^{n^2})

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