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1 Which of the following conversion is not possible (algorithmically)?

A regular grammar to context-free grammar

B nondeterministic FSA to deterministic FSA

C nondeterministic PDA to deterministic PDA

D nondeterministic TM to deterministic TM

Answer: nondeterministic PDA to deterministic PDA

2 Which one of the following statement is FALSE?

A context-free languages are closed under union

B context-free languages are closed under concatenation

C context-free languages are closed under intersection

D context-free languages are closed under Kleene closure

Answer: context-free languages are closed under intersection

3 Which of the following regular expression identity is true?

A $r^* = r^*$

B $(r^*s^*)^* = (r + s)^*$

C $(r + s)^* = r^* + s^*$

D $r^*s^* = r^* + s^*$

Answer: $(r^*s^*)^* = (r + s)^*$

4 R_1 and R_2 are regular sets. Which of the following is not true?

A $R_1 \cap R_2$ need not be regular

B $S^* - R_1$ is regular

C $R_1 \cup R_2$ is regular

D \emptyset is regular

Answer: $R_1 \cap R_2$ need not be regular

5 Recursive languages are

A a proper superset of CFL

B always recognized by PDA

C are also called type 0 languages

D always recognized by FSA

Answer: a proper superset of CFL

6 Which of the following problem is undecidable?

A membership problem for CFL

B membership problem for regular sets

C membership problem for CSL

D membership problem for type 0 languages

Answer: membership problem for type 0 languages

7 Recursively enumerable languages are not closed under

A union

B homomorphism

C complementation

D concatenation

Answer: complementation

8 Which of the following statement is wrong?

A Any regular language can be generated by a context-free grammar

B Some non-regular languages cannot be generated by any CFG

C the intersection of a CFL and regular set is a CFL

D All non-regular languages can be generated by CFGs.

Answer: All non-regular languages can be generated by CFGs.

9 Consider the following statements

I. Recursive languages are closed under complementation

II. Recursively enumerable languages are closed under union

III. Recursively enumerable languages are closed under complementation

Which of the above statements are TRUE?

A I only

B I and II

C I and III

D II and III

Answer: I and II

10 Consider a language L for which there exists a Turing machine T , that accepts every word in L and either rejects or loops for every word that is not in L . The language L is

A NP hard

B NP complete

C recursive

D recursively enumerable

Answer: recursively enumerable