

TOC unit III MCQ

1. Grammars that can be translated to DFAs:

- a. Left linear grammar
- b. Right linear grammar
- c. Generic grammar
- d. All of these

Answer: (b). Right linear grammar

2. The language accepted by a Push down Automata:

- a. Type 0
- b. Type 1
- c. Type 2
- d. Type 3

Answer: (c). Type 2

3. Recursive Descent Parsers are a type of:

- a. LL parsers
- b. LR parsers
- c. LALR parsers
- d. SLR parsers

Answer: (a). LL parsers

4. If language $L = \{0,1\}^*$, then the reversed language $L^R =$

- a. $\{0,1\}^*$
- b. $\{\}$
- c. $\{0\}^*$
- d. $\{1\}^*$

Answer: (a). $\{0,1\}^*$

5. Consider the following two languages:

$L_1 = \{x \mid \text{for some } y \text{ with } |y| = 2^{|x|}, xy \in L \text{ and } L \text{ is regular language}\}$

$L_2 = \{x \mid \text{for some } y \text{ such that } |x| = |y|, xy \in L \text{ and } L \text{ is regular language}\}$

Which one of the following is correct?

- a. Only L_1 is regular language
- b. Only L_2 is regular language
- c. Both L_1 and L_2 are regular languages
- d. Both L_1 and L_2 are not regular languages

Answer: (c). Both L_1 and L_2 are regular languages

6. Consider R to be any regular language and L1, L2 be any two context-free languages. Which of the following is correct?

- a. $L1'$ is context free
- b. $(L1 \cup L2)' - R$ is context free
- c. $L1 \cap L2$ is context free
- d. $L1 - R$ is context free

Answer: (d). $L1 - R$ is context free

7. Consider the following problems:

(i) Whether a finite state automaton halts on all inputs?

(ii) Whether a given context free language is regular?

(iii) Whether a Turing machine computes the product of two numbers?

Which one of the following is correct?

- a. Only (i) and (iii) are undecidable problems
 - b. Only (ii) and (iii) are undecidable problems
 - c. Only (i) and (ii) are undecidable problems
 - d. (i), (ii) and (iii) are undecidable problems
- Answer: (b). Only (ii) and (iii) are undecidable problems

8. Which of the following problems is decidable for recursive languages (L)?

- a. Is $L = \varphi$?
- b. Is $w \in L$, where w is a string?
- c. Is $L = \Sigma^*$?
- d. Is $L = R$, where R is a given regular set?

Answer: (b). Is $w \in L$, where w is a string?

9. Consider the following grammar G:

$S \rightarrow A \mid B$

$A \rightarrow a \mid c$

$B \rightarrow b \mid c$

where {S, A, B} is the set of non-terminals, {a, b, c,} is the set of terminals.

Which of the following statement(s) is/are correct?

S1: LR(1) can parse all strings that are generated using grammar G.

S2: LL(1) can parse all strings that are generated using grammar G.

- a. Only S1

- b. Only S2
- c. Both S1 and S2
- d. Neither S1 nor S2

Answer: (d). Neither S1 nor S2

10. The grammar $S \rightarrow (S) \mid SS \mid \epsilon$ is not suitable for predictive parsing because the grammar is

- a. Right recursive
- b. Left recursive
- c. Ambiguous
- d. An operator grammar

Answer: (c). Ambiguous

11. To obtain a string of n Terminals from a given Chomsky normal form grammar, the number of productions to be used is:

- a. $2n-1$
- b. $2n$
- c. $n+1$
- d. n^2

Answer: (a). $2n-1$

12. Consider the following two Grammars:

G1 : $S \rightarrow SbS \mid a$

G2 : $S \rightarrow aB \mid ab, A \rightarrow GAB \mid a, B \rightarrow ABb \mid b$

Which of the following option is correct?

- a. Only G1 is ambiguous
- b. Only G2 is ambiguous
- c. Both G1 and G2 are ambiguous
- d. Both G1 and G2 are not ambiguous

Answer: (c). Both G1 and G2 are ambiguous

13. The set $A = \{ 0^n 1^n 2^n \mid n=1, 2, 3, \dots \}$ is an example of a grammar that is:

- a. Context sensitive
- b. Context free
- c. Regular
- d. None of the above

Answer: (a). Context sensitive

14. A bottom-up parser generates:

- a. Left-most derivation in reverse

- b.Right-most derivation in reverse
- c.Left-most derivation
- d.Right-most derivation

Answer: (b). Right-most derivation in reverse

15.Consider the following statements:

S1 : There exists no algorithm for deciding if any two Turing machines M1 and M2 accept the same language.

S2 : The problem of determining whether a Turing machine halts on any input is undecidable.

Which of the following options is correct?

- a. Both S1 and S2 are correct
- b. Both S1 and S2 are not correct
- c. Only S1 is correct
- d. Only S2 is correct

Answer: (a). Both S1 and S2 are correct

16.Which of the following statements is/ are TRUE?

(a) The grammar $S \rightarrow SS$ is ambiguous. (Where S is the start symbol)

(b) The grammar $S \rightarrow 0S1 \mid 01S \mid \epsilon$ is ambiguous. (The special symbol ϵ represents the empty string) (Where S is the start symbol)

(c) The grammar (Where S is the start symbol)

$S \rightarrow T/U$

$T \rightarrow xSy \mid xy \mid \epsilon$

$U \rightarrow yT$

generates a language consisting of the string yxyxy.

- a.Only (a) and (b) are TRUE.
- b.Only (a) and (c) are TRUE.
- c.Only (b) and (c) are TRUE.
- d.All of (a), (b) and (c) are TRUE.

Answer: (d). All of (a), (b) and (c) are TRUE.

17. Pumping lemma for regular language is generally used for proving:

- a.whether two given regular expressions are equivalent
- b.a given grammar is ambiguous
- c.a given grammar is regular
- d.a given grammar is not regular

Answer: (a). whether two given regular expressions are equivalent

18. Which of the following problems is undecidable?

- a. To determine if two finite automata are equivalent
- b. Membership problem for context free grammar
- c. Finiteness problem for finite automata
- d. Ambiguity problem for context free grammar

Answer: (d). Ambiguity problem for context free grammar

19. The language $L = \{a^i b c^i \mid i \geq 0\}$ over the alphabet $\{a, b, c\}$ is:

- a. a regular language.
- b. not a deterministic context free language but a context free language.
- c. recursive and is a deterministic context free language.
- d. not recursive.

Answer: (c). recursive and is a deterministic context free language.

20. Context free grammar is not closed under :

- a. Concatenation
- b. Complementation
- c. Kleene Star
- d. Union

Answer: (b). Complementation

21. Consider the following languages :

$$L1 = \{a^m b^n \mid m \neq n\}$$

$$L2 = \{a^m b^n \mid m = 2n+1\}$$

$$L3 = \{a^m b^n \mid m \neq 2n\}$$

Which one of the following statement is correct?

- a. Only L1 and L2 are context free languages
- b. Only L1 and L3 are context free languages
- c. Only L2 and L3 are context free languages
- d. L1, L2 and L3 are context free languages

Answer: (d). L1, L2 and L3 are context free languages