Theory of Computation MCQs [set-4]

Chapter: *Unit 3*

76. 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: D

77. 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 statement are TRUE?

A. I only

B. I and II

C. I and III

D. II and III

Answer: B

78. Recursively enumerable languages are not closed under

A. Union

B. homomorphism

C. complementation

D. concatenation

Answer: C

79. 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: D

80. 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

81. Consider the following problem x. Given a Turing machine M over the input alphabet ?, any state q of M. And a word w ? ?*, does the computation of M on w visit the state q? Which of the following statements about x is correct?

A. X is decidable

B. X is undecidable but partially decidable

C. X is undecidable and not even partially decidable

D. X is not a decision problem

Answer: A

82. If a language is denoted by a regular expression L = (x)* (x y x), then which of the following is not a legal string within L ?

A. yx

B. xyx

C. x

D. xyxyx

Answer: D

83. Given A = {0,1} and L = A*. If R = (0n1n, n > 0), then language L ? R and R are respectively

A. Regular, regular

B. Not regular, regular

C. Regular, not regular

D. Context free, not regular

Answer: D

84. If L1 and L2 are context free language and R a regular set, then which one of the languages below is not necessarily a context free language?

A. L1 L2

B. L1 ? L2

C. L1 ? R

D. L1 ? L2

Answer: B

85. The logic of pumping lemma is a good example of

A. Pigeon-hole principle

B. Divide-and-conquer technique

C. Recursion

D. Iteration

Answer: A

86. For two regular languages L1 = (a + b)* a and L2 = b (a + b) *, the intersection of L1 and L2 is given by

A. (a + b) * ab

B. ab (a + b) *

C. a (a + b) * b

D. b (a + b) * a

Answer: D

87. Pumping lemma is generally used for proving that

A. Given grammar is regular

B. Given grammar is not regular

C. Whether two given regular expressions are equivalent or not

D. None of these

Answer: B

88. What is the highest type number which can be applied to the following grammar? S —>Aa, A —> Ba, B —>abc

A. Type 0

B. Type 1

C. Type 2

D. Type 3

Answer: C

89. Following syntax-directed translation scheme is used with a shift reduction (bottom up) parser that perform the action in braces immediately after a reduction by the corresponding production
A —>aB {print “(1)” A —> c {print “1”),
B —>Ab {print *2”}.
When parser is aaacbbb, then string printed

A. 0202021

B. 1202020

C. 1020202

D. None of these

Answer: A

90. FSM can recognize

A. Any grammar

B. Only CG

C. Both (a) and (b)

D. Only regular grammar

Answer: D

91. Basic limitation of FSM is that it

A. Cannot remember arbitrary large amount of information

B. Sometimes fails to recognize grammars that are regular

C. Sometimes recognizes grammars are not regular

D. None of these

Answer: A

92. Which of the following are decidable?
1) Whether the intersection of two regular language is infinite.
2) Whether a given context free language is regular.
3) Whether two push down automata accept the same language.
4) Whether a given grammar is context free.

A. 1 and 2

B. 1 and 4

C. 2 and 3

D. 2 and 4

Answer: B

93. If L and L^{-} are recursively enumerable, then L is

A. Regular

B. Context free

C. Context sensitive

D. Recursive

Answer: D

94. Which of the following problems is undecidable?

A. Membership problem for CFGs

B. Ambiguity problem for CFGs.

C. Finiteness problem for FSAs.

D. Equivalence problem for FSAs.

Answer: B

95. Fred created a new automaton model which is a push down automaton but with two stacks and the added ability of having commands which do not read input tape but which can pop from one stack and push into the other.This new automaton can recognize (choose strongest result)

A. Context Free Language

B. Context sensitive language

C. Regular language

D. Languages recognizable by Turing machine

Answer: D

96. Which of the following statements is/are FALSE?
(1) For every non-deterministic Turing machine, there exists an equivalent deterministic Turing machine.
(2) Turing recognizable languages are closed under union and complementation.
(3) Turing decidable languages are closed under intersection and complementation
(4) Turing recognizable languages are closed under union and intersection.

A. 1 and 4 only

B. 1 and 3 only

C. 2 only

D. 3 only

Answer: C

97. Consider a string s over (0+1)*. The number of 0's in s is denoted by no(s) and the number of 1's in s is denoted by n1(s). The language that is not regular is

A. L = {s ? (0+1)* I for every prefix s' of s, I no(s')-n1(s') I ? 2}

B. L = {s ? (0+1)* I no(s) mod 7 = n1(s) mod 5 = 0}

C. L = {s ? (0+1)* I no(s) is a 3 digit prime}

D. L = {s ? (0+1)* I no(s)-n1(s) I ? 4

Answer: D

98. Which one of the following is true regarding FOTRAN?

A. It is a context free language

B. It is a context sensitive language

C. It is a regular language

D. None of the above

Answer: B

99. Which statement is true?

A. The PDA must have one accept state and one reject state

B. The PDA must have one accept state and two reject state

C. The PDA must have two accept state and two reject state

D. There is no reject state in the PDA.

Answer: D

100. TM is more powerful than FSM because

A. The tape movement is confined to one direction

B. It has no finite state control

C. It has the capability to remember arbitrary long sequences of input symbols

D. None of these

Answer: B