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Model Questions

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1. There are _____ tuples in finite state machine.
 - a) 4
 - b) 5
 - c) 6
 - d) unlimited

2. Transition function maps.
 - a) $\Sigma^* Q \rightarrow \Sigma$
 - b) $Q^* Q \rightarrow \Sigma$
 - c) $\Sigma^* \Sigma \rightarrow Q$
 - d) $Q^* \Sigma \rightarrow Q$

3. Finite automata requires minimum _____ number of stacks.
 - a) 1
 - b) 0
 - c) 2
 - d) None of the mentioned

4. Regular expression for all strings starts with ab and ends with bba is.
 - a) aba^*b^*bba
 - b) $ab(ab)^*bba$
 - c) $ab(a+b)^*bba$
 - d) All of the mentioned

5. Number of final state require to accept Φ in minimal finite automata.
 - a) 1
 - b) 2
 - c) 3
 - d) None of the mentioned

6. The basic limitation of finite automata is that
 - a) It can't remember arbitrary large amount of information.
 - b) It sometimes recognize grammar that are not regular.

- c) It sometimes fails to recognize regular grammar.
d) All of the mentioned
7. Which of the following is a not a part of 5-tuple finite automata?
a) Input alphabet
b) Transition function
c) Initial State
d) Output Alphabet
8. Which among the following looks similar to the given expression?
 $((0+1).(0+1))^*$
a) $\{x \in \{0,1\}^* \mid x \text{ is all binary number with even length}\}$
b) $\{x \in \{0,1\} \mid x \text{ is all binary number with even length}\}$
c) $\{x \in \{0,1\}^* \mid x \text{ is all binary number with odd length}\}$
d) $\{x \in \{0,1\} \mid x \text{ is all binary number with odd length}\}$
9. Concatenation of R with Φ outputs:
a) R
b) Φ
c) $R.\Phi$
d) None of the mentioned
10. P, O, R be regular expression over Σ , P is not ϵ , then
 $R=Q + RP$ has a unique solution:
a) Q^*P
b) QP^*
c) Q^*P^*
d) $(P^*O^*)^*$
11. Which of the following is correct?
Statement 1: ϵ represents a single string in the set.
Statement 2: Φ represents the language that consist of no string.
a) Statement 1 and 2 both are correct
b) Statement 1 is false but 2 is correct
c) Statement 1 and 2 both are false
d) There is no difference between both the statements, ϵ and Φ are different notation for same reason
12. Which of the following represents a language which has no pair of consecutive 1's if
 $\Sigma = \{0,1\}$?
a) $(0+10)^*(1+\epsilon)$

- b) $(0+10)^*(1+\epsilon)^*$
- c) $(0+101)^*(0+\epsilon)$
- d) $(1+010)^*(1+\epsilon)$

13. The finite automata accept the following languages:

- a) Context Free Languages
- b) Context Sensitive Languages
- c) Regular Languages
- d) All the mentioned

14. Which of the following regular expressions represents the set of strings which do not contain a substring 'rt' if $\Sigma = \{r, t\}$

- a) $(rt)^*$
- b) $(tr)^*$
- c) (r^*t^*)
- d) (t^*r^*)

15. Which among the following is equivalent to the given regular expression?

01^*+1

- a) $(01)^*+1$
- b) $0((1)^*+1)$
- c) $(0(1)^*)+1$
- d) $((0^*1)1^*)^*$

16. Moore Machine is an application of:

- a) Finite automata without input
- b) Finite automata with output
- c) Non- Finite automata with output
- d) None of the mentioned

17. In Moore machine, output is produced over the change of:

- a) transitions
- b) states
- c) Both
- d) None of the mentioned

18. The output alphabet can be represented as:

- a) δ
- b) Δ
- c) Σ
- d) None of the mentioned

19. Which of the following is a correct statement?
- a) Moore machine has no accepting states
 - b) Mealy machine has accepting states
 - c) We can convert Mealy to Moore but not vice versa
 - d) All of the mentioned
20. In mealy machine, the O/P depends upon?
- a) State
 - b) Previous State
 - c) State and Input
 - d) Only Input
21. Which of the given are correct?
- a) Moore machine has 6-tuples
 - b) Mealy machine has 6-tuples
 - c) Both Mealy and Moore has 6-tuples
 - d) None of the mentioned
22. Mealy and Moore machine can be categorized as:
- a) Inducers
 - b) Transducers
 - c) Turing Machines
 - d) Linearly Bounder Automata
23. A Language for which no DFA exist is a_____
- a) Regular Language
 - b) Non-Regular Language
 - c) May be Regular
 - d) Cannot be said
24. Can a DFA recognize a palindrome number?
- a) Yes
 - b) No
 - c) Yes, with input alphabet as Σ^*
 - d) Can't be determined
25. What is the relation between DFA and NFA on the basis of computational power?
- a) DFA > NFA
 - b) NFA > DFA
 - c) Equal
 - d) Can't be said

26. The production of form non-terminal $\rightarrow \epsilon$ is called:
- Sigma Production
 - Null Production
 - Epsilon Production
 - All of the mentioned
27. Which of the following is a regular language?
- String whose length is a sequence of prime numbers
 - String with substring ww' in between
 - Palindrome string
 - String with even number of Zero's
28. Which of the following is an application of Finite Automaton?
- Compiler Design
 - Grammar Parsers
 - Text Search
 - All of the mentioned
29. Under which of the following operation, NFA is not closed?
- Negation
 - Kleene
 - Concatenation
 - None of the mentioned
30. For NFA with ϵ -moves, which among the following is correct?
- $\Delta: Q \times (\Sigma \cup \{\epsilon\}) \rightarrow P(Q)$
 - $\Delta: Q \times (\Sigma) \rightarrow P(Q)$
 - $\Delta: Q \times (\Sigma^*) \rightarrow P(Q)$
 - All of the mentioned
31. Complement of regular sets are _____
- Regular
 - CFG
 - CSG
 - RE
32. Which of the following statements is not true?
- Every language defined by any of the automata is also defined by a regular expression
 - Every language defined by a regular expression can be represented using a DFA
 - Every language defined by a regular expression can be represented using NFA

with ϵ moves

d) Regular expression is just another representation for any automata definition

33. The behaviour of NFA can be simulated using DFA.

a) always

b) never

c) sometimes

d) none of the mentioned

34. Precedence of regular expression in decreasing order is

a) $*$, $.$, $+$

b) $.$, $*$, $+$

c) $.$, $+$, $*$

d) $+$, a , $*$

35. Regular expression Φ^* is equivalent to

a) ϵ

b) Φ

c) 0

d) 1

36. $(a+b)^*$ is equivalent to

a) b^*a^*

b) $(a^*b^*)^*$

c) a^*b^*

d) none of the mentioned

37. Which of the following pair of regular expression are not equivalent?

a) $1(01)^*$ and $(10)^*1$

b) $x(xx)^*$ and $(xx)^*x$

c) $(ab)^*$ and a^*b^*

d) x^+ and x^*x^+

38. A language is regular if and only if

a) accepted by DFA

b) accepted by PDA

c) accepted by LBA

d) accepted by Turing machine

39. Regular grammar is

a) context free grammar

b) non context free grammar

- c) english grammar
- d) none of the mentioned

40. While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into _____ parts.

- a) 2
- b) 5
- c) 3
- d) 6

41. Let $w = xyz$ and y refers to the middle portion and $|y| > 0$. What do we call the process of repeating y 0 or more times before checking that they still belong to the language L or not?

- a) Generating
- b) Pumping
- c) Producing
- d) None of the mentioned

42. Answer in accordance to the third and last statement in pumping lemma:

For all _____ $xy^iz \in L$

- a) $i > 0$
- b) $i < 0$
- c) $i \leq 0$
- d) $i \geq 0$

43. If L_1' and L_2' are regular languages, then $L_1.L_2$ will be

- a) regular
- b) non regular
- c) may be regular
- d) none of the mentioned

44. The entity which generate Language is termed as:

- a) Automata
- b) Tokens
- c) Grammar
- d) Data

45. Which of the following statement is false?

- a) Context free language is the subset of context sensitive language
- b) Regular language is the subset of context sensitive language

- c) Recursively enumerable language is the super set of regular language
- d) Context sensitive language is a subset of context free language

46. The Grammar can be defined as: $G=(V, \Sigma, p, S)$

In the given definition, what does S represents?

- a) Accepting State
- b) Starting Variable
- c) Sensitive Grammar
- d) None of these

47. Which of the following statement is correct?

- a) All Regular grammar are context free but not vice versa
- b) All context free grammar are regular grammar but not vice versa
- c) Regular grammar and context free grammar are the same entity
- d) None of the mentioned

48. $A \rightarrow aA \mid a \mid b$

The number of steps to form aab:

- a) 2
- b) 3
- c) 4
- d) 5

49. The language accepted by Push down Automaton:

- a) Recursive Language
- b) Context free language
- c) Linearly Bounded language
- d) All of the mentioned

50. Which of the following the given language belongs to?

$L=\{a^m b^m c^m \mid m \geq 1\}$

- a) Context free language
- b) Regular language
- c) Both (a) and (b)
- d) None of the mentioned

51. Which of the following statements are correct for a concept called inherent ambiguity in CFL?

- a) Every CFG for L is ambiguous
- b) Every CFG for L is unambiguous

- c) Every CFG is also regular
- d) None of the mentioned

52. What does the given CFG define?

$S \rightarrow aSbS \mid bSaS \mid \epsilon$ and w denotes terminal

- a) w^r
- b) wSw
- c) Equal number of a's and b's
- d) None of the mentioned

53. If L_1 and L_2 are context free languages, which of the following is context free?

- a) L_1^*
- b) $L_2 \cup L_1$
- c) $L_1 \cdot L_2$
- d) All of the mentioned

54. $L = \{0^i 1^j 2^k \mid j > i+k\}$

Which of the following satisfies the language?

- a) 0111100
- b) 011100
- c) 0001100
- d) 0101010

55. In which order are the children of any node ordered?

- a) From the left
- b) From the right
- c) Arbitrarily
- d) None of the mentioned

56. Which among the following is the root of the derivation tree?

- a) Production P
- b) Terminal T
- c) Variable V
- d) Starting Variable S

57. The number of leaves in a parse tree with expression $E^*(E)$ where $*$ and $()$ are operators

- a) 5
- b) 2
- c) 4
- d) 3

58. A grammar with more than one derivation tree is called:
- a) Unambiguous
 - b) Ambiguous
 - c) Regular
 - d) None of the mentioned
59. _____ is the acyclic graphical representation of a grammar.
- a) Binary tree
 - b) Oct tree
 - c) Parse tree
 - d) None of the mentioned
60. Which of the following are always unambiguous?
- a) Deterministic Context free grammars
 - b) Non-Deterministic Regular grammars
 - c) Context sensitive grammar
 - d) None of the mentioned
61. A push down automaton employs _____ data structure.
- a) Queue
 - b) Linked List
 - c) Hash Table
 - d) Stack
62. Push down automata accepts _____ languages.
- a) Type 3
 - b) Type 2
 - c) Type 1
 - d) Type 0
63. A string is accepted by a PDA when
- a) Stack is empty
 - b) Acceptance state
 - c) Both (a) and (b)
 - d) None of the mentioned
64. The following move of a PDA is on the basis of:
- a) Present state
 - b) Input Symbol
 - c) Both (a) and (b)
 - d) None of the mentioned

65. Which among the following is not a part of the Context free grammar tuple?
- End symbol
 - Start symbol
 - Variable
 - Production
66. Which of the following automata takes stack as auxiliary storage?
- Finite automata
 - Push down automata
 - Turing machine
 - All of the mentioned
67. The context free grammar which generates a Regular Language is termed as:
- Context Regular Grammar
 - Regular Grammar
 - Context Sensitive Grammar
 - None of the mentioned
68. NPDA stands for
- Non-Deterministic Push Down Automata
 - Null-Push Down Automata
 - Nested Push Down Automata
 - All of the mentioned
69. A pushdown automata can be defined as: $(Q, \Sigma, G, q_0, z_0, A, \delta)$
 What does the symbol z_0 represents?
- an element of G
 - initial stack symbol
 - top stack alphabet
 - all of the mentioned
70. Let $\Sigma = \{0, 1\}^*$ and the grammar G be:
- $S \rightarrow \epsilon$
 $S \rightarrow SS$
 $S \rightarrow 0S1 \mid 1S0$
- State which of the following is true for the given
- Language of all and only Balanced strings
 - It contains equal number of 0's and 1's
 - Ambiguous Grammar
 - All of the mentioned

71. A push down automata can be represented using:
- Transition graph
 - Transition table
 - ID
 - All of the mentioned
72. A PDA machine configuration (p, w, y) can be correctly represented as:
- (current state, unprocessed input, stack content)
 - (unprocessed input, stack content, current state)
 - (current state, stack content, unprocessed input)
 - none of the mentioned
73. If the PDA does not stop on an accepting state and the stack is not empty, the string is:
- rejected
 - goes into loop forever
 - both (a) and (b)
 - none of the mentioned
74. Which of the following is analogous to the following?
:NFA and NPDA
- Regular language and Context Free language
 - Regular language and Context Sensitive language
 - Context free language and Context Sensitive language
 - None of the mentioned
75. Which of the following relates to Chomsky hierarchy?
- Regular < CFL < CSL < Unrestricted
 - CFL < CSL < Unrestricted < Regular
 - CSL < Unrestricted < CF < Regular
 - None of the mentioned
76. Which of the following strings do not belong to the given regular expression?
 $(a)^*(a+cb)a$
- aa
 - aaa
 - acba
 - acbacba
77. Which of the following strings is not generated by the given grammar:
 $S \rightarrow SaSbS | e$

- a) aabb
- b) abab
- c) abaabb
- d) None of the mentioned

78. abb^*c denotes which of the following?

- a) $\{abnc|n=0\}$
- b) $\{abnc|n=1\}$
- c) $\{anbc|n=0\}$
- d) $\{abcn|n>0\}$

79. Context free grammar is called Type 2 grammar because of _____ hierarchy.

- a) Greibach
- b) Backus
- c) Chomsky
- d) None of the mentioned

80. A CFG consist of the following elements:

- a) a set of terminal symbols
- b) a set of non terminal symbols
- c) a set of productions
- d) all of the mentioned

81. CFGs are more powerful than:

- a) DFA
- b) NDFA
- c) Mealy Machine
- d) All of the mentioned

82. Which among the following is incorrect with reference to a derivation tree?

- a) Every vertex has a label which is a terminal or a variable.
- b) The root has a label which can be a terminal.
- c) The label of the internal vertex is a variable.
- d) None of the mentioned

83. Let $G=(V, T, P, S)$

where a production can be written as:

$S \rightarrow aAS|a$

$A \rightarrow SbA|ba|SS$

Which of the following string is produced by the grammar?

- a) aabbaab

- b) aabbaa
- c) baabab
- d) None of the mentioned

84. Statement 1: Ambiguity is the property of grammar but not the language.
Statement 2: Same language can have more than one grammar.
Which of the following options are correct with respect to the given statements?
- a) Statement 1 is true but statement 2 is false
 - b) Statement 1 is false but statement 2 is true
 - c) Both the statements are true
 - d) Both the statements are false
85. Which of the following are context free language?
- a) $L = \{a^i b^j \mid i \geq 0\}$
 - b) $L = \{ww^r \mid w \text{ is a string and } r \text{ represents reverse}\}$
 - c) Both (a) and (b)
 - d) one of the mentioned
86. Which of the expressions correctly is an requirement of the pumping lemma for the context free languages?
- a) $uv^rwx^r y$
 - b) $uv^r w^r x^r y$
 - c) $uv^{2r} wx^{2r} y$
 - d) All of the mentioned
87. The pumping lemma is often used to prove that a language is:
- a) Context free
 - b) Not context free
 - c) Regular
 - d) None of the mentioned
88. A turing machine operates over:
- a) finite memory tape
 - b) infinite memory tape
 - c) depends on the algorithm
 - d) none of the mentioned
89. Which of the functions are not performed by the turing machine after reading a symbol?
- a) writes the symbol
 - b) moves the tape one cell left/right

- c) proceeds with next instruction or halts
- d) none of the mentioned

90. Turing machine can be represented using the following tools:

- a) Transition graph
- b) Transition table
- c) Queue and Input tape
- d) All of the mentioned

91. The value of n if Turing machine is defined using n-tuples:

- a) 6
- b) 7
- c) 8
- d) 5

92. If d is not defined on the current state and the current tape symbol, then the machine

-
- a) does not halts
 - b) halts
 - c) goes into loop forever
 - d) none of the mentioned

93. The class of recursively enumerable language is known as:

- a) Turing Class
- b) Recursive Languages
- c) Universal Languages
- d) RE

94. Choose the appropriate option:

Statement: If a language L is recursive, it is closed under the following operations:

- a) Union
- b) Intersection
- c) Complement
- d) All of the mentioned

95. According to Chomsky hierarchy, which of the following is adopted by Recursively Enumerable language?

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

96. According to the Rice's theorem, If P is a nontrivial property, L_P is :
- a) infinite
 - b) decidable
 - c) undecidable
 - d) none of the mentioned
97. Fill in the blank with reference to Rice's theorem.
For any non-trivial property of _____ no general or effective method can decide whether an algorithm computes it with that property.
- a) partial functions
 - b) piecewise functions
 - c) both (a) and (b)
 - d) none of the mentioned
98. Post Correspondence problem is
- a) decidable decision problem
 - b) undecidable decision problem
 - c) not a decision problem
 - d) none of the mentioned
99. PCP stands for?
- a) Post Correspondence Problem
 - b) Post Corresponding Problem
 - c) Pre Correspondence problem
 - d) None of the mentioned
100. The non- Kleene Star operation accepts the following string of finite length over set $A = \{0,1\}$ | where string s contains even number of 0 and 1
- a) 01,0011,010101
 - b) 0011,11001100
 - c) ϵ ,0011,11001100
 - d) ϵ ,0011,11001100