Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Formal Language and Automata
Course Code - BCSE404

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○ B.A.(Eng)

Answer all the questions. Each question carry one mark.

9.   1. There are _____ tuples in finite state machine

Mark only one oval.

○ 4

○ 6

○ 5

○ Unlimited

10.   2. Transition function maps

Mark only one oval.

○ Σ * Q -> Σ

○ Q * Q -> Σ

○ Q * Σ -> Q

○ Σ * Σ -> Q

11.   3. Language of finite automata is

Mark only one oval.

○ Type 0

○ Type 1

○ Type 3

○ Type 2

12.   4. Number of final state require to accept Φ in minimal finite automata

Mark only one oval.

○ 1

○ 2

○ 3None of these

○ 3

13.   5. Regular expression for all strings starts with ab and ends with bba is

Mark only one oval.

◯ aba*b*bba

◯ ab(ab)*bba

◯ ab(a+b)*bba

◯ All of these

14.   6. Number of states require to simulate a computer with memory capable of
      storing '3' words each of length '8'

Mark only one oval.

◯ 3*2^8

◯ 2^(3+8)

◯ 2^(3*8)

◯ None of these

15.   7. A regular language over an alphabet a is one that can be obtained from

Mark only one oval.

◯ union

◯ concatenation

◯ All of these

◯ kleene

16. 8. Regular expression {0,1} is equivalent to

Mark only one oval.

$\bigcirc$ 0 U 1

$\bigcirc$ 0 / 1

$\bigcirc$ All of these

$\bigcirc$ 0 + 1

17. 9. Push down automata accepts which language9. Disjoint set data structure is used in

Mark only one oval.

$\bigcirc$ Context sensitive language

$\bigcirc$ Recursive language

$\bigcirc$ Context free language

$\bigcirc$ None of these

18. 10 It is less complex to prove the closure properties over regular languages using

Mark only one oval.

$\bigcirc$ DFA

$\bigcirc$ PDA

$\bigcirc$ NFA

$\bigcirc$ Can't be said

19. 11. Which of the following is an application of Finite Automaton?

Mark only one oval.

◯ Compiler Design

◯ Grammar Parsers

◯ All of these

◯ Text Search

20. 12. A PDA machine configuration (p, w, y) can be correctly represented as

Mark only one oval.

◯ (unprocessed input, stack content, current state)

◯ (current state, stack content, unprocessed input)

◯ (current state, unprocessed input, stack content)

◯ None of these

21. 13. A language accepted by Deterministic Push down automata is closed under which of the following?

Mark only one oval.

◯ Union

◯ both Complement and Union

◯ Complement

◯ None of these

22.   14. Every grammar in Chomsky Normal Form is:

Mark only one oval.

    ⚪ regular

    ⚪ context sensitive

    ⚪ context free

    ⚪ All of these

23.   15. In which of the following, does the CNF conversion find its use?

Mark only one oval.

    ⚪ CYK Algorithm

    ⚪ Bottom up parsing

    ⚪ All of these

    ⚪ Preprocessing step in some algorithms

24.   16. Which among the following can be an example of application of finite state machine(FSM)?

Mark only one oval.

    ⚪ Adder

    ⚪ Stack

    ⚪ Communication Link

    ⚪ None of these

25.   17. Predict the number of transitions required to automate the following language using only 3 states:L= {w | w ends with 00}

Mark only one oval.

◯ 2

◯ 4

◯ 3

◯ cannot be said

26.   18. L1= {w | w does not contain the string tr }L2= {w | w does contain the string tr}Given ∑= {t, r}, The difference of the minimum number of states required to form L1 and L2?

Mark only one oval.

◯ 1

◯ 2

◯ 0

◯ cannot be said

27.   19. In mealy machine, the O/P depends upon?

Mark only one oval.

◯ State

◯ Previous State

◯ State and Input

◯ Only Input

28.   20. Which of the given are correct?

Mark only one oval.

⬭ Moore machine has 6-tuples

⬭ Mealy machine has 6-tuples

⬭ Both Mealy and Moore has 6-tuples

⬭ None of these

29.   21. The major difference between Mealy and Moore machine is about:

Mark only one oval.

⬭ Input Variations

⬭ Both Output Variations and Input Variations

⬭ Output Variations

⬭ None of these

30.   22. RR* can be expressed in which of the forms:

Mark only one oval.

⬭ R-

⬭ R+ U R-

⬭ R+

⬭ R

31.   23. Which of the following is not a regular expression?

Mark only one oval.

○ [(a+b)*-(aa+bb)]*

○ (01+11+10)*

○ [(0+1)-(0b+a1)*(a+b)]*

○ (1+2+0)*(1+2)*

32.   24. Which of the following is true?

Mark only one oval.

○ Every subset of a regular set is regular

○ The union of two non regular set is not regular

○ Every finite subset of non-regular set is regular

○ Infinite union of finite set is regular

33.   25. The minimum number of states required in a DFA (along with a dumping state) to check whether the 3rd bit is 1 or not for |n|>=3

Mark only one oval.

○ 3

○ 4

○ 1

○ 5

34. 26. Generate a regular expression for the given language:l L(x): {xÎ{0,1}*| x ends with 1 nd does not contain a substring 01}

Mark only one oval.

- ( ) (0+01)*
- ( ) (0+01)*1
- ( ) (0+01)*(1+01)
- ( ) All of these

35. 27. The minimum number of transitions to pass to reach the final state as per the following regular expression is: {a,b}*{baaa}

Mark only one oval.

- ( ) 5
- ( ) 6
- ( ) 4
- ( ) 3

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

Mark only one oval.

- ( ) 2
- ( ) 5
- ( ) 3
- ( ) 6

37. 29. A turing machine is a

Mark only one oval.

◯ real machine

◯ abstract machine

◯ more than one option is correct

◯ hypothetical machine

38. 30. Which of the following is false for an abstract machine?

Mark only one oval.

◯ Turing machine

◯ theoretical model of computer

◯ All of them

◯ assumes a discrete time paradigm

39. 31. The context free languages are closed under:

Mark only one oval.

◯ Intersection

◯ Complement

◯ Kleene

◯ None of these

40.   32. Given Grammar G1:S->aSbS->eGrammar G2:R->cRdR->eIf L(G)=L(G1) U L(G2), the number of productions the new starting variable would have:

Mark only one oval.

◯ 3

◯ 4

◯ 2

◯ 1

41.   33. If L1 and L2 are context free languages, L1-L2 are context free:

Mark only one oval.

◯ always

◯ sometimes

◯ never

◯ none of the mentioned

42.   34. Let T={p, q, r, s, t}. The number of strings in S* of length 4 such that no symbols can be repeated.

Mark only one oval.

◯ 120

◯ 360

◯ 625

◯ 36

43. 35. A_____ is context free grammar with atmost one non terminal in the right handside of the production.

Mark only one oval.

   ◯ linear bounded grammar

   ◯ regular grammar

   ◯ linear grammar

   ◯ none of the mentioned

44. 36. Which of the following relates to Chomsky hierarchy?

Mark only one oval.

   ◯ CFL

   ◯ CSL

   ◯ Regular

   ◯ None of the mentioned

45. 37. Which of the following statement is false in context of tree terminology?

Mark only one oval.

   ◯ A node can have three children

   ◯ Root has no parent

   ◯ Root with no children is called a leaf

   ◯ Trees are collection of nodes, with a parent child relationship

46.   38. Which among the following is the root of the parse tree?

Mark only one oval.

     ◯ Production P

     ◯ Terminal T

     ◯ Starting Variable S

     ◯ Variable V

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

Mark only one oval.

     ◯ From the right

     ◯ Arbitrarily

     ◯ From the left

     ◯ None of the mentioned

48.   40. A CFG is not closed under

Mark only one oval.

     ◯ Dot operation

     ◯ Union Operation

     ◯ Iteration

     ◯ Concatenation

49.   41. Which of the following are distinct to parse trees?

Mark only one oval.

◯ abstract parse trees

◯ sentence diagrams

◯ both abstract parse trees and sentence diagrams

◯ none of the mentioned

50.   42. A symbol X is called to be useful if and only if its is:

Mark only one oval.

◯ generating

◯ reachable

◯ both generating and reachable

◯ none of the mentioned

51.   43. Grammar is checked by which component of compiler

Mark only one oval.

◯ Scanner

◯ Parser

◯ Semantic Analyzer

◯ None of the mentioned

52. 44. With reference of a DPDA, which among the following do we perform from the start state with an empty stack?

Mark only one oval.

○ process the whole string

○ end in final state

○ all of the mentioned

○ end with an empty stack

53. 45. The following denotion belongs to which type of language: G=(V, T, P, S)

Mark only one oval.

○ Regular grammar

○ Context Sensitive grammar

○ Context free grammar

○ All of the mentioned

54. 46.Which of the following regular expression allows strings on {a,b}* with length n where n is a multiple of 4.

Mark only one oval.

○ (a+b+ab+ba+aa+bb+aba+bab+abab+baba)*

○ (bbbb+aaaa)*

○ ((a+b)(a+b)(a+b)(a+b))*

○ None of the mentioned

55.   47. Which of the following is incorrect? There exists algorithms to decide if:

Mark only one oval.

⃝ String w is in CFL L

⃝ CFL L is empty

⃝ All of the mentioned

⃝ CFL L is infinite

56.   48. Fill in the blank with the most appropriate option. Statement: In theory of
       computation, abstract machines are often used in _____ regarding
       computability or to analyze the complexity of an algorithm.

Mark only one oval.

⃝ thought experiments

⃝ principle

⃝ all of the mentioned

⃝ hypothesis

57.   49. Which of the problems were not answered when the turing machine was
       invented?

Mark only one oval.

⃝ Does a machine exists that can determine whether any arbitrary machine on its tape is
    circular

⃝ Does a machine exists that can determine whether any arbitrary machine on its tape is
    ever prints a symbol

⃝ None of the mentioned

⃝ Hilbert Entscheidungs problem

58.   50. Which of the following statements is not true?

Mark only one oval.

◯ 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 NFA with e moves

◯ Every language defined by a regular expression can be represented using a DFA

◯ Regular expression is just another representation for any automata definition

59.   51. All the regular languages can have one or more of the following descriptions: i) DFA ii) NFA iii) e-NFA iv) Regular Expressions Which of the following are correct?

Mark only one oval.

◯ i, ii, iv

◯ i, ii, iii

◯ i, ii, iii, iv

◯ i, iv

60.   52. The basic limitation of finite automata is that

Mark only one oval.

◯ It sometimes recognize grammar that are not regular.

◯ It sometimes fails to recognize regular grammar

◯ It can't remember arbitrary large amount of information.

◯ All of the mentioned

61.   53. L1= {w | w does not contain the string tr } L2= {w | w does contain the string tr}
       Given ∑= {t, r}, The difference of the minimum number of states required to form
       L1 and L2?

       Mark only one oval.

       ◯ 3

       ◯ 2

       ◯ 0

       ◯ 1

62.   54. Which among the following is not an application of FSM?

       Mark only one oval.

       ◯ Lexical Analyser

       ◯ BOT

       ◯ None of the mentioned

       ◯ State charts

63.   55. Regular expression Φ* is equivalent to

       Mark only one oval.

       ◯ Φ

       ◯ 0

       ◯ ε

       ◯ 1

64.   56. Design a NFA for the language: L: {an| n is even or divisible by 3} Which of the
       following methods can be used to simulate the same.

Mark only one oval.

⭘ a) e-NFA

⭘ b) Power Construction Method

⭘ Both (a) and (b)

⭘ None of the mentioned

65.   57. Which of the following is true for a predictive parser?

Mark only one oval.

⭘ Recursive Descent parser

⭘ no backtracking

⭘ Recursive Descent parser and no backtracking

⭘ None of the mentioned

66.   58. The total number of states to build the given language using DFA: L= {w | w has
       exactly 2 a's and at least 2 b's}

Mark only one oval.

⭘ 11

⭘ 12

⭘ 13

⭘ 10

67.   59. Statement 1: Null string is accepted in Moore Machine. Statement 2: There are more than 5-Tuples in the definition of Moore Machine.

Mark only one oval.

○ Statement 1 is true while Statement 2 is false

○ Statement 1 is false while Statement 2 is true

○ Statement 1 is true and Statement 2 is true

○ Statement 1 and Statement 2, both are false

68.   60. Which one among the following is true? A mealy machine

Mark only one oval.

○ produces a language

○ produces a grammar

○ has less circuit delays

○ can be converted to NFA

69.   61. Number of states require to simulate a computer with memory capable of storing '3' words each of length '8'.

Mark only one oval.

○ 3 * 28

○ 2(3+8)

○ 2(3*8)

○ None of the mentioned

70.   62. Generate a regular expression for the following problem statement: Password Validation: String should be 8-15 characters long. String must contain a number, an Uppercase letter and a Lower case letter.

Mark only one oval.

⬭ ^(?=.*[a-z])(?=.*[A-Z])(?=.*\d).{9,16}$

⬭ ^(?=.[a-z])(?=.[A-Z])(?=.\d).{8,15}$

⬭ ^(?=.*[a-z])(?=.*[A-Z])(?=.*\d).{8,15}$

◯ None of the mentioned

71.   63. The _____ of a set of states, P, of an NFA is defined as the set of states reachable from any state in P following e-transitions.

Mark only one oval.

⬭ e-pack

⬭ Q in the tuple

⬭ e-closure

⬭ None of the mentioned

72.   64. What is wrong in the given definition? Def: ({q0, q1, q2}, {0,1}, δ, q3, {q3})

Mark only one oval.

⬭ The definition does not satisfy 5 Tuple definition of NFA

⬭ There are no transition definition

⬭ Initial and Final states do not belong to the Graph

⬭ Initial and final states can't be same

73. 65. What is the relation between DFA and NFA on the basis of computational power?

Mark only one oval.

○ DFA > NFA

○ NFA > DFA

○ Equal

○ Can't be said

74. 66. How many strings of length less than 4 contains the language described by the regular expression $(x+y)*y(a+ab)*$?

Mark only one oval.

○ 7

○ 10

○ 12

○ 11

75. 67. Suppose A->xBz and B->y, then the simplified grammar would be:

Mark only one oval.

○ A->xyzA->xBz|xyz

○ A->xBz|B|y

○ A->xyz

○ none of the mentioned

76.   68. Given Grammar: S->A, A->aA, A->e, B->bA Which among the following
        productions are Useless productions?

        Mark only one oval.

        ◯ S->A

        ◯ A->aA

        ◯ B->bA

        ◯ A->e

77.   69. Given grammar G: S->aS|A|C A->a B->aa C->aCb Find the set of variables thet
        can produce strings only with the set of terminals.

        Mark only one oval.

        ◯ {C}

        ◯ {A,B}

        ◯ {A,B,S}

        ◯ None of the mentioned

78.   70. Given a Grammar G: S->aA A->a A->B B->A B->bb Which among the following
        will be the simplified grammar?

        Mark only one oval.

        ◯ S->aA|aB, A->B, B->bb

        ◯ S->aA|aB, A->a, B->A

        ◯ S->aA|aB, A->a, B->bb

        ◯ None of the emntioned

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