Theory of Computation MCQs [set-2]

Chapter: *Unit 1*

26. The following grammar
G = (N, T, P, S)
N = {S, A, B}
T = {a, b, c}
P : S ? aSa
S ? aAa
A ? bB
B ? bB
B ? c is

A. is type 3

B. is type 2 but not type 3

C. is type 1 but not type 2

D. is type 0 but not type 1

Answer: B

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27. The following grammar
G = (N, T, P, S)
N = {S, A, B, C, D, E}
T = {a, b, c}
P : S ? aAB
AB ? CD
CD ? CE
C ? aC
C ? b
bE ? bc is

A. is type 3

B. is type 2 but not type 3

C. is type 1 but not type 2

D. is type 0 but not type 1

Answer: C

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28. The following grammar
G = (N, T, P, S)
N = {S, A, B, C}
T = {a, b, c}
P : S ? aS
A ? bB
B ? cC
C ? a is

A. is type 3

B. is type 2 but not type 3

C. is type 1 but not type 2

D. is type 0 but not type 1

Answer: A

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29. P, Q, R are three languages. If P & R are regular and if PQ=R, then

A. Q has to be regular

B. Q cannot be regular

C. Q need not be regular

D. Q has to be a CFL

Answer: C

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30. Which of the following is true with respect to Kleene's theorem?
1 A regular language is accepted by a finite automaton.
2 Every language is accepted by a finite automaton or a turingmachine.

A. 1 only

B. 2 only

C. Both 1 and 2 are true statements

D. None is true

Answer: C

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31. Automaton accepting the regular expression of any number of a ' s is:

A. a*

B. ab*

C. (a/b)*

D. a*b*c

Answer: A

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32. Grammars that can be translated to DFAs:

A. Left linear grammar

B. Right linear grammar

C. Generic grammar

D. All of these

Answer: B

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33. Two strings x and y are indistinguishable if:

A. ?*(s, x) = ?* (s, y), i.e. the state reached by a DFA M on input x is the same as the state reached by M on input y

B. if for every string z ? ?* either both xz and yz are in language A on ?* or both xz and yz are not in A

C. Both above statements are true

D. None of the above

Answer: C

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34. Given an arbitrary non-deterministic finite automaton NFA with N states, the maximum number of states in an equivalent minimized DFA is at least:

A. N2

B. 2N

C. 2N

D. N!

Answer: C

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35. Regular expressions are

A. Type 0 language

B. Type 1 language

C. Type 2 language

D. Type 3 language

Answer: A

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36. The regular expression 0*(10)* denotes the same set as

A. (1*0)*1*

B. 0+(0+10)*

C. (0+1)*10(0+1)*

D. None of the above

Answer: B

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37. Consider the NFA M shown below. Let the language accepted by M be L. Let L1 be the language accepted by the NFA M1, obtained by changing the accepting state of M to a non-accepting state and by changing the non-accepting state of M to accepting states. Which of the following statements is true?

A. L1 = {0,1}* ? L

B. L1 = {0,1}*

C. L1 is a subset of L

D. L1 = L

Answer: A

38. Which of the statements is true:

A. The complement of a regular language is always regular.

B. Homomorphism of a regular language is always regular.

C. Both of the above are true statements

D. None of the above

Answer: C

39. The regular sets are closed under:

A. Union

B. Concatenation

C. Kleene closure

D. All of the above

Answer: D

40. Any given transition graph has an equivalent:

A. regular

B. DFSM (Deterministic Finite State Machine)

C. NDFSM

D. All of them

Answer: D

41. 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

Answer: A

42. Which of the following is not a regular expression?

A. [(a+b)*-(aa+bb)]*

B. [(0+1)-(0b+a1)*(a+b)]*

C. (01+11+10)*

D. (1+2+0)*(1+2)*

Answer: B

43. Consider the regular language L = (111+111111)*. The minimum number of states inany DFA accepting this language is

A. 3

B. 5

C. 8

D. 9

Answer: D

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

A. 7

B. 10

C. 12

D. 11

Answer: D

45. Which of the following is TRUE?

A. Every subset of a regular set is regular

B. Every finite subset of a non-regular set is regular

C. The union of two non-regular sets is not regular

D. Infinite union of finite sets is regular

Answer: B

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46. The minimum state automaton equivalent to the above FSA has the following number of states

A. 1

B. 2

C. 3

D. 4

Answer: B

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47. Which one of the following languages over the alphabet {0,1} is described by the regular expression: (0+1)*0(0+1)*0(0+1)*?

A. The set of all strings containing the substring 00.

B. The set of all strings containing at most two 0's.

C. The set of all strings containing at least two 0's.

D. The set of all strings that begin and end with either 0 or 1.

Answer: C

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48. Let w be any string of length n is {0,1}*. Let L be the set of all substrings of w. What is the minimum number of states in a non-deterministic finite automaton that accepts L?

A. n-1

B. n

C. n+1

D. 2n-1

Answer: C

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49. Which of the following are regular sets?

A. I and IV only

B. I and III only

C. I only

D. IV only

Answer: A

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50. A minimum state deterministic finite automation accepting the language L={W W ? {0,1}*, number of 0s and 1s in are divisible by 3 and 5, respectively} has

A. 15 states

B. 11 states

C. 10 states

D. 9 states

Answer: A

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