

Charotar University of Science and Technology (CHARUSAT)

Chandubhai S. Patel Institute of Technology

U & P U. Patel Department of Computer Engineering

CE349 QUESTION BANK (MCQ QUESTION)

1.	A relation R is said to be _____, if for two elements a and b in X, if a is related to b then b is related to a.
2.	A relation R is said to be _____, if for three elements a, b and c in X and if a is related to b, b is related to c and c is related to a.
3.	A relation R is said to be _____, if every element of A is related to itself by that relation R.
4.	A relation R is called as an _____ on A, if R is reflexive, symmetric and Transitive.
5.	A relation R is not to be called _____, if for two elements a and b in X, if a is related to b but b is not related to a.
6.	(a, b)* means (a) Any combination of a, b including null (b) Any combination of a, b excluding null (c) Any combination of a, b, but a will come first (d) None of these
7.	(a, b)+ means (a) Any combination of a, b including null (b) Any combination of a, b excluding null (c) Any combination of a, b, but a will come first (d) None of these
8.	(0, 1)* means (a) Any combination of 0, 1 including null (b) Any combination of 0, 1 excluding null

	(c) Any combination of 0,1, but a will come first (d) None of these
9.	$(0,1)^+$ means (a) Any combination of 0,1 including null (b) Any combination of 0,1 excluding null (c) Any combination of 0,1, but a will come first (d) None of these
10.	What is the language generated by the grammar $S \rightarrow aSb$ $S \rightarrow A$ $A \rightarrow aA$ (a) $a^m b^m$ (b) \emptyset (c) $a^n b^m$ (d) $a^m b^n$
11.	The language generated by the grammar $S \rightarrow 0S0 \mid 1S1 \mid 0 \mid 1$ is (a) Even palindrome of 0 and 1 (b) Odd palindrome of 0 and 1 (c) Any combination of 0 and 1 (d) None of these
12.	The language generated by the grammar $S \rightarrow aSb \mid bSb \mid a \mid b$ is (a) Even palindrome of a and b (b) Odd palindrome of a and b (c) Any combination of a and b (d) None of these
13.	The language constructed from the grammar $S \rightarrow aSbb \mid aAbb$ $A \rightarrow a$

	<p>(a) $a^{n+1}b^{2n}$ (b) $a^n b^{2n}$ (c) $a^n b^{2n-1}$ (d) $a^{n+1} b^{2n+1}$</p>
14.	<p>The language constructed from the grammar $S \rightarrow aSa aBa$ $A \rightarrow Ba b$ is (a) $a^n b a^n$ (b) $a^n b a^{n+1}$ (c) a^{2n} (d) \emptyset</p>
15.	<p>Which type of grammar is the following in particular $S \rightarrow aSb ab$ (a) Unrestricted (b) Context Sensitive Grammar (c) Context Free Grammar (d) Regular Grammar</p>
16.	<p>Which type of grammar is the following in particular $S \rightarrow aS bA$ $S \rightarrow aA a$ (a) Unrestricted (b) Context Sensitive Grammar (c) Context Free Grammar (d) Regular Grammar</p>
17.	<p>Which type of grammar is the following in particular $A \rightarrow aB$ $B \rightarrow aC$ $C \rightarrow bC aD$ $D \rightarrow bA b$ (a) Not type 0 but context free (b) Context Sensitive Grammar (c) Context Free Grammar</p>

	(d) Context Free but Regular in particular
18.	<p>The language $\{a^m b^n c^m n, m \geq 1\}$ is</p> <p>(a) Regular</p> <p>(b) Context Free but not regular</p> <p>(c) Context Sensitive but not context free</p> <p>(d) Type 0 but not context sensitive</p>
19.	<p>The language $\{a^n b^n c^m n, m \geq 1\}$ is</p> <p>(e) Regular</p> <p>(f) Context Free but not regular</p> <p>(g) Context Sensitive but not context free</p> <p>(h) Type 0 but not context sensitive</p>
20.	<p>Which of the following grammar generates strings with any number of 1's?</p> <p>(a) $S \rightarrow 1A, A \rightarrow \epsilon$</p> <p>(b) $S \rightarrow 1S, S \rightarrow \epsilon$</p> <p>(c) $S \rightarrow S1, S \rightarrow \epsilon$</p> <p>(d) (b) & (c)</p>
21.	<p>Which of the following grammar generates strings with any number of a's?</p> <p>(a) $S \rightarrow aA, A \rightarrow \epsilon$</p> <p>(b) $S \rightarrow aS, S \rightarrow \epsilon$</p> <p>(c) $S \rightarrow Sa, S \rightarrow \epsilon$</p> <p>(d) (b) & (c)</p>
22.	<p>In the given CFG, which of the following strings is not generated by the grammar?</p> $S \rightarrow aSb \mid bSb \mid a \mid b \mid \epsilon$ <p>(a) aaaa</p> <p>(b) baba</p> <p>(c) abba</p> <p>(d) babaaabab</p>
23.	<p>Which language is generated by below CFG?</p> $S \rightarrow aSAb \mid \epsilon$ $A \rightarrow bA \mid \epsilon$

	<p>(a) $((a + b)^*b)^*$</p> <p>(b) $\{a^m b^n m \leq n\}$</p> <p>(c) $\{a^m b^n m = n\}$</p> <p>(d) $a^* b^*$</p>
24.	<p>Consider the below grammar</p> <p>$S \rightarrow xB \mid yA$</p> <p>$A \rightarrow x \mid xS \mid yAA$</p> <p>$B \rightarrow y \mid yS \mid xBB$</p> <p>Which of the below strings are accepted by the grammar?</p> <p>(i) xxyyx</p> <p>(ii) xxyyxy</p> <p>(iii) xyxy</p> <p>(iv) yxxy</p> <p>(v) yxx</p> <p>(vi) xyx</p> <p>(a) (i), (ii) and (iii)</p> <p>(b) (ii), (v) and (vi)</p> <p>(c) (ii), (iii) and (iv)</p> <p>(d) (i), (iii) and (iv)</p>
25.	<p>What is the highest number to the grammar given by the following production rules.</p> <p style="text-align: center;">$S \rightarrow Aa \quad A \rightarrow c \mid Ba \quad B \rightarrow abc$</p> <p>(a) Type 0</p> <p>(b) Type 1</p> <p>(c) Type 2</p> <p>(d) Type 3</p>
26.	<p>The machine format of context sensitive grammar is</p> <p>(a) Finite Automata</p> <p>(b) Push Down Automata</p> <p>(c) Linear Bounded Automata</p> <p>(d) Turing Machine</p>
27.	<p>The language $\{a^m b^n c^{m+n} n, m \geq 1\}$ is</p>

	(a) Regular (b) Context Free but not regular (c) Context sensitive but not context free (d) Type 0 but not context sensitive
28.	What is the tightest bound type below grammar? $S \rightarrow Abc \mid ABSc \quad BA \rightarrow AB \quad Bb \rightarrow bb \quad A \rightarrow a$ (a) Type 0 (b) Type 1 (c) Type 2 (d) Type 3
29.	What is the tightest bound type below grammar? $S \rightarrow aSb \mid A \quad A \rightarrow Ac \mid c$ (a) Type 0 (b) Type 1 (c) Type 2 (d) Type 3
30.	What is true for $\delta(q, ab)$ in DFA (a) $\delta(q, a) \cup \delta(q, b)$ (b) $\delta(\delta(q, a), b)$ (c) $\delta(q, a), b$ (d) $\delta(q, a) \cap \delta(q, b)$
31.	The transitional function of DFA is (a) $Q \times \Sigma \rightarrow Q$ (b) $Q \times \Sigma \rightarrow 2^Q$ (c) $Q \times \Sigma \rightarrow 2^n$ (d) $Q \times \Sigma \rightarrow Q^n$
32.	The transitional function of DFA is (a) $Q \times \Sigma \rightarrow Q$ (b) $Q \times \Sigma \rightarrow 2^Q$ (c) $Q \times \Sigma \rightarrow 2^n$

	(d) $Q \times \Sigma \rightarrow Q^n$
33.	<p>The maximum number of states of a DFA converted from NFA with n states is</p> <p>(a) n (b) n^2 (c) 2^n (d) None</p>
34.	<p>An NFA with a set of states Q is converted to an equivalent DFA with a set of states Q'.</p> <p>(a) $Q' = Q$ (b) $Q' \subseteq Q$ (c) $Q \subseteq Q'$ (d) None</p>
35.	<p>The basic limitations of a finite state machine is</p> <p>(a) It cannot remember arbitrarily large amount of information (b) It cannot remember state transitions (c) It cannot remember grammar for a language (d) It cannot remember language generated from a grammar.</p>
36.	<p>The string WW^R is not recognized by any FSM because</p> <p>(a) An FSM cannot remember arbitrarily large amount of information (b) An FSM cannot fix the mid point (c) An FSM cannot match W with W^R. (d) An FSM cannot remember the first and last point.</p>
37.	<p>A finite automata recognizes</p> <p>(a) Any language (b) Context Sensitive Language (c) Context Free Language (d) Regular Language</p>
38.	<p>Which is true for a dead state?</p> <p>(a) It cannot be reached anytime (b) There is no necessity of the state (c) If control enters, there is no way to come out of the state</p>

	(d) If control enters, FA is dead.
39.	Which is true for a Moore Machine? (a) Output depends on the present state (b) Output depends on the present input (c) Output depends on the present state and the present input (d) Output depends on the present state and the past input
40.	Which is true for the mealy machine? (a) Output depends on the present state (b) Output depends on the present input (c) Output depends on the present state and the present input (d) Output depends on the present state and the past input
41.	Which is true for the inaccessible state? (a) It cannot be reached anytime (b) There is no necessity of the state (e) If control enters, there is no way to come out of the state (c) If control enters, FA is dead.
42.	In Mealy machine, output is a function of (a) Present state only (b) Next state only (c) Present state and input (d) Input only
43.	In moore machine, output is associated with (a) Present state only (b) Next state only (c) Present state and input (d) Input only
44.	A string after full traversal is not accepted by an NFA if it results in (a) Some non-final states (b) All non-final states (c) A single non-final state (d) Some final states

45.	<p>Consider the strings $u=abbaba$, $v=bab$ and $w=aabb$. Which of the following statement is true for the given transitional system?</p> <p>(a) The automaton accepts u and v but not w. (b) The automaton accepts each u, v and w. (c) The automaton rejects each of u, v and w. (d) The automaton accepts u but rejects v and w.</p>
46.	<p>If the final state and non-final states in the following DFA are interchanged, then which of the following languages over the alphabet $\{a,b\}$ will be accepted by the new DFA?</p> <p>(a) Set of all strings that do not end with ab (b) Set of all strings that begin with either an a or ab. (c) Set of all strings that do not contain the substring ab. (d) The set described by the regular expression $b^*aa^*(ba)^*b^*$</p>
47.	<p>The language of all words with at least two a's can be described by the regular expression</p> <p>(a) $(ab)^*a$ (b) $(a+b)^*ab^*a(a+b)^*$ (c) $b^*ab^*a(a+b)^*$ (d) All of these</p>
48.	<p>The set of all strings of $\{0,1\}$ having exactly two 0's is</p> <p>(a) $1^*01^*01^*$ (b) $(0+1)^*1$ (c) $(11+0)^*$ (d) $(00+11)^*$</p>
49.	<p>Which of the strings do not belong to the regular expression $(ba+baa)^*aaba$</p> <p>(a) $baaaba$ (b) $babaaabaaaba$ (c) $babababa$ (d) $baaaaba$</p>
50.	<p>Which of the following RE over $\{0,1\}$ denotes the set of strings not containing 100 as substring?</p> <p>(a) $(1+0)^*0^*$</p>

	(b) 0^*1010^* (c) 0^*1^*01 (d) All of the above
51.	The string 1101 does not belong to the set represented by (a) $110^*(0+1)$ (b) $1(0+1)^*101$ (c) $(10)^*(01)^*(00+11)^*$ (d) $(00+(11)^*01)^*$
52.	Which two of the following four regular expressions are equivalent? (i) $(00)^*(\epsilon+0)$ (ii) $(00)^*$ (iii) 0^*0^* (iv) $0(00)^*$ (a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (iii) and (iv)
53.	Which of the following alternatives is true for the following three regular expressions? (i) $011((11)^* + (01)^*)^*011$ (ii) $011(((1+0)1)^*011)^*$ (iii) $011(((1+0)^*1^*)^*011)^*$
54.	Consider the following statements: (i) $\emptyset^* = \epsilon$ (ii) $s(rs+s)^* = (sr+s)^*sr$ (iii) $(r+s)^* = (r^*+s^*)^+$ Find out the correct alternatives (a) All are true (b) Only (ii) is false (c) Only (iii) is false (d) Both (ii) and (iii) are false

55.	<p>Which of the following regular expressions describe the language over $\{0,1\}$ consisting of all strings that contain exactly two 1's?</p> <p>(a) $(0 + 1)^*11(0 + 1)^*$ (b) 0^*110^* (c) $0^*10^*10^*$ (d) $(0 + 1)^*1(0 + 1)^*1(0 + 1)^*$</p>
56.	<p>Which one of the following regular expressions identified is true?</p> <p>(a) $r^{(*)} = r^*$ (b) $(r^*s^*) = (r + s)^*$ (c) $(r + s)^* = r^* + s^*$ (d) $r^*s^* = r^* + s^*$</p>
57.	<p>A grammar is called ambiguous if</p> <p>(a) It generates more than one string (b) It generates both leftmost and rightmost derivation for a give string (c) It generates more than one parse tree for a given string (d) It fulfils both (b) and (c)</p>
58.	<p>Which is not true for ambiguous grammar?</p> <p>(a) Ambiguity creates problem in generating language from a given grammar (b) All ambiguity can be removed (c) Inherent ambiguity cannot be removed (d) Some ambiguity can be removed by hand</p>
59.	<p>Non-generating symbols are those symbols which</p> <p>(a) Do not generate any string of non-terminals (b) Do not generate any null string (c) Do not generate any string of terminal and non-terminals (d) Do not generate any string of terminals</p>
60.	<p>Useless symbols in CFG are</p> <p>(a) Non-generating symbols and non-reachable symbols (b) Null alphabets and null string (c) Non-terminal symbols (d) All of these</p>

61.	<p>Which of the following is a unit production?</p> <p>(a) <i>String of NT</i> \rightarrow <i>String of NT</i></p> <p>(b) <i>Single NT</i> \rightarrow <i>String of NT</i></p> <p>(c) <i>Single NT</i> \rightarrow <i>Single NT</i></p> <p>(d) <i>String of NT</i> \rightarrow <i>Single NT</i></p>
62.	<p>Which is true for the following CFG?</p> $S \rightarrow aA \mid \epsilon$ $A \rightarrow bA \mid a$ <p>(a) Null production can be removed</p> <p>(b) Null production cannot be removed</p> <p>(c) As A does not produce null, null cannot be removed</p> <p>(d) Both (b) and (c)</p>
63.	<p>Which of the following production is in Chomsky Normal Form (CNF)?</p> <p>(a) $(NT) \rightarrow (String\ of\ NT)$</p> <p>(b) $(NT) \rightarrow (String\ of\ terminal\ and\ non - terminal)$</p> <p>(c) $(NT) \rightarrow (String\ of\ terminal)$</p> <p>(d) $(NT) \rightarrow (String\ of\ exactly\ two\ NT)$</p>
64.	<p>Which is true for mechanical diagram of PDA?</p> <p>(a) PDA contains a stack</p> <p>(b) The head reads as well as writes</p> <p>(c) The head moves from left to right</p> <p>(d) The input string is surrounded by an infinite number of blanks in both sides</p>
65.	<p>The difference between finite automata and pushdown automata is in _____</p> <p>(a) Reading head</p> <p>(b) Input tape</p> <p>(c) Finite Control</p> <p>(d) Stack</p>
66.	<p>In the PDA, transitional function δ is in the form</p> <p>(a) $Q \times (\Sigma \cup \{\lambda\}) \times \tau \rightarrow (Q, \tau)$</p> <p>(b) $Q \times \Sigma \rightarrow Q$</p> <p>(c) $Q \times \Sigma \times \tau \rightarrow Q$</p>

	(d) $Q \times \tau \rightarrow Q \times \Sigma$
67.	<p>Instantaneous description remembers</p> <p>(a) The information of state and input tape content at a given instance of time.</p> <p>(b) The information of state and stack content at a given instance of time.</p> <p>(c) The information of input tape and stack content at a given instance of time.</p> <p>(d) The information of state, input tape, and stack content at a given instance of time.</p>
68.	<p>Which of the following is not possible algorithmically?</p> <p>(a) RE to CFG</p> <p>(b) NFA to DFA</p> <p>(c) CFG to PDA</p> <p>(d) NPDA to DPDA</p>
69.	<p>Which of the following is not accepted by a DPDA but accepted by an NPDA?</p> <p>(a) $L = \{a^n b^n n > 0\}$</p> <p>(b) $L = \{wcw^R w \in (a, b)^*\}$</p> <p>(c) $L = \{ww^R w \in (a, b)^+\}$</p> <p>(d) $L = \{a^n b^m c^m d^n m, n > 0\}$</p>
70.	<p>Which of the followings cannot be designed by a PDA?</p> <p>(a) $L = \{a^n b^n c^i n, i > 0\}$</p> <p>(b) $L = \{a^n b^n c^n n > 0\}$</p> <p>(c) $L = \{a^n c^i b^n n, i > 0\}$</p> <p>(d) $L = \{c^i a^n b^n n, i > 0\}$</p>
71.	<p>Which of the following language over $\{a, b, c\}$ is accepted by Deterministic PDA?</p> <p>(a) $L = \{wcw^R w \in (a, b)^*\}$</p> <p>(e) $L = \{ww^R w \in (a, b)^*\}$</p> <p>(e) $L = \{a^n b^n c^n n \geq 0\}$</p> <p>(f) $L = \{w w \text{ is a palindrome over } \{a, b, c\}\}$</p>

72.	<p>Consider the languages</p> $L_1 = \{ww^R w \in (0,1)^*\}$ $L_2 = \{w\#w^R w \in (0,1)^*\} \text{ where } \# \text{ is a special symbol}$ $L_3 = \{ww w \in (0,1)^*\}$ <p>Which of the following is true?</p> <p>(a) L_1 is a deterministic CFL (b) L_2 is a deterministic CFL (c) L_3 is a CFL but not a deterministic CFL (d) L_3 is a deterministic CFL</p>
73.	<p>Let $M = (K, \Sigma, \tau, \Delta, s, F)$ be a PDA where $K = \{s, f\}, F = \{f\}, \Sigma = \{a, b\}, \tau = \{a\}, \Delta = \{((s, a, \epsilon), (s, a)), ((s, b, \epsilon), (s, a)), ((s, a, \epsilon), (f, \epsilon)), ((f, a, a), (f, \epsilon)), ((f, b, a), (f, \epsilon))\}$</p> <p>Which of the following strings is not a member of $L(M)$?</p> <p>(a) aaa (b) aabab (c) baaba (d) bab</p>
74.	<p>Which of the following languages is accepted by a NPDA but not DPDA?</p> <p>(a) Always Regular (b) Never Regular (c) Always a Deterministic CFL (d) Always a CFL</p>
75.	<p>The symbols belong to the stack of a PDA</p> <p>(a) Terminals only (b) Non-Terminals only (c) States (d) Both terminals and Non-termianals</p>
76.	<p>L is accepted by a PDA where no symbol is necessarily removed from the stack. L is in particular</p> <p>(a) Context sensitive (b) Unrestricted (c) Context-free (d) Regular</p>

