

EPT-TEST-6 (TOC)

25 QUESTIONS

60 MINUTES

Concept: DFA

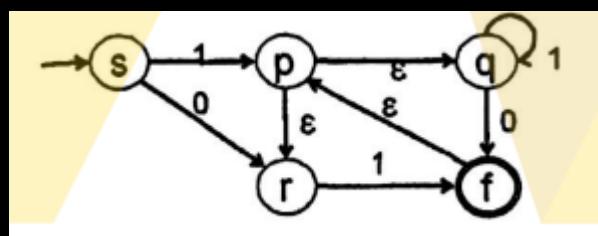
Sub-Concept: DFA

Marks: +1

Type: MSQ

Level: moderate

Q1: Consider the following DFA



Which of the following Strings are accepted by the above DFA, where f is the final state?

- A) 11
- B) 110
- C) 1100
- D) 010

Sub-Concept: TOC

Marks: +2

Type: MSQ

Level: moderate

Q2: Which of the following is/are true for the following language?

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

- A) DFA is not possible for the above language.**
- B) PDA is not possible for the above language.**
- C) NFA is possible for the above language.**
- D) $a^* b^* c^*$ is the Regular expression for the above language.**

Sub-Concept: TOC

Marks: +2,-0.66

Type: MCQ

Level: moderate

Ques 3: Consider the following two statements:

S-1: $L = \{a^i b^j c^k \mid i, j, k \geq 0, \text{ and } i = j \text{ or } i = k\}$ is a Context free language.

S-2: $L = \{a^i b^j c^i \mid i \leq j \leq 2i\}$. is a Context free language.

A) only S-2 is true

- B)Both S-1 and S-2 are true.**
- C)Only S-1 is true.**
- D)Both S-1 and S-2 are false.**

Topic:TOC

Concept: Decidability

Sub-Concept: Decidability

Marks: +2

Type: MSQ

Level: moderate

Topic:TOC

Concept:DFA

Sub-Concept:DFA

Marks: +1

Type: NAT

Level:moderate

Q4: How many minimum number of states required for the minimal DFA for the language of all strings over the alphabet {0, 1} that do not contain the substring 110.

Concept: TOC

Sub-Concept: TOC

Marks: +1,-0.33

Type: MCQ

Level: moderate

Q5: Consider the following two statements:

S-1: Let B be the set of all infinite sequences over {0, 1}. S is countable

S-2: $\text{EQ}_{\text{CFG}} = \{\langle G_1, G_2 \rangle \mid G_1 \text{ and } G_2 \text{ are CFGs and } L(G_1) = L(G_2)\}$.

EQ_{CFG} is undecidable

A) only S-2 is true

B) Both S-1 and S-2 are true.

C) Only S-1 is true.

D) Both S-1 and S-2 are false.

Sub-Concept: Language

Marks: +2

Type: MSQ

Level: moderate

Q6: Which of the following languages is not regular?

A) $L = \{0^m 1 0^n 1 \mid m >= n\}$

B) $L = \{ww^R \mid w \in \{0, 1\}^*\}$

C) $L = \{0^m 1^n \mid m, n \geq 0\}$

D) $L = \{0^p \mid p \text{ is prime}\}$

Topic: TOC

Concept: Language

Sub-Concept: Language

Marks: +2

Type: NAT

Level: Difficult

Q7: The symmetric difference of languages L and M, which we shall denote $SD(L, M)$, is the set of strings that are in exactly one of L and M. For example, if $L = \{0, 11, 1\}$ and $M = \{1, 00, 11\}$, then $SD(L, M) = \{0, 00\}$.

Suppose $L = (0^*1^*)$ and $M = (1^*0^*)$. How many strings of length 3 or less are in $SD(L, M)$?

Concept: DFA

Sub-Concept: DFA

Marks: +1

Type: NAT

Level: Easy

Q8: The number of states in the minimal deterministic finite automaton corresponding to the regular expression is $(0+1)^*00?$

Concept:CFG

Sub-Concept:CFG

Marks: +1,-0.33

Type: MCQ

Level: moderate

Q9: Consider the following CFG:

S -> 00S2 | 0S | A | 01A2

A -> 11A2 | 1A | ε

Which of the following languages are generated by the above CFG?

A) L= {0ⁱ1^j2^k | i+j > 2k}.

B) L= {0ⁱ1^j2^k | i+j < 2k}.

C) L= {0ⁱ1^j2^k | i+j = 2k}.

D) L= {0ⁱ1^j2^k | i+j >= 2k}.

Sub-Concept:TOC

Marks: +1,-0.33

Type: MCQ

Level: Easy

Ques 10: Let L be the language $\{a^i \mid i \text{ is a perfect square}\}$. That is, L contains the strings a , $aaaa$, $aaaaaaaaaa$, $aaaaaaaaaaaaaaaaaa$, and so on.

Which of the following is true.

- A) L is regular.**
- B)we can draw the DFA for L**
- C) L is Context Free.**
- D) L is not Context Free.**

Concept:Grammar

Sub-Concept:Grammar

Marks: +2

Type: MSQ

Level:Difficult

Q11: consider the following grammar:

$S \rightarrow A \mid B \mid C \mid \epsilon$

A -> B0 | C0 | 0

B -> A1 | C1 | 1

C -> A2 | B2 | 2

Which of the following is/are true?

- A) Given grammar generates regular language.**
- B) 00,11 Strings are not generated by the above grammar.**
- C) The language generated by above grammar with alphabet {0, 1, 2} consisting of strings that do not have any consecutive 0's, any consecutive 1's, or any consecutive 2's.**
- D) 010 String is generated by the above grammar.**

Concept:Language

Sub-Concept:Language

Marks: +2

Type: NAT

Level:moderate

Q12:How many of the following statements are true?

S-1:Every Regular language is CFL

S-2: Every CFL is a regular language.

S-2: Every NFA is DFA.

Concept:CFL

Sub-Concept:CFL

Marks: +2,-0.66

Type: MCQ

Level: moderate

Q13: We know the difference between two context-free languages need not be context-free. Suppose we take the difference of a regular language R and a context-free language C. There are two ways to take the difference.

i)R-C

ii)C-R

Which of the following is/are true?

A)i is context-free language but ii is not context-free language

B)both i and ii is context-free language

C)i is not context-free language but ii is context-free language

D)both i and ii are not context-free language

Concept:DFA

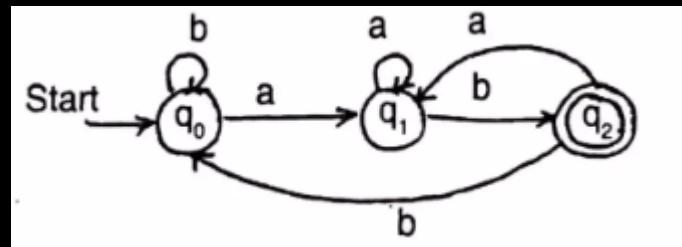
Sub-Concept:DFA

Marks: +1,-0.33

Type: MCQ

Level:moderate

Ques 14: Consider the following DFA:



The language accepted by above DFA is:

- A)all the Strings that contains ab as a substring
- B)all the Strings that is started with ab
- C)all the Strings that is ended with ab
- D)all the Strings that is either started with ab or ended with ba

Concept:RE

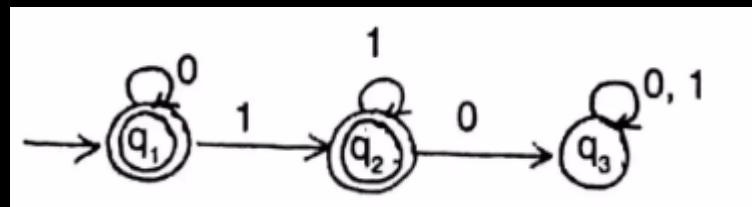
Sub-Concept:RE

Marks: +1,-0.33

Type: MCQ

Level: moderate

Ques 15: Consider the following DFA



Which of the following is the RE of the above DFA:

- A) 0^*1^*
- B) 0^*1^*
- C) 0^+1^*
- D) 0^+1^*

Sub-Concept: Language

Marks: +2,-0.66

Type: MCQ

Level: Difficult

Q16: The symmetric difference of languages L and M, which we shall denote $SD(L,M)$, is the set of strings that are in exactly one of L and M. For example, if $L = \{0, 11, 1\}$ and $M = \{1, 00, 11\}$, then $SD(L,M) = \{0, 00\}$.

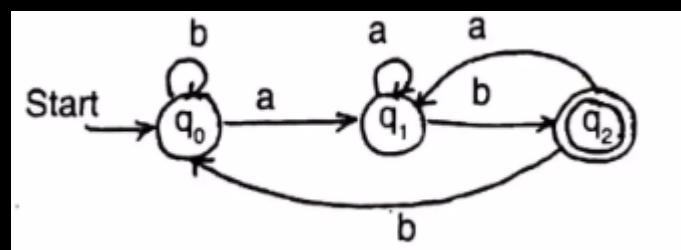
Suppose $L = (0^*1^*)$ and $M = (1^*0^*)$. Which of the following is a regular expression for $SD(L,M)$?

- A) 00^*11^*
- B) $00^*11^* + 11^*00^*$
- C) 11^*00^*
- D) 0^*1^*

Type: NAT

Level: moderate

Q17: Consider the following DFA:



How many of the following Strings are accepted by above DFA

Baba, ab, abbababbaab, bbbbbbaaaaababa, abbbab, bababaaaabab

Sub-Concept: Decidability

Marks: +1,-0.33

Type: MCQ

Level: moderate

Q18: Consider the following statements:

S-1:Recognizable sets are closed under complement.

S-2:Decidable sets are closed under complement

- A)only S-2 is true**
- B)both S-1 and S-2 is true**
- C)only S-1 is true**
- D)both S-1 and S-2 are false.**

Topic:TOC

Concept:NFA

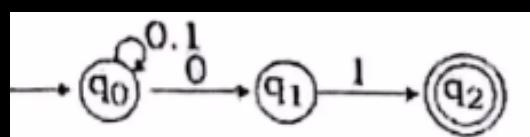
Sub-Concept:NFA

Marks: +2

Type: MSQ

Level:moderate

Q19:Consider the following NFA:



- A)The Language accepted by above NFA is all the String that are ending with 01.**
- B)The equivalent DFA for the above NFA has 4 States.**
- C)The equivalent DFA for the above NFA has 5 States.**
- D)The language generated by the above NFA is regular.**

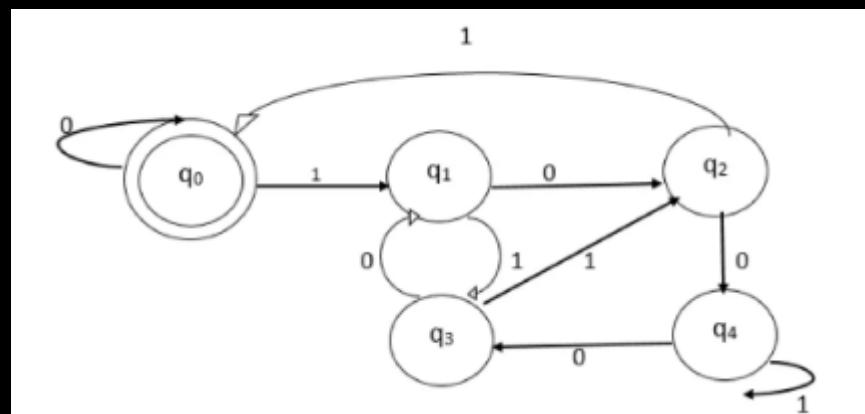
Sub-Concept:DFA

Marks: +1

Type: NAT

Level:Easy

Q20: Consider the following DFA



How many of the following Strings are accepted by above DFA

000,101,111,100,1000101010,001

Sub-Concept:Grammar

Marks: +1

Type: NAT

Level:Easy

Q21: How many Unit Productions are there in below Grammar:

S -> AA

A-> a

B -> c

B -> b

C -> D

D -> E

E -> a

Concept:DFA

Sub-Concept:Transition Function

Marks: +1,-0.33

Type: MCQ

Level:Easy

Q22: Transition function for DFA is

A) $\Sigma^* Q \rightarrow \Sigma$

B) $Q^* Q \rightarrow \Sigma$

C) $\Sigma^* \Sigma \rightarrow Q$

D) $Q^* \Sigma \rightarrow Q$

Sub-Concept:RE

Marks: +1

Type: MSQ

Level:moderate

Q23: Which of the following is/are the Regular expression for all strings starts with ab and ends with bba is:

- A)ab(a^*b^*)bba
- B)ab(ab) * bba
- C)ab(a^*b^*) * bba
- D)ab($a+b$) * bba

Sub-Concept:TOC

Marks: +1

Type: MSQ

Level:moderate

Q24: Let $\Sigma = \{0, 1\}$ and let $L = \{w \mid w \text{ contains an equal number of occurrences of the substrings } 01 \text{ and } 10\}$.

Which of the following is/are true?

- A) L is a regular language
- B) L is not a regular language
- C)we can draw a DFA for L
- D) L is CFL

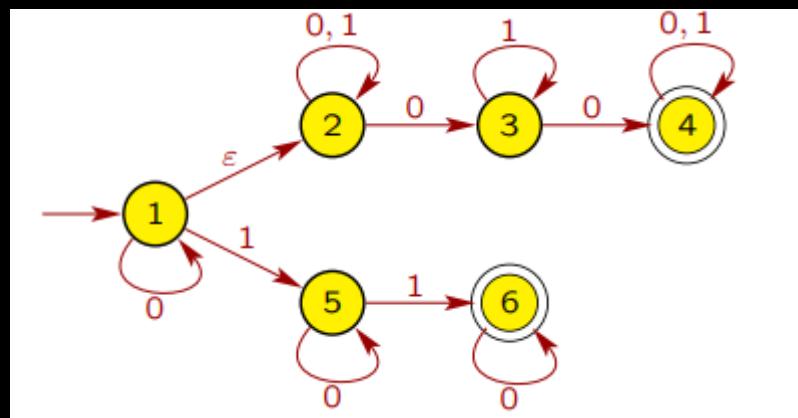
Sub-Concept:DFA

Marks: +1,-0.33

Type: MCQ

Level: moderate

Q25: Consider the following DFA



- A) $L = \{ w \in \Sigma^* \mid w \text{ contains at exactly two 0s, or exactly two 1s} \}$
- B) $L = \{ w \in \Sigma^* \mid w \text{ contains at least two 0s, or exactly two 1s} \}$
- C) $L = \{ w \in \Sigma^* \mid w \text{ contains at exactly two 0s, or at least two 1s} \}$
- D) $L = \{ w \in \Sigma^* \mid w \text{ contains at least two 0s, or at least two 1s} \}$

Answers

A1: A,B,C,D

A2: A

A3:C

A4: 4

A5: A

A6: A,B,D

A7: 6

01, 10, 001, 011, 100, 110

A8: 3

A9:D

A10: D

A11: A,B,C,D

A12: 1

A13: C

A14:C

A15: B

A16:B

A17: 4

A18: A

A18:A

A19: A,B,C,D

A20: 2

A21: 2

A22: D

A23: C,D

A24: A,C,D

A25:B