

Table of Contents

1CS402FinalTermsolvedmcqs	2
1 L	26
CS 402 Theory of Automata Final Term Paper.	29
CS 402 Theory of Automata Final Term Paper	60
CS402 - Final Term Solved Subjective with references By Moaaz	104
cs402 Khan	122
CS402_FINAL_2007 (1)	161
CS402-finalterm-paper-2005	167
CS402-FINALTERM-paper-2006	171

	Cs402- Theory of Automata Latest Solved MCQs from Final term Papers	10 june,2011
FINAL TERM	mc100402098@vu.edu.pk	Latest Mcqs
Solved MCQS for final term Question: 1 The production of the form nonterminal $\rightarrow \Lambda$ is said to be null production. ➤ ▶ True Page 104 ➤ ▶ False Question: 2 Consider the following GFC : $s \rightarrow aa bB, a \rightarrow aa B, B \rightarrow aS \Lambda$ here $s \rightarrow aa$ and $A \rightarrow B$ are null productions ,while $B \rightarrow \Lambda$ is null able production ➤ ▶ false page 105 ➤ ▶ True Question: 3 Which statement is true? ➤ The tape of turing machine is infinite. ➤ The tape of turing machine is finite. ➤ The tape of turing machine is infinite when the language is regular ➤ The tape of turing machine is finite when the language is nonregular. Question: 4 The production of the form nonterminal $\rightarrow$ one nonterminal is called the : ➤ Null production ➤ Null able production ➤ Unit production page105 ➤ None of the given Question: 5 For a given input, it provides the compliment of Boolean AND output. ➤ NAND box (NOT AND) ➤ DELAY box ➤ OR box ➤ AND box Question: 6 (Marks: 1) - Please choose one Choose the correct statement.		

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- A Mealy machine generates no language as such
- A Moore machine generates no language as such
- **A Mealy machine has no terminal state**
- All of these

Question: 7

Let Q and R be expressed by ab^*a and $(ba)^*$ respectively i.e $Q=\{aa, aba, abba, \dots\}$ and $R=\{\Lambda, ba, baba, bababa, \dots\}$.aba is the only word in Q which can make a word in R, because the words in R don't contain the

- Single letter
- **Double letter** page 84
- String
- Null string

Question: 8

It delays the transmission of signal along the wire by one step (clock pulse).

- OR box
- **DELAY box**
- NAND box (NOT AND)
- AND box

Question: 9

To describe the complement of a language, it is very important to describe the ----- of that language over which the language is defined.

- String
- Regular Expression
- **Alphabet**
- Word

Question:10

Let L be a language defined over an alphabet Σ , then the language of strings, defined over Σ , not belonging to L denoted by L^c or L is called :

- Non regular language of L
- **Complement of the language L**
- Non of the given
- All of above

Question:11

For the given input, it provides the Boolean OR output

- DELAY box
- AND box
- NAND box (NOT AND)
- **OR box**

Question: 12

For the given input, AND box provides the Boolean AND output.

- **True**

- False

Question: 13

The current in the wire is indicated by 1 and 0 indicates the absence of the current.

- **True**
- False

Question: 14

If L is a regular language ,then according to Kleene,theorem , there exists an :

- TG
- GTG
- **FA** **page77**
- Non of the given

Question: 15

Any language that can not be expressed by a RE is said to be regular language.

- True
- **False**

Question: 16

and $r_2 = (a + b)$ then the language $(aa + bb)(a + b)$ will be generated by

- **$(r_1 + r_2)$**
- $(r_2)(r_1)$
- $(r_1)^*$
- $(r_1)(r_2)$

Question: 17

If L1 and L2 are regular languages is/are also regular language(s).

- $L_1 + L_2$
- $L_1 L_2$
- L_1^*
- **All of above** **Page 70**

Question: 18

Let L be a language defined over an alphabet Σ , then the language of strings, defined over Σ , not belonging to L, is called Complement of the language L, denoted by L^c or L' .

True
False

NO19: For a certain language L, the complement of L^c is the given language L i.e. $(L^c)^c = L$

- **True** **Page 71**
- False

Question: 20

If L is a regular language then, L^c is also a _____ language.

- **Regular**
- Non-regular
- Regular but finite
- None of the given

Question: 21

If an effectively solvable problem has answered in yes or no, then this solution is called -----

- Decision problem
- Decision method
- **Decision procedure**
- Decision making

Question: 22

There is an approach in defining the quotient of regular languages ie the language Q is said to be quotient of two regular languages P and R, denoted by $Q=R/P$ if :

- **$PQ=R$**
- $R=PQ$
- $QR=P$
- Non of above

Question: 23

consider a language L defined over an alphabet Σ if two strings x and y defined over Σ are run over an FA accepting the language L, then x and y are said to belong to the same if they end in the same

- **Class ,state**
- Final ,infinite
- Regular ,nonregular
- All of Above

Question:24

If L is a regular language then, ----- is also a regular language.

- L^m
- L^s
- L^x
- **L^c**

Question:25

Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ , not belonging to L. is called

- **Complement of L**
- Finite Automata of L
- Transition Graph of L
- Regular expression of L

Question: 26

If L_1 and L_2 are two regular languages, then $L_1 \cup L_2$ is not a regular.

- True
- **False**

Question:27

L = language of words containing even number of a's. Regular Expression is

- $(a+b)^*aa(a+b)^*$
- **$(b+ab^*a)^*$**
- $a+bb^*aab^*a$
- $(a+b)^*ab(a+b)^*$

Question:28

The regular expression defining the language $L_1 \cup L_2$ can be obtained, converting and reducing the previous ----- into a ----- as after eliminating states.

- GTG, TG
- **FA, GTG**
- FA, TG
- TG, RE

Question: 29

The language that can be expressed by any regular expression is called a Non regular language.

True

False Page 76

Question:30

Please choose one

Choose the incorrect statement:

- $(a+b)^*aa(a+b)^*$ generates Regular language.
- A language consisting of all strings over $\Sigma=\{a,b\}$ having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- **None of these**

Question: 31

The languages ----- are the examples of non regular languages

- EVEN-EVEN and PRIME
- **PALINDROME and PRIME. Page 76**
- PALINDROME and EVEN-EVEN
- FACTORIAL and SQUIRE

Question: 32

De-Morgan's law for sets is expressed by,

- $(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
- $(L_1^c \cap L_2^c)^c = L_1 \cap L_2$
- $(L_1^c \cap L_2^c)^c = L_1 \cup L_2$
- $(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$

Question: 33

Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ^* such that all the strings of the form $xy^n z$ for $n=1,2,3, \dots$ are the words in L. called Complement of L

- **Pumping Lemma** **Page 77**
- Kleene's theorem
- None of the given
- 1,2 both

Question: 34

Languages are proved to be regular or non regular using pumping lemma.

- **True**
- False

Question:35

----- is obviously infinite language.

- EQUAL-EQUAL
- EVEN-EVEN
- **PALINDROME** **Page 80**
- FACTORIAL

Question: 36

If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by $r1 + r2$ will be _____

- Ir-regular
- Can't be decided
- **Regular language** **Page 77**
- Another Language which is not listed here

Question: 37

Let L be an infinite language accepted by a language accepted by a finite automaton with N states , then for all words W in L that have length more than N there are strings x,y and Z (y being non null string)and length $(x)+\text{length}(y) \leq N$.s.t. $W=xyz$ and all strings of the form $xy^n z$ are in L for $n=1,2,3, \dots$

- **True** **Page 80**

- False

Question: 38

If, two strings x and y , defined over Σ , are run over an FA accepting the language L , then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.

- True
- False

Question: 39

Myhill Nerode theorem is consisting of the followings.

- L partitions Σ^* into distinct classes.
- If L is regular then, L generates finite number of classes.
- If L generates finite number of classes then L is regular.
- All of above Page 80

Question:40

The language Q is said to be quotient of two regular languages P and R , denoted by--- if $PQ=R$.

- $R=Q/P$
- $Q=R/P$ Page 83
- $Q=P/R$
- $P=R/Q$

Question:41

If two languages R and Q are given, then the prefixes of Q in R denoted by $\text{Pref}(Q \text{ in } R)$.

- True Page 83
- False

Question:42

Let $Q = \{aa, abaaabb, bbaaaaa, bbbbbb\}$ and $R = \{b, bbbb, bbbaaa, bbbaaaa\}$ $\text{Pref}(Q \text{ in } R)$ is equal to

- $\{b, bbba, bbbaaa\}$, Page 83
- $\{b, bba, bbaaa\}$
- $\{ab, bba, bbbaa\}$
- $\{b, bba, bbba\}$

Question: 43

If R is regular language and Q is any language (regular/ non regular), then $\text{Pref}(Q \text{ in } R)$ is -----.

- Non-regular
- Equal
- Regular Page 84
- Infinite

Question: 44

The regular expression thus obtained if contains at least one word then the language is not empty

otherwise the language is :

- Regular
- No regular
- **Empty Page 85**
- Non of the above

Question: 45

"CFG" stands for _____ :

- Context Free Graph
- **Context Free Grammar Page 92**
- Context Finite Graph
- Context Finite Grammar

Question:46

The langue generated by CFG is called Context free language (CFL)

- False
- **True**

Question:47

_____ states are called the halt states.

- **ACCEPT and REJECT**
- ACCEPT and READ
- ACCEPT AND START
- ACCEPT AND WRITE

Question:48

If a regular expression contains * then it may define an infinite language ,with exception Λ^* as $\Lambda^* = \Lambda$ e.g.

- $(\Lambda + a \Lambda^*)(\Lambda^* + \Lambda)^*$ defines finite language. While $(\Lambda + a \Lambda^*)(\Lambda^* + \Lambda)^*$ defines an finite language.
- True
- **False Page 90**

Question:49

The part of an FA, where the input string is placed before it is run, is called

- State
- Transition
- **Input Tape Page 110**
- Output Tape

Question: 50

TM is more powerful than FSM because

- The tape movement is confined to one direction
- **It has no finite state control**
- It has the capability to remember arbitrary long sequences of input symbols
- None of these

NO51: In new format of an FA This state is like dead-end non final state:

- ACCEPT
- **REJECT Page 110**
- STATR
- READ

NO52: For language L defined over {a, b}, then L partitions $\{a, b\}^*$ into classes

- Infinite
- Finite
- **Distinct**
- Non-distinct

NO53 := language of words containing even number of a's. Regular Expression is

- $(a+b)^*aa(a+b)^*$
- **$(b+ab^*a)^*$**
- $a+bb^*aab^*a$
- $(a+b)^*ab(a+b)^*$

No 54: All NonNull words of the CFL can be generated by the corresponding CFG which is in CNF i.e the grammar in CNF will generate the same language except the :

- string
- regular language
- **null string .**
- non of above

NO55: The is said to be ambiguous if there exist at least one word of its language that can be generated by the different production tree .

- CFL
- **CFG Page 98**
- GTG
- None of the given

NO56 : Between the two consecutive joints on a path

- One character can be pushed and one character can be popped
- **Any no. of characters can be pushed and one character can be popped**
- One character can be pushed and any no. of characters can be popped
- Any no. of characters can be pushed and any no. of characters can be popped

NO57: In pumping lemma theorem ($x y^n z$) the range of n is:

- **$n=1, 2, 3, 4, \dots$** **Page 77**
- $n=0, 1, 2, 3, 4, \dots$
- $n=-3, -2, -1, 0, 1, 2, 3, 4, \dots$
- $n=-3, -2, -1, 1, 2, 3, 4, \dots$

NO58: TM is more powerful than FSM because

- The tape movement is confined to one direction
- **It has no finite state control**
- It has the capability to remember arbitrary long sequences of input symbols
- None of these

NO59 : If every production in CFG is one of the following forms

Conterminal $\rightarrow$ semi word

Nonterminal $\rightarrow$ word

Then the language generated by that GFC is :

- **Regular**
- Nonregular
- Finite
- Infinite

NO 60: Then the language generated by that CFG is:

- Non regular
- Infinite
- **Regular** **Page 102**
- Finite

NO 61: The PDA is called non-deterministic PDA when there are more than one out going edges from..... state :

- START or READ
- POP or REJECT
- **READ or POP** **Page 116**
- PUSH or POP

NO:62 Identify the TRUE statement:

- A PDA is non-deterministic, if there are more than one READ states in PDA
- A PDA is never non-deterministic
- **Like TG, A PDA can also be non-deterministic** **Page 116**
- A PDA is non-deterministic, if there are more than one REJECT states in PDA

NO:63 the language Q is infinite.

- **True** **Page 134**
- False

Left hand side of a production in CFG consists of:

- One terminal
 - More than one terminal
 - One non-terminal
 - Terminals and non-terminals
- Page 64:

NO65: it is very important to determine which sequences of rows do correspond to possible paths through the:

- CFG
- CFL
- **PDA Page 128**
- TAPE

NO: 66 : The following problem(s) ----- is/are called decidable problem(s).

- The two regular expressions define the same language
- The two FAs are equivalent
- **Both a and b**
- None of given

NO67: Before the CFG corresponding to the given PDA is determined, the PDA is converted in to the standard form which is called the:

- Standard form
- **Conversion form Page 108**
- Left most derivation
- None of them

NO: 68 The deviation of the word W generated by a CFG, such that at each step ,a production is applied to the left most nonterminal in the working string is said to be

- Left most terminal
- **Left most deviation : Page 108**
- None of these
- A ,B both

NO 69: To examine whether a certain FA accepts any words, it is required to seek the paths from ---- -- state.

- Final to initial
- Final to final
- **Initial to final**
- Initial to initial

NO 70: The high level language is converted into assembly language codes by a program called compiler.

- **TRUE**
- FALSE

NO 71: Grammatical rules which involve the meaning of words are called -----

➤ **Semantics** **Page 92**

- Syntactic
- Both a and b
- None of given

NO72: Choose the correct statement.

- A Mealy machine generates no language as such
- A Moore machine generates no language as such
- A Mealy machine has no terminal state**
- All of these

NO: 73 Grammatical rules which do not involve the meaning of words are called -----

- Semantics

➤ **Syntactic** **Page 92**

- **Both a and b**
- **None of given**

NO74: - Please choose one

The word ‘formal’ in formal languages means

- They are unnecessary, in reality
- Only the form of the string of symbols is significant
- **The symbols used have well defined meaning**
- None of these

NO: 75 is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column .

- STACK
- POP AND STACK
- **PUSHDOWN STACK** **Page 112**
- **None of above**

NO 76: Consider the language L of strings, defined over $\Sigma = \{a,b\}$, ending in a

- ▶ There are finite many classes generated by L, so L is regular
- ▶ **There are infinite many classes generated by L, so L is regular**
- ▶ There are finite many classes generated by L, so L is non-regular
- ▶ There are infinite many classes generated by L, so L is non-regular

NO77: The symbols that can't be replaced by anything are called -----

- Productions
- **Terminals** **Page 92**
- Non-terminals
- All of above

NO78: “One language can be expressed by more than one FA”. This statement is _____

- **True**
- False
- Some times true & sometimes false
- None of these

NO: 79 The symbols that must be replaced by other things are called _____

- Productions
- Terminals
- **Non-terminals** **Page 92**
- None of given

NO 80: Which of the following statement is NOT true:

- FA can be considered to be an NFA
- FA can be considered to be an NFA with null string
- NFA can be considered to be an TG
- **TG can be considered to be an NFA**

NO 81: Let FA 3 be an FA accepting $L1 \cap L2$ then the initial stat of FA3 must be correspond to the initial state of..... and initial state of p 74

- FA3, FA2
- **FA1 , FA2**
- FA1,FA3
- None of the given

NO82: If $r1 = (aa + bb)$ and $r2 = (a + b)$ then the language $(aa + bb)(a + b)$ will be generated by

- $(r1)(r2)$
- **$(r1 + r2)$**
- $(r2)(r1)$
- $(r1)^*$

NO83: The grammatical rules are often called _____

- **Productions** **Page 92**
- Terminals
- Non-terminals
- None of given

NO 84: Does the empty string match the regular expression $|y+a|$?

- Yes
- **No**

NO 85

The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.

- Capital, bold
- **Small, capital** **Page 92**
- Capital, small
- Small, bold

NO86: FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having

Choices:

- no transition at certain state
- one transition at certain state
- **more than one transitions at certain state**
- none of the given options

NO:87 $\Sigma = \{a,b\}$ Productions $S \rightarrow XaaX$ $X \rightarrow aX$ $X \rightarrow bX$ $X \rightarrow \Lambda$

This grammar defines the language expressed by _____

- **$(a+b)^*aa(a+b)^*$** **Page 94**
- $(a+b)^*a(a+b)^*a$
- $(a+b)^*aa(a+b)^*aa$
- $(a+b)^*aba+b)^*$

NO 88: Which statement is true:

- **▶ The tape of turing machine is infinite.**
- ▶ The tape of turing machine is finite.
- ▶ The tape of turing machine is infinite when the language is regular
- ▶ The tape of turing machine is finite when the language is nonregular.

NO89 : The language generated by _____ is called Context Free Language (CFL).

- FA
- TG
- **CFG** **Page 93**
- TGT

NO 90: Let $A = \{0, 1\}$. The number of possible strings of length 'n' that can be formed by the elements of the set A is:

- n!
- **n^2**
- n^m
- 2^n

NO : 91 $S \rightarrow aXb|bXa$ $X \rightarrow aX|bX|\Lambda$ The given CFG generates the language of strings in English _____

- **Beginning and ending in different letters** **Page 96**
- Beginning and ending in same letter

- Having even-even language
- None of given

NO92: Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- Depends on the language
- None of the given options
- **True**
- False

NO 93: The CFG is said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

- **TRUE** **Page 100**
- FALSE

NO 94: The language generated by that CFG is regular if _____

- No terminal → semi word
- No terminal → word
- **Both a and b** **Page 102**
- None of given

NO95: A regular language:

- **Must be finite**
- Must be infinite
- Can be finite or infinite
- Must be finite and cannot be infinite

NO96: The production of the form non terminal $\rightarrow \Lambda$ is said to be null production .

- **TRUE** **Page 104**
- FALSE

NO 97: Who did not invent the Turing machine?

- Alan Turing
- **A. M. Turing**
- Turing
- None of these

NO: 98 A production is called null able production if it is of the form $N \rightarrow \Lambda$

- **TRUE** **Page 105**
- FALSE

NO99: A DFA with n states must accept at least one string of length greater than n.

Choices:

- True
- False

NO100: For every three regular expressions R, S, and T, the languages denoted by $R(S \cup T)$ and $(RS) \cup (RT)$ are the same.

Choices:

- True
- False

NO101: Choose the right option: (2)

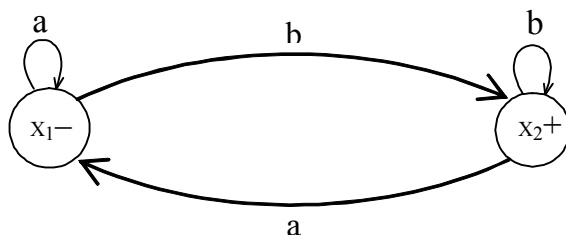
In a Mealy machine, the set of letters and the set of output characters must be same

In a Mealy machine, the set of letters and the set of output characters may not be same

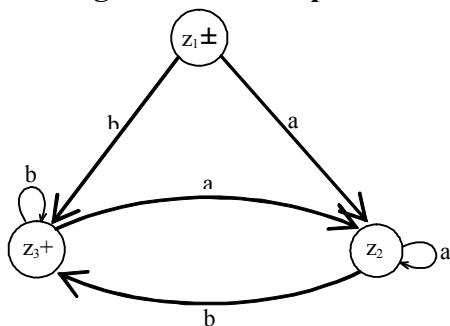
B only

A only

No102 : - Please choose one



Above given FA corresponds RE r. then FA corresponding to r^* will be



This statement is

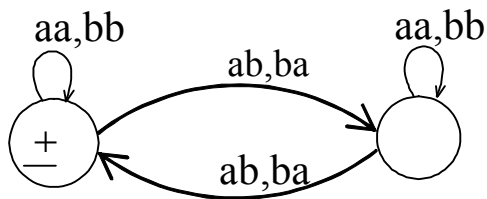
True Page 42

False

Depends on language

None of these

NO103 : - Please choose one



Above given TG has _____ RE.

$(aa+aa+(ab+ab)(aa+ab)^*(ab+ba))^*$

$(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$ Page 26

$(aa+bb+(ab+ba)(aa+bb)(ab+ba))^*$

None of these

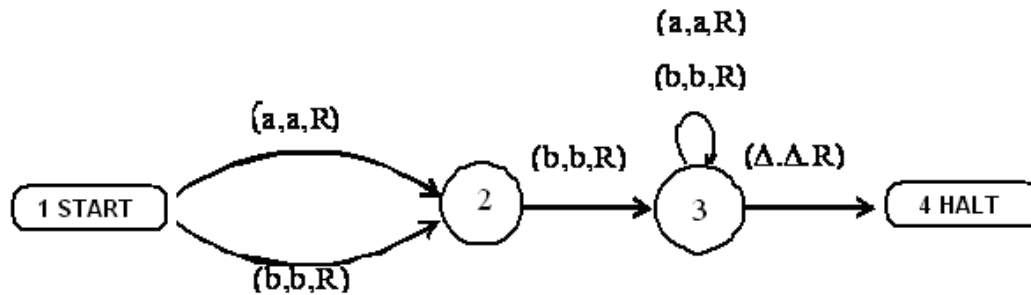
NO104: - Please choose one

Like TG, a PDA can also be non-deterministic

True

False

NO105 :- Please choose one :



The above machine is a/anTG _____ <http://vustudents.ning.com>

Finite Automata

Turing machine Page 148

FA

TG

NO106: In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called :

Dead State

Waste Basket

Davey John Locker

All of these

NO107: - Please choose one

In CFG, the symbols that can't be replaced by anything are called ____

➤ Terminal

- Non-Terminal
- **Production**
- All of given

NO108: - Please choose one

Which of the following is NOT a regular language?

- String of 0's whose length is a perfect square
- **Set of all palindromes made up of 0's and 1's**
- String of 0's whose length is a prime number
- All of the given options

NO109: - Please choose one

Choose the incorrect (FALSE) statement

- A Mealy machine generates no language as such
- A Mealy machine has no terminal state
- **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine . Page 62**
- All of these

NO110: - Please choose one

Pumping lemma is generally used to prove that

- ▶ A given language is infinite
- ▶ **A given language is not regular : Page 77**
- ▶ Whether two given regular expressions of a regular language are equivalent or not
- ▶ None of these

NO111:- Please choose one

Which of the following is a regular language?

- String of odd number of zeroes
- Set of all palindromes made up of 0's and 1's
- **String of 0's whose length is a prime number**
- All of these

NO112 : lemma is generally used to prove that

- A given language is infinite
- **A given language is not regular Page 78**
- Whether two given regular expressions of a regular language are equivalent or not
- None of these

NO113: language can be expressed by more than one FA". This statement is _____

- **True**
- False
- Some times true & sometimes false
- None of these

NO114: language:

- Must be finite
- **Must be infinite**
- Can be finite or infinite
- Must be finite and cannot be infinite

NO115 : enters in a specific state but there is no way to leave it, then that specific state is called

- Dead State
- Waste Basket
- Davey John Locker
- **All of these**

NO116: symbols that can't be replaced by anything are called ____

- **Terminal** **Page 92**
- Non-Terminal
- Production
- All of given

NO117: following is NOT a regular language?

- String of 0's whose length is a perfect square
- Set of all palindromes made up of 0's and 1's
- String of 0's whose length is a prime number
- **All of the given options**

NO118: Left hand side of a production in CFG consists of

- One terminal
- More than one terminal
- One non-terminal
- **Terminals and non-terminals** **Page 92**

NO119: One language can be expressed by more than one FA". This statement is _____

- **True**
- False
- Some times true & sometimes false
- None of these
-

NO120: invent the Turing machine?

- Alan Turing
- **A. M. Turing**
- Turing
- None of these

'NO121: formal' in formal languages means

- **The symbols used have well defined meaning**
- They are unnecessary, in reality
- Only the form of the string of symbols is significant

- None of these

NO122: TM is more powerful than FSM because

- The tape movement is confined to one direction
- **It has no finite state control**
- It has the capability to remember arbitrary long sequences of input symbols
- None of these

NO123: A program which is the set of rules which show that which state is to be entered when a letter is read form the :

- **TAPE** **Page 147**
- HALT
- TM
- None of above

NO124: The process of finding the derivation of word generated by particular grammar is called :

- PLUS TIMING
- **Parsing** **Page 142**
- HALT
- All of above

NO125: For a non regular language there exist FA:

- **NO**
- Yes

NO126: Bottem up parsing can be determined similar to that of TOP Down parsing with the change that in this case ,the process is started with the given string and the tree is extended till “S “is Regular

- Non regular
- **Obtain** **Page 146**
- Finite

NO127: A production in CFG consists of:

- One terminal
- More than one terminal
- One non-terminal
- **Terminals and non-terminals**

NO128: If L1 and L2 are regular languages is/are also regular language(s).

- L1 + L2
- L1L2
- L1*
- **All of above**

NO129: Between the two consecutive joints on a path

- One character can be pushed and one character can be popped

- **Any no. of characters can be pushed and one character can be popped**
- One character can be pushed and any no. of characters can be popped
- Any no. of characters can be pushed and any no. of characters can be popped

NO131: Language which are context –free are called Non –CFL:

- True
- **False** **Page 132**

NO132: The following problem(s) ----- is/are called decidable problem(s).

The two regular expressions define the:

- same language
- The two FAs are equivalent
- **Both a and b**
- None of given

NO133: If F accept an language then there are some words w.s.t $N \leq \text{length}(w) < 2n$:

- Regular
- Finite
- **Infinite** **Page 91**
- None of given

NO134: If an FA has N state then it must accept the word of length:

- N^2
- $N-1$
- **$n+1$**
- all of above

NO135: The values of input (say a & b) does not remain same in one cycle due to

- tape
- halt
- **clock pulse**
- start

NO136: Consider the following CFG

$S \rightarrow aS | bS | aaS | \Lambda$

can be observed that the word aaa can be derived from more than:

- **one production tree** **Page 101**
- two production tree
- Total language tree
- All of above

NO137: One language can have CFG(s)

- **At least one**
- At least two
- At least three
- None of them

NO138: The reverse of the string sbfsbb over { sb, f, b}

- **(bsbfsb)**
- bfsbs
- sbbfsb
- bbfsb

NO139: CFG is said to be a regular grammar if it generates the regular language i.e. a CFG is said to be a regular grammar in which each production is one of the:

- Three forms
- One form
- Four forms
- **Two forms Page 102**

NO140: If L1 and L2 are regular languages then which statement is NOT true?

- **(L1/L2 is always regular)**
- L1+L2 are always regular
- L1*L2 are always regular
- None of them

NO141: If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular:

- False
- **True**

NO142: the moment a final state of FA is entered, the possibility of the initial state of FA will be included as well:

- first, third
- **first, second Page 39**
- second, third
- all of above
-

NO143: Any word generated by given CFG cannot also be expressed by Syntax tree or Generation tree or Derivation tree as well

- true
- **false**

NO144: According to Mayhill Nerode theorem, if L generates finite no. of classes then L is....

- **Regular**

- Nonregular
- Infinite
- Finite

NO145: L is a regular language so by kleene,s theorem ,there exists an:

- **FA Page 71**

- GTG
- TG
- CNF

NO146: The language generated by the CFG is called the language by the CFG

- **Produced**
- Null string
- Pumping lemma
- Non of then

NO147: In CFG, the symbols that cannot be replaced by anything are called:

- None terminals
- Infinite
- Finite
- **Terminals**

NO148: The production $S \rightarrow SS \mid a \mid b \mid ^$ can be expressed by RE:

- **$(a+b)^+$**
- a-b
- $(a-b)^+$
- None of them

NO149: Set of all palindromes over {a,b}is regular

- **(false)**
- (true)

NO150: An FA has same initial and final state, then it means that it has no final state.

- **(false)**
- (true)

NO151: The same non terminals can be written in single line if they have more than one.....

- **(Productions)**
- Regular production
- None regular production

NO152: If L1 and L2 are two regular languages then $L1 \cap L2$ is also :

- **Regular Page 73**

- None regular
- Finite
- None infinite

NO154: For language L defined over {a, b}, then L partitions {a, b}* into classes:

- **(Distinct)**
- Accept
- Unit production
- None of the above

NO155: The two FAs are

- Same
- **Equivalent** **Page 85**
- Different
- None of them

NO156: There is at least one production that has one.....on its left side:

- Terminal
- Infinite
- **None Terminal**
- All of above

NO157: The complement of a regular language is also a regular

- **(True)**

- False

➤ **NO159: If an effectively solvable problem has answer in yes or no, then this solution is called :
Decision procedure Page 85**

- Decidable problem
- Solved able problem
- All of above

NO160: In pref(Q in R) Q is to (than) R

- **Q is not equal to R**
- Q is equal to R
- Q is infinite
- None of them

NO61: For FA corresponding

To $(L_1 \cap L_2)^c \cup (L_1^c \cap L_2)$ the regular expression can be determined that defines the language accepted by this :

- TG
- GFC

➤ **FA** **Page 85**

➤ GTG

NO162: $a^n b^n$ generates the language:

➤ **Non regular languages**

➤ Regular language

➤ Infinite language

➤ Finite language

NO: 163 $(a+b)^*a(a+b)^*b(a+b)^*$ is the RE of language defined over $\{a,b\}$ having at least one a and one b

➤ **True** **Page 11**

➤ False

Such a language does not exist

None of these

Question No: 164: (Marks: 1) - Please choose one

NO164: If $r1 = (aa + bb)$ and $r2 = (a + b)$ then the language $(a + b)^* (aa + bb)^*$ will be generated by :

➤ $(r2)(r1)$

➤ $(r1 + r2)^*$

➤ $(r2)^*(r1)^*$

➤ **$(r1)^*$** **Page 12**

Question No 165: (Marks: 1) - Please choose one

NO165: In FA starting state is represented by a _____ sign.

➤ +

➤ -

➤ *

➤ S

NO166: If w is large enough word in a CF then w can be decomposed into $w = uvwxyz$ such that all words of the form $uv^n x y z^n$ belong to :

➤ CNF

➤ **L**

➤ CFL

➤ CFG

NO167: Can a turing machine's head ever be in the same location in two successive steps?

➤ Yes

➤ Yes but only in finite languages

➤ **No** **Page 150**

➤ Yes but only in infinite languages

NO168: Examin the following CFG and select the correct choice:

$S \rightarrow AB, A \rightarrow BSB, B \rightarrow CC$

$C \rightarrow SS$

$A \rightarrow a|b$

$C \rightarrow b|bb$

- **abb is a word in the corresponding CFL. Page 139**
- abb is not the word of corresponding CFL.
- any word can be accept from the corresponding CFL.
- Non of these

NO169: The production of the form nonterminal $\rightarrow$ string of two nonterminals is called a:

- **live production Page 132**
- dead production
- type of production
- none of them

Question No: 10 (Marks: 1) - Please choose one

NO170: Converting the given CFG in CNF is the first rule of _____

- **CYK algorithm Page 140**
- CKY algorithm
- KYC algorithm
- CNK algorithm

Question No: 11 (Marks: 1) - Please choose one

NO171: Which statement is true?

- The PDA must have one accept state and one reject state
- The PDA must have one accept state and two reject state
- The PDA must have two accept state and two reject state
- **There is no reject state in the PDA. Page 124**

NO172: Question No: 12 (Marks: 1) - Please choose one

If a language can be expressed by a regular expression, then its complement cannot be expressed by a regular expression. This statement is:

- true
- **False**
- Depends on language
- None of the given optios

NO173: Left hand side of CFG may consist of:

- One terminal
- More than one terminal
- **One non-terminal**
- Terminals and non-terminals

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 Proude To Be Virtulian MOAAZ SIDDIQ	CS402- Theory of Automata Solved MCQS From Midterm Papers	Feb 12,2013
MC100401285	<i>Moaaz.pk@gmail.com Mc100401285@gmail.com</i>	PSMD01
FINALTERM EXAMINATION Spring 2010 CS402- Theory of Automata (Session - 1) Question No: 1 (Marks: 1) - Please choose one If $r1 = (aa + bb)$ and $r2 = (a + b)$ then the language $(aa + bb)(a + b)$ will be generated by ▶ (r1)(r2) (Page 10) ▶ $(r1 + r2)$ ▶ $(r2)(r1)$ ▶ $(r1)^*$ Question No: 2 (Marks: 1) - Please choose one “One language can be expressed by more than one FA”. This statement is _____ ▶ True (Page 14) ▶ False ▶ Some times true & sometimes false ▶ None of these Question No: 3 (Marks: 1) - Please choose one Who did not invent the Turing machine? ▶ Alan Turing ▶ A. M. Turing (Page 140) ▶ Turing ▶ None of these Question No: 4 (Marks: 1) - Please choose one Which statement is true? ▶ The tape of turing machine is infinite. (Page 140) ▶ The tape of turing machine is finite. ▶ The tape of turing machine is infinite when the language is regular ▶ The tape of turing machine is finite when the language is nonregular. دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے		

Question No: 5 (Marks: 1) - Please choose one

A regular language:

- ▶ **Must be finite (Page 11)**
- ▶ Must be infinite
- ▶ Can be finite or infinite
- ▶ Must be finite and cannot be infinite

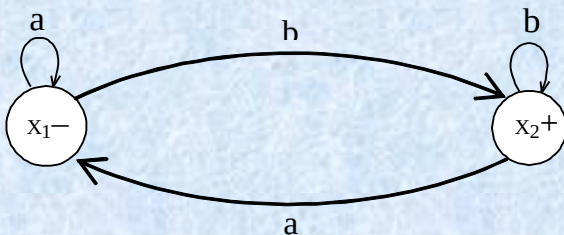
Question No: 6 (Marks: 1) - Please choose one

Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression.

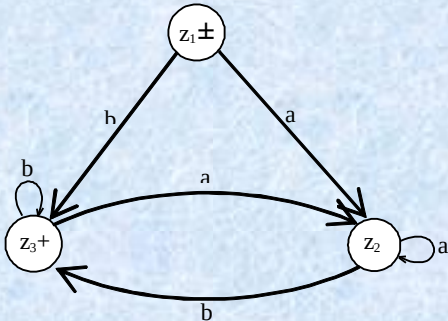
This statement is:

- ▶ Depends on the language
- ▶ None of the given options
- ▶ **True (Page 97)**
- ▶ False

Question No: 7 (Marks: 1) - Please choose one



Above given FA corresponds RE r , then FA corresponding to r^* will be



This statement is

- ▶ **True (Page 38)**
- ▶ False
- ▶ Depends on language
- ▶ None of these

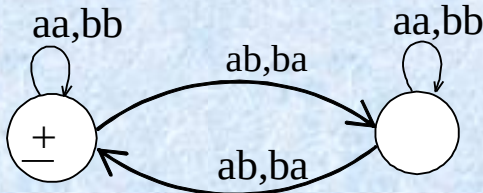
بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

Question No: 8 (Marks: 1) - Please choose one

Consider the language L of strings, defined over $\Sigma = \{a,b\}$, ending in a

- ▶ **There are finite many classes generated by L, so L is regular (Page 76)**
- ▶ There are infinite many classes generated by L, so L is regular
- ▶ There are finite many classes generated by L, so L is non-regular
- ▶ There are infinite many classes generated by L, so L is non-regular

Question No: 9 (Marks: 1) - Please choose one



Above given TG has _____ RE.

- ▶ $(aa+aa+(ab+ab)(aa+ab)^*(ab+ba))^*$
- ▶ **$(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$ (Page 22)**
- ▶ $(aa+bb+(ab+ba)(aa+bb)(ab+ba))^*$
- ▶ None of these

Question No: 10 (Marks: 1) - Please choose one

The word 'formal' in formal languages means

- ▶ The symbols used have well defined meaning
- ▶ They are unnecessary, in reality
- ▶ **Only the form of the string of symbols is significant** [Click here for detail](#)
- ▶ None of these

Question No: 11 (Marks: 1) - Please choose one

Let $A = \{0, 1\}$. The number of possible strings of length 'n' that can be formed by the elements of the set A is

- ▶ $n!$
- ▶ n^2
- ▶ n^m
- ▶ **2^n**

Question No: 12 (Marks: 1) - Please choose one

Choose the correct statement.

- ▶ A Mealy machine generates no language as such
- ▶ A Moore machine generates no language as such
- ▶ A Mealy machine has no terminal state
- ▶ **All of these** [click here for detail](#)

اللہ کا خوف سب سے بڑی دانائی ہے

Question No: 13 (Marks: 1) - Please choose one

TM is more powerful than FSM because

- ▶ The tape movement is confined to one direction
- ▶ It has no finite state control
- ▶ **It has the capability to remember arbitrary long sequences of input symbols** [Click here for detail](#)
- ▶ None of these

Question No: 14 (Marks: 1) - Please choose one

If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by r1 + r2 will be _____

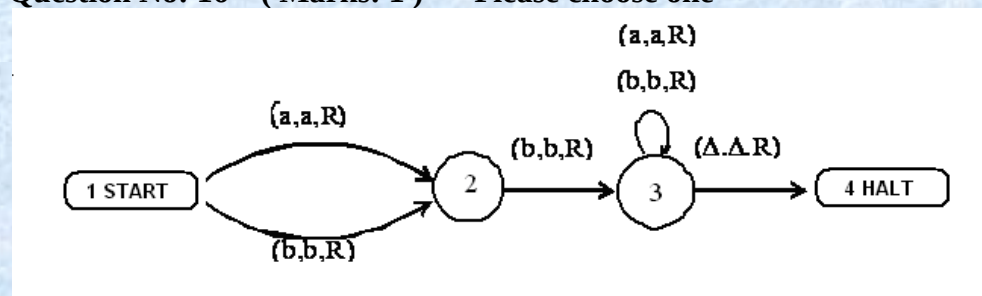
- ▶ **Regular (Page 10)**
- ▶ Ir-regular
- ▶ Can't be decided
- ▶ Another Language which is not listed here

Question No: 15 (Marks: 1) - Please choose one

Like TG, a PDA can also be non-deterministic

- ▶ **True (Page 111)**
- ▶ False

Question No: 16 (Marks: 1) - Please choose one



The above machine is a/anTG _____

- ▶ Finite Automata
- ▶ **Turing machine (Page 141)**
- ▶ FA
- ▶ TG

Question No: 17 (Marks: 1) - Please choose one

The language of all words (made up of a's and b's) with at least two a's can not be described by the regular expression.

- ▶ $a(a+b)^*a(a+b)^*(a+b)^*ab^*$
- ▶ $(a+b)^*ab^*a(a+b)^*$
- ▶ $b^*ab^*a(a+b)^*$
- ▶ **none of these**

$a^n b^n$ {where $n > 0$ } is the language will at least one a and b and cannot be described by RE.

Question No: 18 (Marks: 1) - Please choose one

In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called

- ▶ Dead State
- ▶ Waste Basket
- ▶ Davey John Locker
- ▶ **All of these (Page 17)**

Question No: 19 (Marks: 1) - Please choose one

If L is a regular language then, L^c is also a _____ language.

- ▶ **Regular (Page 66)**
- ▶ Non-regular
- ▶ Regular but finite
- ▶ None of the given

Question No: 20 (Marks: 1) - Please choose one

In CFG, the symbols that can't be replaced by anything are called _____

- ▶ **Terminal (Page 87)**
- ▶ Non-Terminal
- ▶ Production
- ▶ All of given

Question No: 21 (Marks: 1) - Please choose one

Which of the following is NOT a regular language?

- ▶ String of 0's whose length is a perfect square
- ▶ Set of all palindromes made up of 0's and 1's
- ▶ String of 0's whose length is a prime number
- ▶ **All of the given options** [Click here for detail](#)

Question No: 22 (Marks: 1) - Please choose one

Choose the incorrect (FALSE) statement.

- ▶ A Mealy machine generates no language as such
- ▶ A Mealy machine has no terminal state
- ▶ **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine** [click here for detail](#)
- ▶ All of these

Question No: 23 (Marks: 1) - Please choose one

Pumping lemma is generally used to prove that:

- ▶ A given language is infinite
- ▶ **A given language is not regular** [Click here for detail](#)
- ▶ Whether two given regular expressions of a regular language are equivalent or not
- ▶ None of these

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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Question No: 24 (Marks: 1) - Please choose one

Which of the following is a regular language?

- ▶ String of odd number of zeroes [Click here for detail](#)
- ▶ Set of all palindromes made up of 0's and 1's
- ▶ String of 0's whose length is a prime number
- ▶ All of these

Question No: 25 (Marks: 1) - Please choose one

Choose the incorrect statement:

- ▶ $(a+b)^*aa(a+b)^*$ generates Regular language.
- ▶ A language consisting of all strings over $\Sigma=\{a,b\}$ having equal number of a's and b's is a regular language
- ▶ Every language that can be expressed by FA can also be expressed by RE
- ▶ None of these

Question No: 26 (Marks: 1) - Please choose one

Left hand side of a production in CFG consists of:

- ▶ One terminal
- ▶ More than one terminal
- ▶ One non-terminal (Page 87)
- ▶ Terminals and non-terminals

**FINALTERM EXAMINATION
SPRING 2007**

Question No: 1 (Marks: 1) - Please choose one

PDA is only used to represent a regular language.

- ▶ True
- ▶ False [Click here for detail](#)

Question No: 2 (Marks: 1) - Please choose one

If L is a regular language then L^c is also a regular language.

- ▶ True (Page 66)
- ▶ False

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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Question No: 3 (Marks: 1) - Please choose one

A production of the form non-terminal $\Rightarrow$ string of two non-terminal is called a live Production.

▶ **True** (Page 127)

▶ False

Question No: 4 (Marks: 1) - Please choose one

We can find a CFG corresponding to a DFA.

▶ **True** (Page 97)

▶ False

Question No: 5 (Marks: 1) - Please choose one

START, READ, HERE and ACCEPTS are conversions of the machine

▶ **True** (Page 122)

▶ False

Question No: 6 (Marks: 1) - Please choose one

A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees

▶ **True** (Page 95)

▶ False

Question No: 7 (Marks: 1) - Please choose one

Syntax tree or Generation tree or Derivation tree are same tree

▶ **True** (Page 92)

▶ False

Question No: 8 (Marks: 1) - Please choose one

The symbols that cannot be replaced by anything are called terminals

▶ **True** (Page 87)

▶ False

Question No: 9 (Marks: 1) - Please choose one

The production of the form non-terminal $\Rightarrow$ one non-terminal is called unit production

▶ **True** (Page 100)

▶ False

Question No: 10 (Marks: 1) - Please choose one

DFA and PDA are equal in power.

▶ True

▶ **False** (Page 105)

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

FINAL TERM EXAMINATION
Spring 2006
CS402- Theory of Automata

Question No. 1

A production of the form non-terminal $\rightarrow$ non-terminal is called a dead Production.

True

False (Page 127)

Question No. 2

Semi-word is a string having some terminals and one non-terminal at the right of string.

True (Page 97)

False

Question No. 3

Two FAs are equivalent if they have same no. of states.

True (Page 15)

False

Question No. 4

There exist exactly two different derivations in an ambiguous CFG for a word.

True (Page 93)

False

Question No. 6

Regular languages are closed under Union, Concatenation and Kleene star.

True (Page 10)

False

Question No. 7

CFG may also represent a regular language.

True (Page 97)

False

Question No. 9 Marks : 1

PDA is stronger than FA.

True (Page 105)

False

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

FINAL TERM EXAMINATION
Spring 2005
CS402- Theory of Automata

Question No. 1

A Total Language Tree has

All languages over Σ

All strings over Σ (Page 96)

All words of all languages over Σ

All words of one language over Σ

Question No. 2

What Turing Machine does not have?

Stack

Tape

Head

Word

Turing machine has stack but insertion and deletion can be done from both sides. Tape and head to.

Question No. 3

CFG given $S \Rightarrow bS|Sb|aa$ represents language

b^*aa

aab^*

b^*aab^*

$b^*(aa)^*b^*$

Question No. 4

A Language that is finite but not regular

Λ

$(a+b)^*$

Φ (not sure)

All strings of a's in $\Sigma = \{a, b\}$

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1)

Select correct option:

The values of input (say a & b) does not remain same in one cycle due to

NAND gate

Click plus

OR gate

NOT gate

Question # 2 of 10 (Total Marks: 1)

Select correct option:

Set of all palindromes over {a,b} is regular

True

False (Page 74)

Question # 3 of 10 (Total Marks: 1)

Select correct option:

In CFG, the symbols that cannot be replaced by anything are called

Terminals (Page 87)

Non terminals

Productions

None of the given options

Question # 4 of 10 (Total Marks: 1)

Select correct option:

$a^n b^n$ generates the language

regular

non regular

EQUAL and non regular (Page 71)

EQUAL and regular

Question # 5 of 10 (Total Marks: 1)

Select correct option:

The grammatical rules which involves meaning of words are called:

Semantic (Page 87)

Syntactics

Alphabets

None of the given options

خود کو تمہیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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Question # 6 of 10 (Total Marks: 1) Select correct option:

The reverse of the string sbfsbb over { sb, f, b }

bbsfbs

bsbfsb

sbbfsb

bsfbsb

Question # 7 of 10 (Total Marks: 1) Select correct option:

If an FA has N state then it must accept the word of length

N-1

N+1

N+2N

Question # 8 of 10 (Total Marks: 1) Select correct option:

Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

Must be final state

May be final state or not (Page 75)

May be start or not

None of the given options

Question # 9 of 10 (Total Marks: 1) Select correct option:

In $\text{pref}(Q \text{ in } R)$ Q is to (than) R

Equal

Not Equal (Page 79)

Greater

Smaller

Question # 10 of 10 (Total Marks: 1) Select correct option:

According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

Finite

Infinite

Regular (Page 76)

Non Regular

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اس سے ڈر کر بھاگتی ہے

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Question # 1 of 10 (Total Marks: 1)**Select correct option:**

If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

True (Page 68)

False

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

In pumping lemma theorem ($x y^n z$) the range of n is

 $n=1,2,3,4,\dots$ (Page 74) $n=0,1,2,3,4,\dots$ $n=-3,-2,-1,0,1,2,3,4,\dots$ $n=-3,-2,-1,1,2,3,4,\dots$ **Question # 3 of 10 (Total Marks: 1)****Select correct option:**

The complement of a regular language is also a regular

True rep

False

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

For a non regular language there exist FA

One

At least one

At most one

No (Page 71)**Question # 2 of 10 (Total Marks: 1)****Select correct option:**

The strings or words which do not belong to a language is called..... of that language

Intersection

Union

Complement (Page 66)

Quotient

Question # 3 of 10 (Total Marks: 1) Select correct option:

A non regular language can be represented by

- RE
- FA
- TG

None of the given options (Page 71)

Question # 4 of 10 (Total Marks: 1) Select correct option:

For language L defined over {a, b}, then L partitions {a, b}* into classes

- Infinite
- Finite

Distinct (Page 75)

- Non distinct

Question # 5 of 10 (Total Marks: 1) Select correct option:

If an FA accept a word then there must exist a path from

Initial to final state (Page 81)

- Initial to each state
- Initial to each state but not to final state
- Initial to final state by traversing each state

Question # 6 of 10 (Total Marks: 1) Select correct option:

Does the empty string match the regular expression $|y+a|$?

Yes

No (Page 3)

Question # 7 of 10 (Total Marks: 1) Select correct option:

If an FA already accepts the language expressed by the closure of certain RE, then the given FA is the required FA.

True (Page 37)

False

Question # 8 of 10 (Total Marks: 1) Select correct option:

Which of the following statement is true about NFA with Null String?

- Infinite states
- Infinite set of letters
- Infinite set of transitions

Transition of null string is allowed at any stage (Page 71)

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

If R is a regular language and L is some language, and $L \cup R$ is a regular language, then L must be a regular language.

True (page 10)

False

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

FA corresponding to an NFA can be built by introducing an empty state for a letter having

no transition at certain state (Page 43)

one transition at certain state

two transition at certain state

more than two transitions at certain state

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only (Page 35)

FA2 only

FA1 or FA2

FA1 and FA2

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

$(a^* + b^*)^* = (a + b)^*$ this expression is _____

True

False**Question # 3 of 10 (Total Marks: 1)****Select correct option:**

If $S = \{ x \}$, then S^* will be

 $\{x, xx, xxx, xxxx, \dots\}$ **$\{^x, xx, xxx, xxxx, \dots\}$ (Page 10)****Question # 4 of 10 (Total Marks: 1)****Select correct option:**

The states in which there is no way to leave after entry are called

Davey John Lockers

Dead States

Waste Baskets

All of the given options (Page 17)

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

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Question # 5 of 10 (Total Marks: 1)

Select correct option:

If $S = \{ab, bb\}$, then S^* will not contain

Abbbab

Bbba

ababbb

bbbbab

Question # 6 of 10 (Total Marks: 1)

Select correct option:

According to theory of automata there are _____ types of languages

1

2 (Page 3)

3

4

Question # 7 of 10 (Total Marks: 1)

Select correct option:

What do automata mean?

Something done manually

Something done automatically (Page 3)

Question # 8 of 10 (Total Marks: 1)

Select correct option:

What is false about the term alphabet?

It is a finite set of symbols.

It is usually denoted by Greek letter sigma

It can be an empty set. (Page 3)

Strings are made up of its elements

Question # 9 of 10 (Total Marks: 1)

Select correct option:

Formal is also known as _____

Syntactic language (page 3)

Semantic language

Informal language

None of these

Question # 10 of 10 (Total Marks: 1)

Select correct option:

Following are types of languages

Formal Languages (Syntactic languages)

Informal Languages (Semantic languages)

Both (Page 3)

None of above

عقل مند اپنے عیب خود دیکھتا ہے اور بڑے قوفوں کے عیب دنیا دیکھتی ہے

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1)

Select correct option:

Consider the following production (of a CFG): $S \rightarrow XYZ$ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals

- S
- X**
- Y
- Z

Question # 2 of 10 (Total Marks: 1)

Select correct option:

A PDA is called nondeterministic PDA if _____

There are more than one outgoing edges at READ or POP states with one label (Page 111)

- There are more than one PUSH states
- There are more than one POP states
- All of the given options

Question # 3 of 10 (Total Marks: 1)

Select correct option:

A PDA consists of the following:

- An alphabet (Sigma) of input letters.
- An input TAPE with infinite many locations in one direction
- One START state with only one out-edge and no in-edge

All of the given options (Page 105)

Question # 4 of 10 (Total Marks: 1)

Select correct option:

The CFG $S \rightarrow aSa \mid bSb \mid a \mid b \mid \epsilon$ represents the language

EVEN-EVEN

PALINDROM (Page 91)

EQUAL

ODD-ODD

Question # 5 of 10 (Total Marks: 1)

Select correct option:

Halt states are

Start and Accept

Accept and Reject (Page 105)

Start and Reject

Read and Reject

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Question # 6 of 10 (Total Marks: 1)**Select correct option:**

Choice of path can be determined by left most derivation of the string belonging to CFL at..... state

Accept (Page 104)

Reject

Push

POP

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

The unit and null productions can be deleted from a CFG

True (Page 99-100)

False

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

Identify the TRUE statement about following CFG:

 $S \rightarrow SB|AB$ $A \rightarrow CC$ $B \rightarrow b$ $C \rightarrow a$

The given CFG has 8 Nonterminals

The given CFG has 8 Terminals

The given CFG is in CNF (Page 101)

The given CFG is not in CNF

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

The structure given below is called _____ $S \rightarrow aA|bB$ $A \rightarrow aS|a$ $B \rightarrow bS|b$

RE

TG

CFG (Page 87)

PDA

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

Which of the following states is not part of PDA

START

ACCEPT

WRITE (Page 107)

REJECT

بد صورت چہرہ بد صورت دماغ سے بہتر ہے

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1)

Select correct option:

The production of the form: nonterminal $\rightarrow$ one nonterminal is called the _____

Unit production (Page 100)

NULL production

Terminal production

Non Terminal production

Question # 2 of 10 (Total Marks: 1)

Select correct option:

A _____ is the one for which every input string has a unique path through the machine.

Deterministic PDA (Page 111)

nondeterministic PDA

PUSHDOWN store

Input Tape

Question # 3 of 10 (Total Marks: 1)

Select correct option:

In the null production $N \rightarrow \Lambda$, N is a

Terminal

Non terminal (Page 99)

Word

None of the given options

Question # 4 of 10 (Total Marks: 1)

Select correct option:

The major problem in the earliest computers was

To store the contents in the registers

To display mathematical formulae (Page 87)

To load the contents from the registers

To calculate the mathematical formula

Question # 5 of 10 (Total Marks: 1)

Select correct option:

In polish notation, (o-o-o) is the abbreviation of.....?

Operand - Operator – Operand

Operand - Operand- Operator

Operator -Operand – Operand (Page 94)

Operand -Operand – Operand

Question # 6 of 10 (Total Marks: 1)

Select correct option:

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the production trees

One

Two

More than one (Page 95)

At most one

Question # 7 of 10 (Total Marks: 1)

Select correct option:

The input string is placed, before it runs, in

Stack

Memory

Tape (Page 105)

Ram

Question # 8 of 10 (Total Marks: 1)

Select correct option:

The production $S \rightarrow SS \mid a \mid b \mid \wedge$ can be expressed by RE

$(a+b)^+$

$(a+b)$

$(a+b)^*$ (Page 88)

$(ab)^*$

Question # 9 of 10 (Total Marks: 1)

Select correct option:

The locations into which we put the input letters on "Input Tap" are called _____

words

alphabets

cells (Page 105)

elements

Question # 10 of 10 (Total Marks: 1)

Select correct option:

"CFG" stands for _____

Context Free Graph

Context Free Grammar (Page 87)

Context Finite Graph

Context Finite Grammar

عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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Question # 1 of 10 (Total Marks: 1)

Select correct option:

In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

Least Significant nonterminal

Most Significant nonterminal

Left most nonterminal (Page 103)

Left most derivate

Question # 2 of 10 (Total Marks: 1)

Select correct option:

The unit production is

Terminal --> Terminal

Terminal --> Non Terminal

Non terminal --> Terminal

Non terminal --> Non Terminal (Page 100)

Question # 3 of 10 (Total Marks: 1)

Select correct option:

A _____ operator adds a new letter at the top of STACK

PUSH (Page 107)

POP

READ

APPEND

Question # 4 of 10 (Total Marks: 1)

Select correct option:

PDA stands for _____

Push and Drop Automaton

Pop and Drop Automaton

Push Down Automaton (Page 112)

None of given options

Question # 5 of 10 (Total Marks: 1)

Select correct option:

The production of the form: Nonterminal-> ^ is said to be _____ production

NULL (Page 99)

UNIT

Chomsky form production

None of the given options

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

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Question # 6 of 10 (Total Marks: 1)

Select correct option:

If a CFG has a null production, then it is _____

Posiible to construct another CFG without null production accepting the same language with the exception of the word Λ (Page 99)

Not possible to construct another CFG without null production accepting the same language with the exception of the word Λ

Called NULL CFG

Called Chmosky Normal Form (CNF)

Question # 7 of 10 (Total Marks: 1)

Select correct option:

In a STACK:

The element PUSHed first is POPed first

The element PUSHed first is POPed in the last (Page 107 concept)

The element PUSHed in last is POPed in last

None of given options

Question # 8 of 10 (Total Marks: 1)

Select correct option:

Kleene star closure can be defined

Over any set of string (Page 7)

Over specific type of string

Question # 9 of 10 (Total Marks: 1)

Select correct option:

While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by

A

B

null string (Page 26)

None of the given options

خوبصورتی علم و ادب سے ہوتی ہے لباس و حسن سے نہیں
بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

Some More Quizzes

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a given input, it provides the compliment of Boolean AND output.

NAND box (NOT AND) **(Page 63)**

DELAY box

OR box

AND box

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
It delays the transmission of signal along the wire by one step (clock pulse).

NAND box (NOT AND)

DELAY box **(Page 63)**

OR box

AND box

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
For the given input, it provides the Boolean OR output

NAND box (NOT AND)

DELAY box

OR box **(Page 63)**

AND box

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For the given input, AND box provides the Boolean AND output.

True **(Page 63)**

False

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.

True **(Page 63)**

False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Any language that can not be expressed by a RE is said to be regular language.

True

False **(Page 71)**

Question # 7 of 10 (Total Marks: 1) Select correct option:
If L1 and L2 are regular languages _____ is/are also regular language(s).

L1 + L2

L1L2

L1*

All of above (Page 10)

Question # 8 of 10 (Total Marks: 1) Select correct option:
Let L be a language defined over an alphabet Σ , then the language of strings, defined over Σ , not belonging to L, is called Complement of the language L, denoted by L^c or L' .

True (Page 66)

False

Question # 9 of 10 (Total Marks: 1) Select correct option:
To describe the complement of a language, it is very important to describe the ----- of that language over which the language is defined.

Alphabet (Page 66)

Regular Expression

String

Word

Question # 10 of 10 (Total Marks: 1) Select correct option:
For a certain language L, the complement of L^c is the given language L i.e. $(L^c)^c = L$

True

False (Page 66)

Question # 1 of 10 (Total Marks: 1) Select correct option:
If L is a regular language then, ----- is also a regular language.

L^m

L^s

L^x

L^c (Page 66)

Question # 2 of 10 (Total Marks: 1) Select correct option:
Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ , not belonging to L. is called

Transition Graph of L

Regular expression of L

Complement of L (Page 66)

Finite Automata of L

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

If L1 and L2 are two regular languages, then $L_1 \cup L_2$ is not a regular.

True

False (Page 65)

Question # 4 of 10 (Total Marks: 1)**Select correct option:**

De-Morgan's law for sets is expressed by,

$$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$$

$$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$$

$$(L_1^c \cap L_2^c)^c = L_1 \cap L_2$$

$$(L_1^c \cap L_2^c)^c = L_1 \cup L_2$$
 CORRECT (page 68)

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.

True (Page 68)

False

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

L = language of words containing even number of a's. Regular Expression is

$$(a+b)^*aa(a+b)^*$$

$$(b+ab^*a)^*$$
 (Page 68)

$$a+bb^*aab^*a$$

$$(a+b)^*ab(a+b)^*$$

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

The regular expression defining the language $L_1 \cap L_2$ can be obtained, converting and reducing the previous --- into a --- as after eliminating states.

GTG, TG

FA, GTG (Page 69)

FA, TG

TG, RE

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

The language that can be expressed by any regular expression is called a Non regular language.

True

False (Page 71)

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

Question # 9 of 10 (Total Marks: 1) Select correct option:
The languages ----- are the examples of non regular languages.

PALINDROME and PRIME (Page 71)

PALINDROME and EVEN-EVEN
EVEN-EVEN and PRIME
FACTORIAL and SQUIRE

Question # 10 of 10 (Total Marks: 1) Select correct option:
Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ^* such that all the strings of the form $xy^n z$ for $n=1,2,3, \dots$ are the words in L. called.

Complement of L
Pumping Lemma (Page 72)
Kleene's theorem
None in given

Question # 1 of 10 (Total Marks: 1) Select correct option:
Languages are proved to be regular or non regular using pumping lemma.
True (Page 74)
False

Question # 2 of 10 (Total Marks: 1) Select correct option:
----- is obviously infinite language.
EQUAL-EQUAL
EVEN-EVEN
PALINDROME (Page 75)
FACTORIAL

Question # 3 of 10 (Total Marks: 1) Select correct option:
If, two strings x and y, defined over Σ , are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
True (Page 75)
False

Question # 4 of 10 (Total Marks: 1) Select correct option:
Myhill Nerode theorem is consisting of the followings,
L partitions Σ^* into distinct classes.
If L is regular then, L generates finite number of classes.
If L generates finite number of classes then L is regular.
All of above (Page 75)

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

The language Q is said to be quotient of two regular languages P and R, denoted by--- if $PQ=R$.

$R=Q/P$

Q=R/P (Page 78)

$Q=P/R$

$P=R/Q$

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

If two languages R and Q are given, then the prefixes of Q in R denoted by $\text{Pref}(Q \text{ in } R)$.

True (Page 78)

False

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

Let $Q = \{aa, abaaabb, bbaaaaa, bbbbbb\}$ and $R = \{b, bbbb, bbbaaa, bbbaaaa\}$ Pref (Q in R) is equal to,

{b,bbba,bbbbaa} (Page 78)

{b,bba,bbaaa}

{ab,bba,bbbba}

{b,bba,bbba}

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

If R is regular language and Q is any language (regular/ non regular), then $\text{Pref}(Q \text{ in } R)$ is -----.

Non-regular

Equal

Regular (Page 79)

Infinite

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

_____ states are called the halt states.

ACCEPT and REJECT (Page 105)

ACCEPT and READ

ACCEPT AND START

ACCEPT AND WRITE

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

The part of an FA, where the input string is placed before it is run, is called _____

State

Transition

Input Tape (Page 105)

Output Tape

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Question # 1 of 10 (Total Marks: 1)**Select correct option:**

In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

ACCEPT

REJECT (Page 105)

STATR

READ

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

Between the two consecutive joints on a path

One character can be pushed and one character can be popped

Any no. of characters can be pushed and one character can be popped (Page 122)

One character can be pushed and any no. of characters can be popped

Any no. of characters can be pushed and any no. of characters can be popped

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

The PDA is called non-deterministic PDA when there are more than one out going edges from..... state

START or READ

POP or REJECT

READ or POP (Page 111)

PUSH or POP

Question # 4 of 10 (Total Marks: 1)**Select correct option:**

Identify the TRUE statement:

A PDA is non-deterministic, if there are more than one READ states in PDA

A PDA is never non-deterministic

Like TG, A PDA can also be non-deterministic (Page 111)

A PDA is non-deterministic, if there are more than one REJECT states in PDA

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.

True (Page 79)

False

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

If an effectively solvable problem has answered in yes or no, then this solution is called -----

Decision procedure (Page 80)

Decision method

Decision problem

Decision making

Question # 7 of 10 (Total Marks: 1)

Select correct option:

The following problem(s) ----- is/are called decidable problem(s).

The two regular expressions define the same language

The two FAs are equivalent

Both a and b (Page 80)

None of given

Question # 8 of 10 (Total Marks: 1)

Select correct option:

To examine whether a certain FA accepts any words, it is required to seek the paths from ----- state.

Final to initial

Final to final

Initial to final (Page 81)

Initial to initial

Question # 9 of 10 (Total Marks: 1)

Select correct option:

The high level language is converted into assembly language codes by a program called compiler.

TRUE (Page 87)

FALSE

Question # 10 of 10 (Total Marks: 1)

Select correct option:

Grammatical rules which involve the meaning of words are called -----

Semantics (Page 87)

Syntactic

Both a and b

None of given

Question # 1 of 10 (Total Marks: 1)

Select correct option:

Grammatical rules which do not involve the meaning of words are called -----

Semantics

Syntactic (Page 87)

Both a and b

None of given

Question # 2 of 10 (Total Marks: 1)

Select correct option:

The symbols that must be replaced by other things are called _____

Productions

Terminals

Non-terminals (Page 87)

None of given

Question # 3 of 10 (Total Marks: 1) Select correct option:

The grammatical rules are often called _____

Productions (Page 87)

Terminals
Non-terminals
None of given

Question # 4 of 10 (Total Marks: 1) Select correct option:

The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.

Capital, bold

Small, capital (Page 87)

Capital, small
Small, bold

Question # 5 of 10 (Total Marks: 1) Select correct option:

The language generated by _____ is called Context Free Language (CFL).

FA

TG

CFG (Page 87)

TGT

Question # 6 of 10 (Total Marks: 1) Select correct option:

$\Sigma = \{a,b\}$ Productions $S \rightarrow XaaX$

$X \rightarrow aX$

$X \rightarrow bX$

$X \rightarrow \Lambda$

This grammar defines the language expressed by _____

$(a+b)^*aa(a+b)^*$ (Page 89)

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

$(a+b)^*aa(a+b)^*aa$

$(a+b)^*aba+b)^*$

Question # 7 of 10 (Total Marks: 1) Select correct option:

$S \rightarrow aXb|b$

$XaX \rightarrow aX|bX|\Lambda$

The given CFG generates the language in English _____

Beginning and ending in different letters (Page 91)

Beginning and ending in same letter

Having even-even language

None of given

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

TRUE

FALSE (Page 95)**Question # 9 of 10 (Total Marks: 1)****Select correct option:**

The language generated by that CFG is regular if _____

No terminal $\rightarrow$ semi wordNo terminal $\rightarrow$ word**Both a and b (Page 97)**

None of given

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

The production of the form no terminal $\rightarrow \Lambda$ is said to be null production.

TRUE**(Page 99)**

FALSE

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

CNF is stands for

Context Normal Form

Complete Normal Form

Chomsky Normal Form (Page 102)

Compared Null Form

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

Proof(Kleene's Theorem Part II)

If a TG has more than one start states, then

Introduce the new start state (Page 26)

Eliminate the old start state

Replace the old start state with final state

Replace the old final state with new start state

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

Which of the following regular expression represents same language?

a. $(a+ab)^*$ b. $(ba+a)^*$ c. $a^*(aa^*b)^*$ d. $(a^*b^*)^*(a+b)^*a(a+b)^*b(a+b)^*+(a+b)^*b(a+b)^*a(a+b)^*$ **Muhammad Moaaz Siddiq – MCS(4th)****Moaaz.pk@gmail.com****Campus:- Institute of E-Learning & Moderen Studies
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$\{x\}^*, \{x\}^+, \{a+b\}^*$

Select correct option:

a and b (correct)

a and c

c and d

Question # 4 of 10 (Total Marks: 1)

Select correct option:

Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only

FA2 only

FA1 or FA2 (Page 32)

FA1 and FA2

Question # 5 of 10 (Total Marks: 1)

Select correct option:

Which of the following statement is NOT true about TG?

There exists exactly one path for certain string (Page 19)

There may exist more than one paths for certain string

There may exist no path for certain string

There may be no final state

Question # 6 of 10 (Total Marks: 1)

Select correct option:

Kleene's theorem states

All representations of a regular language are equivalent.

All representations of a context free language are equivalent.

All representations of a recursive language are equivalent

Finite Automata are less powerful than Pushdown Automata. (Page 105)

Question # 7 of 10 (Total Marks: 1)

Select correct option:

A language accepted by an FA is also accepted by

TG only

GTG only

RE only

All of the given (Page 25)

انسان کے لئے بری صحبت سے بڑھ کر بری کوئی چیز نہیں

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CS402- Theory of Automata
Solved MCQS
From Final term Papers

Feb 22,2013

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PSMD01

FINAL TERM EXAMINATION

Fall 2012

CS402- Theory of Automata

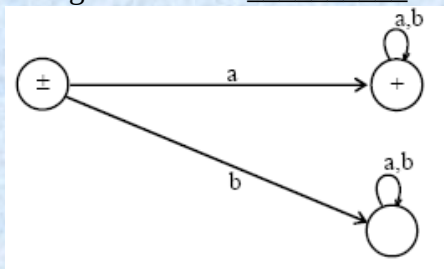
Question No: 1 (Marks: 1) - Please choose one

If $\Sigma = \{aa, bb\}$, then Σ^* will not contain

- ▶ aaabbb
- ▶ aabbbb
- ▶ aabbaa
- ▶ bbaabbbb

Question No: 2 (Marks: 1) - Please choose one

Below given FA has _____ RE.



▶ $a(a+b)^*$ (Page 14)

- ▶ $(a(a+b)^*)^*$
- ▶ $a(a+b)^*a$
- ▶ $a(a+b)^*a + b(a+b)^*b$

Question No: 3 (Marks: 1) - Please choose one

“One language can have _____ TG’s”.

- ▶ Only one
- ▶ Only two
- ▶ More than one
- ▶ Only three

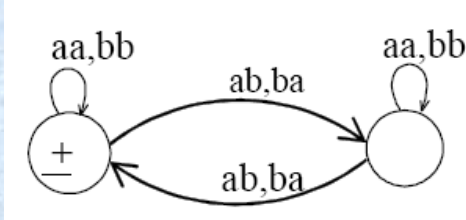
دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

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Question No: 4 (Marks: 1) - Please choose one



Above given TG represents the language i.e.

- ▶ **EVEN-EVEN** (Page 22)
- ▶ PALINDROME
- ▶ FACTORIAL
- ▶ None of these

Question No: 5 (Marks: 1) - Please choose one

According to 1st part of the Kleene's theorem, If a language can be accepted by an FA then it can be accepted by a _____ as well.

- ▶ FA
- ▶ CFG
- ▶ GTG
- ▶ **TG** (Page 25)

Question No: 6 (Marks: 1) - Please choose one

Even-palindrome is a _____ language.

- ▶ **Non-regular** [click here for detail](#)
- ▶ Regular
- ▶ Regular but infinite
- ▶ Regular but finite

Question No: 7 (Marks: 1) - Please choose one

If L is a regular language then, L^c is also a _____ language.

- ▶ **Regular** (Page 66)
- ▶ Non-regular
- ▶ Regular but finite
- ▶ None of the given

Question No: 8 (Marks: 1) - Please choose one

Pumping lemma is generally used to prove that:

- ▶ A given language is infinite
- ▶ **A given language is not regular** [Click here for detail](#)
- ▶ Whether two given regular expressions of a regular language are equivalent or not
- ▶ None of these

بري صحبت سے تنہائی بہتر ہے اور تنہائی سے نيك صحبت بہتر ہے

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Question No: 9 (Marks: 1) - Please choose one

If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

- ▶ accept all
- ▶ **accept no (Page 85)**
- ▶ accept some
- ▶ reject no

Question No: 10 (Marks: 1) - Please choose one

In CFG, the symbols that can't be replaced by anything are called _____.

- ▶ **Terminal (Page 87)**
- ▶ Non-Terminal
- ▶ Production
- ▶ All of given

Question No: 11 (Marks: 1) - Please choose one

Which of the following is a regular language?

- ▶ **String of odd number of zeroes** [Click here for detail](#)
- ▶ Set of all palindromes made up of 0's and 1's
- ▶ String of 0's whose length is a prime number
- ▶ All of these

Question No: 12 (Marks: 1) - Please choose one

Which of the following pairs of regular expressions are equivalent?

- ▶ $1(001)^*$ and $(10)^*10$
- ▶ **$x(xx)^*$ and $(x)^*x$**
- ▶ X^+ and X^*
- ▶ X^+ and X^*X^+

Question No: 13 (Marks: 1) - Please choose one

An alphabet of Σ is valid if

- ▶ No letter of Σ appears in middle of any other letter
- ▶ No letter of Σ appears at end of any other letter
- ▶ **No letter of Σ appears at start of any other letter** (Page 4)
- ▶ No letter of Σ appears at end or middle of any other letter

اللہ کا خوف سب سے بڑی دانائی ہے

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Question No: 14 (Marks: 1) - Please choose one

Which of the following statement is true

- ▶ [The length of the output string is greater than length of input string in moore machine. Click here for detail](#)
- ▶ The length of the output string is greater than length of input string in mealy machine.
- ▶ The length of the output string is equal to length of input string in moore machine.
- ▶ The length of the output string is less than length of input string in mealy machine.

Question No: 15 (Marks: 1) - Please choose one

If a CFG has only productions of the form
nonterminal $\rightarrow$ string of two nonterminals

or

nonterminal $\rightarrow$ one terminal

then the CFG is said to be in _____

▶ **Chomsky Normal Form (Page 101)**

- ▶ Ambiguous Form
- ▶ Left Aligned Form
- ▶ Right Aligned Form

Question No: 16 (Marks: 1) - Please choose one

We can also represent an FA using different states e.g Accept state; Reject state, Read state etc.

The _____ state behaves as final state of an FA

▶ **Accept (Page 105)**

- ▶ Pop
- ▶ Push
- ▶ Reject

Question No: 17 (Marks: 1) - Please choose one

where the input string is placed before it is run, is called _____

- ▶ Date tape
- ▶ **Input Tape (Page 105)**
- ▶ Output Tape
- ▶ Magnetic tape

Question No: 18 (Marks: 1) - Please choose one

An FSM can be considered as TM

- ▶ Of finite tape length, rewinding capability and unidirectional tape movement
- ▶ Of finite tape length, without rewinding capability and bidirectional tape movement
- ▶ Of finite tape length, rewinding capability and bidirectional tape movement
- ▶ **Of finite tape length, without rewinding capability and unidirectional tape movement** [click here for detail](#)

Question No: 19 (Marks: 1) - Please choose one

The process of finding the derivation of the word generated by particular grammar is called _____

- ▶ Processing
- ▶ **Parsing (Page 136)**
- ▶ Programming
- ▶ Planning

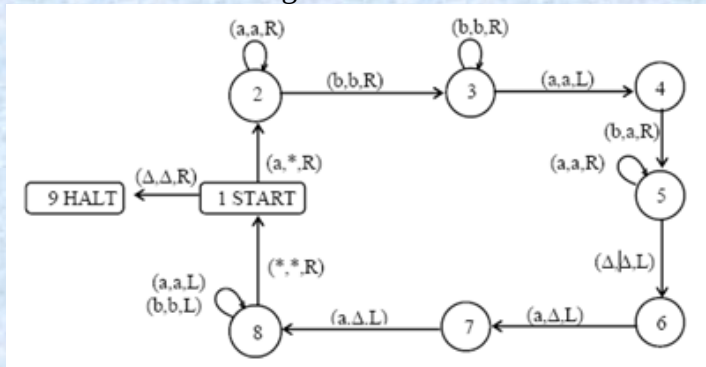
Question No: 20 (Marks: 1) - Please choose one

The first rule of converting the given “CFG in CNF”, is _____

- ▶ CNK algorithm
- ▶ **CYK algorithm (Page 135) Algorithm 4 (The CYK algorithm)**
- ▶ CKY algorithm
- ▶ KYC algorithm

Question No: 21 (Marks: 1) - Please choose one

Consider the following TM



- ▶ Above TM accepts the non-CFL $\{a b c\}$
- ▶ **Above TM accepts the non-CFL $\{a^n b^n a^n\}$ (Page 142)**
- ▶ Above TM accepts the non-CFL $\{a^n b^{n+2} a^n\}$

Question No: 22 (Marks: 1) - Please choose one

Alphabet $\Sigma = \{a, bc, cc\}$ has number of letters

- ▶ One
- ▶ Two
- ▶ **Three**
- ▶ Four

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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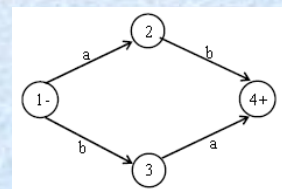
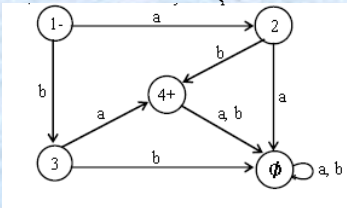
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Question No: 23 (Marks: 1) - Please choose one

If $r1$ is a regular expression then $r1^*$ is a _____

- ▶ GTG
- ▶ NFA
- ▶ FA
- ▶ **RE (Page 9)**

Question No: 24 (Marks: 1) - Please choose one



- ▶ **(a) is FA, (b) is NFA (Page 43)**
- ▶ (a) is NFA, (b) is FA
- ▶ (a) is TG, (b) is FA
- ▶ (a) is TG, (b) is GTG

Question No: 25 (Marks: 1) - Please choose one

We cannot write regular expressions for all _____.

- ▶ FA's
- ▶ TG's
- ▶ NFA's
- ▶ **CFG's (Page 97)**

Question No: 26 (Marks: 1) - Please choose one

For every Context Free Grammar (CFG), we can make the corresponding _____.

- ▶ FA
- ▶ TG
- ▶ **PDA** [click here for detail](#)
- ▶ Regular Grammar

Question No: 27 (Marks: 1) - Please choose one

Pumping Lemma II says that $\text{length}(x) + \text{length}(y)$ should be _____.

► **Less than number of states (Page 75)**

- Equal to number of states
- Greater than number of states
- Greater than or equal to number of states

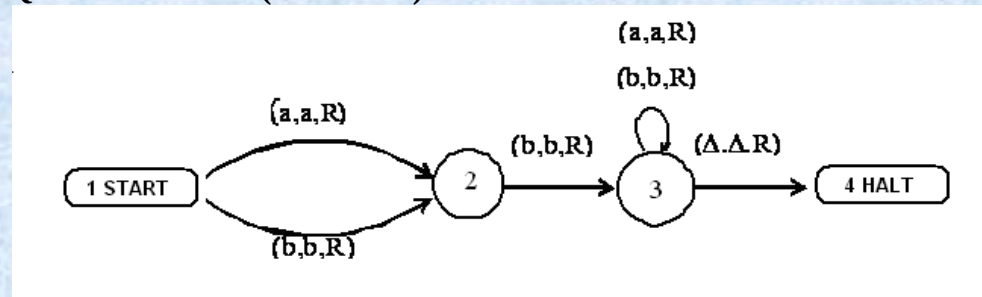
Question No: 28 (Marks: 1) - Please choose one

Chomsky normal form (CYK) algorithm was proposed by _____.

► **John cock (Page 135)**

- James Cock
- Daniel I.A.
- John Weiss

Question No: 29 (Marks: 1) - Please choose one



The above machine is a/anTG _____

- Finite Automata
- **Turing machine (Page 141)**
- FA
- TG

Question No: 30 (Marks: 1) - Please choose one

The language of Palindromes defined over an alphabet set $\{a, b\}$ can be recognized by _____.

- FA
- NFA
- TG
- **PDA (Page 91)**

Hint: - as it is non-regular so its CFG and PDA are possible.

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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Question No: 31 (Marks: 1) - Please choose one

Which of the following statement(s) is/are true or false?

- (1) The Turing Machine is similar to a finite automation but with an unlimited and unrestricted memory.
(2) A Turing machine much more accurate model of a general purpose computer.

► **Statement 1 is true** [Click here for detail](#)

► **Statement 2 is true** [Click here for detail](#)

► Both statements (1 & 2) are false

► Statements 2 is false

Question No: 32 (Marks: 1) - Please choose one

Which of the following is the first phase of compiler on the basis of functionality?

► Parser

► Lexical analyzer

► **Scanner** [Click here for detail](#)

► Interpreter

Hint: - The first phase of a compiler is called lexical analysis (and is also known as a lexical scanner).

Question No: 33 (Marks: 1) - Please choose one

$(\Sigma^* - L)$ represent the _____ of a language L.

► **Complement** (Page 66)

► Kleene's closure

► Union

► intersection

Question No: 34 (Marks: 1) - Please choose one

If we have two transition graphs then their union will be expressed by

► **taking a common start state and joining them by two null transitions** (Page 65)

► just connecting both start states by null transitions

► connecting final state of first TG to the initial state of second TG

► connecting the final state of first TG to the final state of second TG

Question No: 35 (Marks: 1) - Please choose one

_____ and _____ are removed in order to make a CFG in Chomsky Normal Form(CNF).

► Null, nullable productions

► Nullable, unit productions

► **Null, unit productions** (Page 102)

► String of length 0, null

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

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Question No: 36 (Marks: 1) - Please choose one

If L1 and L2 are expressed by regular languages then L1 + L2 is also a _____ Language.

► **Regular (Page 10)**

► Ir-regular

► PDA

► Hybrid

Question No: 37 (Marks: 1) - Please choose one

Which of the following is a regular Context Free Grammar:

► $S \rightarrow abS \mid baS \mid \wedge$ **$ab(ab+ba)^*ba + ba(ab+ba)^*ab$**

► $S \rightarrow aSb \mid baS \mid \wedge$

► $S \rightarrow abS \mid bSa \mid \wedge$

► $S \rightarrow aSb \mid Sa \mid \wedge$

Hint :- remaining represents palindromes language which is non-regular

Question No: 38 (Marks: 1) - Please choose one

A read state can have _____ outgoing edge/ edges.

► 1

► 2

► 3

► **Any number of (Page 111)**

Question No: 39 (Marks: 1) - Please choose one

Finite Automation (FA) and Nondeterministic Finite Automation (NFA) are equivalent if

► **FA and NFA accept the same language (Page 43) [Also click here for detail](#)**

► FA shape is same like an NFA

► FA accept the null string also

► NFA accept the null string also

Question No: 40 (Marks: 1) - Please choose one

_____ is always Deterministic.

► **Finite Automation (Page 25)**

► Transition Graph

► Generalize Transition Graph

► Non-deterministic finite automation

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

FINAL TERM EXAMINATION
Spring 2010
CS402- Theory of Automata (Session - 1)

Question No: 1 (Marks: 1) - Please choose one

If $r_1 = (aa + bb)$ and $r_2 = (a + b)$ then the language $(aa + bb)(a + b)$ will be generated by

- ▶ **(r₁)(r₂) (Page 10)**
- ▶ $(r_1 + r_2)$
- ▶ $(r_2)(r_1)$
- ▶ $(r_1)^*$

Question No: 2 (Marks: 1) - Please choose one

“One language can be expressed by more than one FA”. This statement is _____

- ▶ **True (Page 14)**
- ▶ False
- ▶ Some times true & sometimes false
- ▶ None of these

Question No: 3 (Marks: 1) - Please choose one

Who did not invent the Turing machine?

- ▶ Alan Turing
- ▶ **A. M. Turing (Page 140)**
- ▶ Turing
- ▶ None of these

Question No: 4 (Marks: 1) - Please choose one

Which statement is true?

- ▶ **The tape of turing machine is infinite. (Page 140)**
- ▶ The tape of turing machine is finite.
- ▶ The tape of turing machine is infinite when the language is regular
- ▶ The tape of turing machine is finite when the language is nonregular.

Question No: 5 (Marks: 1) - Please choose one

A regular language:

- ▶ **Must be finite (Page 11)**
- ▶ Must be infinite
- ▶ Can be finite or infinite
- ▶ Must be finite and cannot be infinite

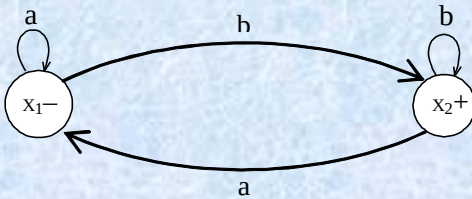
عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

Question No: 6 (Marks: 1) - Please choose one

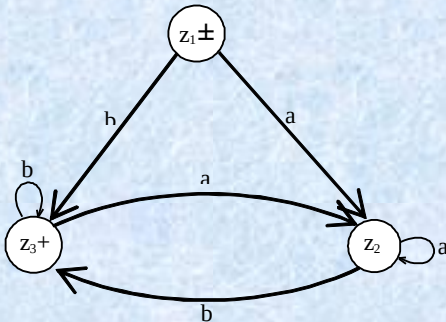
Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- ▶ Depends on the language
- ▶ None of the given options
- ▶ **True (Page 97)**
- ▶ False

Question No: 7 (Marks: 1) - Please choose one



Above given FA corresponds RE r . then FA corresponding to r^* will be



This statement is

- ▶ **True (Page 38)**
- ▶ False
- ▶ Depends on language
- ▶ None of these

Question No: 8 (Marks: 1) - Please choose one

Consider the language L of strings, defined over $\Sigma = \{a,b\}$, ending in a

- ▶ **There are finite many classes generated by L , so L is regular (Page 76)**
- ▶ There are infinite many classes generated by L , so L is regular
- ▶ There are finite many classes generated by L , so L is non-regular
- ▶ There are infinite many classes generated by L , so L is non-regular

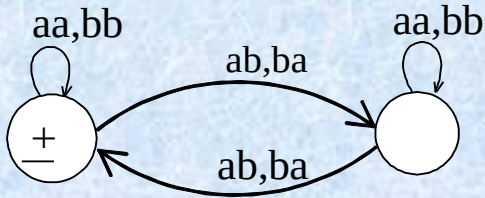
خود کو تمہیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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Question No: 9 (Marks: 1) - Please choose one



Above given TG has _____ RE.

- ▶ $(aa+aa+(ab+ab)(aa+ab)^*(ab+ba))^*$
- ▶ **$(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$ (Page 22)**
- ▶ $(aa+bb+(ab+ba)(aa+bb)(ab+ba))^*$
- ▶ None of these

Question No: 10 (Marks: 1) - Please choose one

The word 'formal' in formal languages means

- ▶ The symbols used have well defined meaning
- ▶ They are unnecessary, in reality
- ▶ **Only the form of the string of symbols is significant** [Click here for detail](#)
- ▶ None of these

Question No: 11 (Marks: 1) - Please choose one

Let $A = \{0, 1\}$. The number of possible strings of length 'n' that can be formed by the elements of the set A is

- ▶ $n!$
- ▶ n^2
- ▶ n^m
- ▶ **2^n**

Question No: 12 (Marks: 1) - Please choose one

Choose the correct statement.

- ▶ A Mealy machine generates no language as such
- ▶ A Moore machine generates no language as such
- ▶ A Mealy machine has no terminal state
- ▶ **All of these** [click here for detail](#)

Question No: 13 (Marks: 1) - Please choose one

TM is more powerful than FSM because

- ▶ The tape movement is confined to one direction
- ▶ It has no finite state control
- ▶ **It has the capability to remember arbitrary long sequences of input symbols** [Click here for detail](#)
- ▶ None of these

Question No: 14 (Marks: 1) - Please choose one

If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by $r1 + r2$ will be _____

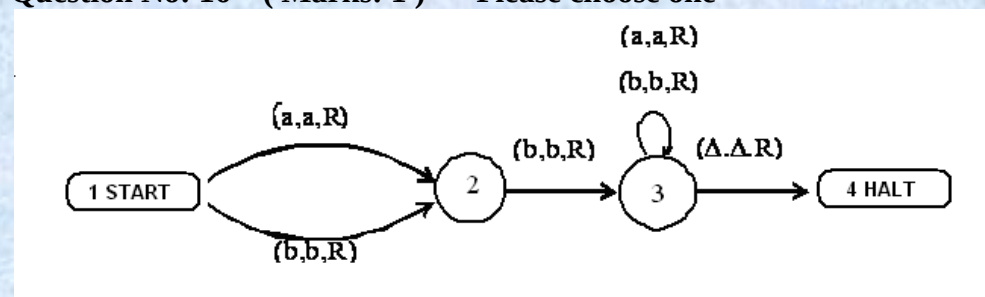
- ▶ **Regular (Page 10)**
- ▶ Ir-regular
- ▶ Can't be decided
- ▶ Another Language which is not listed here

Question No: 15 (Marks: 1) - Please choose one

Like TG, a PDA can also be non-deterministic

- ▶ **True (Page 111)**
- ▶ False

Question No: 16 (Marks: 1) - Please choose one



The above machine is a/an _____

- ▶ Finite Automata
- ▶ **Turing machine (Page 141) rep**
- ▶ FA
- ▶ TG

Question No: 17 (Marks: 1) - Please choose one

The language of all words (made up of a's and b's) with at least two a's can not be described by the regular expression.

- ▶ $a(a+b)^*a(a+b)^*(a+b)^*ab^*$
- ▶ $(a+b)^*ab^*a(a+b)^*$
- ▶ $b^*ab^*a(a+b)^*$
- ▶ **none of these**

$a^n b^n$ {where $n > 0$ } is the language will at least one a and b and cannot be described by RE.

Question No: 18 (Marks: 1) - Please choose one

In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called

- ▶ Dead State
- ▶ Waste Basket
- ▶ Davey John Locker
- ▶ **All of these (Page 17)**

Question No: 19 (Marks: 1) - Please choose one

If L is a regular language then, L^c is also a _____ language.

- ▶ **Regular (Page 66) rep**
- ▶ Non-regular
- ▶ Regular but finite
- ▶ None of the given

Question No: 20 (Marks: 1) - Please choose one

In CFG, the symbols that can't be replaced by anything are called _____

- ▶ **Terminal (Page 87) rep**
- ▶ Non-Terminal
- ▶ Production
- ▶ All of given

Question No: 21 (Marks: 1) - Please choose one

Which of the following is NOT a regular language?

- ▶ String of 0's whose length is a perfect square
- ▶ Set of all palindromes made up of 0's and 1's
- ▶ String of 0's whose length is a prime number
- ▶ **All of the given options** [Click here for detail](#)

Question No: 22 (Marks: 1) - Please choose one

Choose the incorrect (FALSE) statement.

- ▶ A Mealy machine generates no language as such
- ▶ A Mealy machine has no terminal state
- ▶ **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine** [click here for detail](#)
- ▶ All of these

Question No: 23 (Marks: 1) - Please choose one

Pumping lemma is generally used to prove that:

- ▶ A given language is infinite
- ▶ **A given language is not regular** [Click here for detail](#) rep
- ▶ Whether two given regular expressions of a regular language are equivalent or not
- ▶ None of these

Question No: 24 (Marks: 1) - Please choose one

Which of the following is a regular language?

- ▶ **String of odd number of zeroes** [Click here for detail](#) rep
- ▶ Set of all palindromes made up of 0's and 1's
- ▶ String of 0's whose length is a prime number
- ▶ All of these

Question No: 25 (Marks: 1) - Please choose one

Choose the incorrect statement:

- ▶ $(a+b)^*aa(a+b)^*$ generates Regular language.
- ▶ **A language consisting of all strings over $\Sigma=\{a,b\}$ having equal number of a's and b's is a regular language**
- ▶ Every language that can be expressed by FA can also be expressed by RE
- ▶ None of these

Question No: 26 (Marks: 1) - Please choose one

Left hand side of a production in CFG consists of:

- ▶ One terminal
- ▶ More than one terminal
- ▶ **One non-terminal (Page 87)**
- ▶ Terminals and non-terminals

FINAL TERM EXAMINATION SPRING 2007

Question No: 1 (Marks: 1) - Please choose one

PDA is only used to represent a regular language.

- ▶ True
- ▶ **False** [Click here for detail](#)

Question No: 2 (Marks: 1) - Please choose one

If L is a regular language then LC is also a regular language.

- ▶ **True (Page 66) rep**
- ▶ False

Question No: 3 (Marks: 1) - Please choose one

A production of the form non-terminal $\rightarrow$ string of two non-terminal is called a live Production.

- ▶ **True (Page 127)**
- ▶ False

Question No: 4 (Marks: 1) - Please choose one

We can find a CFG corresponding to a DFA.

- ▶ **True (Page 97)**
- ▶ False

Question No: 5 (Marks: 1) - Please choose one

START, READ, HERE and ACCEPTS are conversions of the machine

- ▶ True (Page 122)
- ▶ False

Question No: 6 (Marks: 1) - Please choose one

A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees

- ▶ True (Page 95)
- ▶ False

Question No: 7 (Marks: 1) - Please choose one

Syntax tree or Generation tree or Derivation tree are same tree

- ▶ True (Page 92)
- ▶ False

Question No: 8 (Marks: 1) - Please choose one

The symbols that cannot be replaced by anything are called terminals

- ▶ True (Page 87) rep
- ▶ False

Question No: 9 (Marks: 1) - Please choose one

The production of the form non-terminal $\Rightarrow$ one non-terminal is called unit production

- ▶ True (Page 100)
- ▶ False

Question No: 10 (Marks: 1) - Please choose one

DFA and PDA are equal in power.

- ▶ True
- ▶ False (Page 105)

FINAL TERM EXAMINATION

Spring 2006

CS402- Theory of Automata

Question No. 1

A production of the form non-terminal $\Rightarrow$ non-terminal is called a dead Production.

True

False (Page 127)

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اس سے ڈر کر بھاگتی ہے

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Question No. 2

Semi-word is a string having some terminals and one non-terminal at the right of string.

True (Page 97)

False

Question No. 3

Two FAs are equivalent if they have same no. of states.

True (Page 15)

False

Question No. 4

There exist exactly two different derivations in an ambiguous CFG for a word.

True (Page 93)

False

Question No. 6

Regular languages are closed under Union, Concatenation and Kleene star.

True (Page 10)

False

Question No. 7

CFG may also represent a regular language.

True (Page 97)

False

Question No. 9 Marks : 1

PDA is stronger than FA.

True (Page 105)

False

FINAL TERM EXAMINATION

Spring 2005

CS402- Theory of Automata

Question No. 1

A Total Language Tree has

All languages over Σ

All strings over Σ (Page 96)

All words of all languages over Σ

All words of one language over Σ

Question No. 2

What Turing Machine does not have?

Stack

Tape

Head

Word

Turing machine has stack but insertion and deletion can be done from both sides. Tape and head to.

Question No. 3

CFG given $S \Rightarrow bS|Sb|aa$ represents language

b^*aa

aab^*

b^*aab^*

$b^*(aa)^*b^*$

Question No. 4

A Language that is finite but not regular

Λ

$(a+b)^*$

Φ (not sure)

All strings of a's in $\Sigma = \{a, b\}$

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

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CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1)

Select correct option:

The values of input (say a & b) does not remain same in one cycle due to

NAND gate

Click plus

OR gate

NOT gate

Question # 2 of 10 (Total Marks: 1)

Select correct option:

Set of all palindromes over {a,b} is regular

True

False (Page 74)

Question # 3 of 10 (Total Marks: 1)

Select correct option:

In CFG, the symbols that cannot be replaced by anything are called

Terminals (Page 87) rep

Non terminals

Productions

None of the given options

Question # 4 of 10 (Total Marks: 1)

Select correct option:

$a^n b^n$ generates the language

regular

non regular

EQUAL and non regular (Page 71)

EQUAL and regular

Question # 5 of 10 (Total Marks: 1)

Select correct option:

The grammatical rules which involves meaning of words are called:

Semantic (Page 87)

Syntactics

Alphabets

None of the given options

عقل مند اپنے عیب خود دیکھتا ہے اور بیوقوفوں کے عیب دنیا دیکھتی ہے

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Question # 6 of 10 (Total Marks: 1)

Select correct option:

The reverse of the string sbfsbb over { sb, f, b }

bbsfbs

bsbfsb

sbbfsb

bsfbsb

Question # 7 of 10 (Total Marks: 1)

Select correct option:

If an FA has N state then it must accept the word of length

N-1

N+1

N+2N

Question # 8 of 10 (Total Marks: 1)

Select correct option:

Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

Must be final state

May be final state or not (Page 75)

May be start or not

None of the given options

Question # 9 of 10 (Total Marks: 1)

Select correct option:

In $\text{pref}(Q \text{ in } R)$ Q is to (than) R

Equal

Not Equal (Page 79)

Greater

Smaller

Question # 10 of 10 (Total Marks: 1)

Select correct option:

According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

Finite

Infinite

Regular (Page 76)

Non Regular

عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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Question # 1 of 10 (Total Marks: 1)

Select correct option:

If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

True (Page 68)

False

Question # 2 of 10 (Total Marks: 1)

Select correct option:

In pumping lemma theorem ($x y^n z$) the range of n is

$n=1,2,3,4,\dots$ (Page 74)

$n=0,1,2,3,4,\dots$

$n=-3,-2,-1,0,1,2,3,4,\dots$

$n=-3,-2,-1,1,2,3,4,\dots$

Question # 3 of 10 (Total Marks: 1)

Select correct option:

The complement of a regular language is also a regular

True rep

False

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1)

Select correct option:

For a non regular language there exist FA

One

At least one

At most one

No (Page 71)

Question # 2 of 10 (Total Marks: 1)

Select correct option:

The strings or words which do not belong to a language is called..... of that language

Intersection

Union

Complement (Page 66)

Quotient

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

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Question # 3 of 10 (Total Marks: 1) Select correct option:

A non regular language can be represented by

- RE
- FA
- TG

None of the given options (Page 71)

Question # 4 of 10 (Total Marks: 1) Select correct option:

For language L defined over {a, b}, then L partitions {a, b}* into classes

- Infinite
- Finite

Distinct (Page 75)

Non distinct

Question # 5 of 10 (Total Marks: 1) Select correct option:

If an FA accept a word then there must exist a path from

Initial to final state (Page 81)

- Initial to each state
- Initial to each state but not to final state
- Initial to final state by traversing each state

Question # 6 of 10 (Total Marks: 1) Select correct option:

Does the empty string match the regular expression $|y+a|$?

Yes

No (Page 3)

Question # 7 of 10 (Total Marks: 1) Select correct option:

If an FA already accepts the language expressed by the closure of certain RE, then the given FA is the required FA.

True (Page 37)

False

Question # 8 of 10 (Total Marks: 1) Select correct option:

Which of the following statement is true about NFA with Null String?

- Infinite states
- Infinite set of letters
- Infinite set of transitions

Transition of null string is allowed at any stage (Page 71)

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

If R is a regular language and L is some language, and $L \cup R$ is a regular language, then L must be a regular language.

True (page 10)

False

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

FA corresponding to an NFA can be built by introducing an empty state for a letter having

no transition at certain state (Page 43)

one transition at certain state

two transition at certain state

more than two transitions at certain state

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only (Page 35)

FA2 only

FA1 or FA2

FA1 and FA2

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

$(a^* + b^*)^* = (a + b)^*$ this expression is _____

True

False**Question # 3 of 10 (Total Marks: 1)****Select correct option:**

If $S = \{ x \}$, then S^* will be

 $\{x, xx, xxx, xxxx, \dots\}$ **$\{^x, x, xx, xxx, xxxx, \dots\}$ (Page 10)****Question # 4 of 10 (Total Marks: 1)****Select correct option:**

The states in which there is no way to leave after entry are called

Davey John Lockers

Dead States

Waste Baskets

All of the given options (Page 17)

خوبصورتی علم و ادب سے ہوتی ہے لباس و حسن سے نہیں

Question # 5 of 10 (Total Marks: 1)

Select correct option:

If $S = \{ab, bb\}$, then S^* will not contain

Abbbab

Bbba

ababbb

bbbbab

Question # 6 of 10 (Total Marks: 1)

Select correct option:

According to theory of automata there are _____ types of languages

1

2 (Page 3)

3

4

Question # 7 of 10 (Total Marks: 1)

Select correct option:

What do automata mean?

Something done manually

Something done automatically (Page 3)

Question # 8 of 10 (Total Marks: 1)

Select correct option:

What is false about the term alphabet?

It is a finite set of symbols.

It is usually denoted by Greek letter sigma

It can be an empty set. (Page 3)

Strings are made up of its elements

Question # 9 of 10 (Total Marks: 1)

Select correct option:

Formal is also known as _____

Syntactic language (page 3)

Semantic language

Informal language

None of these

Question # 10 of 10 (Total Marks: 1)

Select correct option:

Following are types of languages

Formal Languages (Syntactic languages)

Informal Languages (Semantic languages)

Both (Page 3)

None of above

بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1)

Select correct option:

Consider the following production (of a CFG): $S \rightarrow XYZ$ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals

- S
- X**
- Y
- Z

Question # 2 of 10 (Total Marks: 1)

Select correct option:

A PDA is called nondeterministic PDA if _____

There are more than one outgoing edges at READ or POP states with one label (Page 111)

- There are more than one PUSH states
- There are more than one POP states
- All of the given options

Question # 3 of 10 (Total Marks: 1)

Select correct option:

A PDA consists of the following:

- An alphabet (Sigma) of input letters.
- An input TAPE with infinite many locations in one direction
- One START state with only one out-edge and no in-edge

All of the given options (Page 105)

Question # 4 of 10 (Total Marks: 1)

Select correct option:

The CFG $S \rightarrow aSa \mid bSb \mid a \mid b \mid \wedge$ represents the language

EVEN-EVEN

PALINDROM (Page 91)

EQUAL

ODD-ODD

Question # 5 of 10 (Total Marks: 1)

Select correct option:

Halt states are

Start and Accept

Accept and Reject (Page 105)

Start and Reject

Read and Reject

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

Choice of path can be determined by left most derivation of the string belonging to CFL at..... state

Accept (Page 104)

Reject

Push

POP

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

The unit and null productions can be deleted from a CFG

True (Page 99-100)

False

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

Identify the TRUE statement about following CFG:

 $S \rightarrow SB|AB$ $A \rightarrow CC$ $B \rightarrow b$ $C \rightarrow a$

The given CFG has 8 Nonterminals

The given CFG has 8 Terminals

The given CFG is in CNF (Page 101)

The given CFG is not in CNF

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

The structure given below is called _____ $S \rightarrow aA|bB$ $A \rightarrow aS|a$ $B \rightarrow bS|b$

RE

TG

CFG (Page 87)

PDA

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

Which of the following states is not part of PDA

START

ACCEPT

WRITE (Page 107)

REJECT

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1)

Select correct option:

The production of the form: nonterminal $\rightarrow$ one nonterminal is called the _____

Unit production (Page 100)

NULL production

Terminal production

Non Terminal production

Question # 2 of 10 (Total Marks: 1)

Select correct option:

A _____ is the one for which every input string has a unique path through the machine.

Deterministic PDA (Page 111)

nondeterministic PDA

PUSHDOWN store

Input Tape

Question # 3 of 10 (Total Marks: 1)

Select correct option:

In the null production $N \rightarrow \Lambda$, N is a

Terminal

Non terminal (Page 99)

Word

None of the given options

Question # 4 of 10 (Total Marks: 1)

Select correct option:

The major problem in the earliest computers was

To store the contents in the registers

To display mathematical formulae (Page 87)

To load the contents from the registers

To calculate the mathematical formula

Question # 5 of 10 (Total Marks: 1)

Select correct option:

In polish notation, (o-o-o) is the abbreviation of.....?

Operand - Operator – Operand

Operand - Operand- Operator

Operator -Operand – Operand (Page 94)

Operand -Operand – Operand

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the production trees

One

Two

More than one (Page 95)

At most one

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

The input string is placed, before it runs, in

Stack

Memory

Tape (Page 105)

Ram

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

The production $S \rightarrow SS \mid a \mid b \mid \wedge$ can be expressed by RE

 $(a+b)^+$ $(a+b)$ **$(a+b)^*$ (Page 88)** $(ab)^*$ **Question # 9 of 10 (Total Marks: 1)****Select correct option:**

The locations into which we put the input letters on "Input Tap" are called _____

words

alphabets

cells (Page 105)

elements

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

"CFG" stands for _____

Context Free Graph

Context Free Grammar (Page 87)

Context Finite Graph

Context Finite Grammar

بد صورت چہرہ بد صورت دماغ سے بہتر ہے

Question # 1 of 10 (Total Marks: 1)

Select correct option:

In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

Least Significant nonterminal

Most Significant nonterminal

Left most nonterminal (Page 103)

Left most derivate

Question # 2 of 10 (Total Marks: 1)

Select correct option:

The unit production is

Terminal --> Terminal

Terminal --> Non Terminal

Non terminal --> Terminal

Non terminal --> Non Terminal (Page 100)

Question # 3 of 10 (Total Marks: 1)

Select correct option:

A _____ operator adds a new letter at the top of STACK

PUSH (Page 107)

POP

READ

APPEND

Question # 4 of 10 (Total Marks: 1)

Select correct option:

PDA stands for _____

Push and Drop Automaton

Pop and Drop Automaton

Push Down Automaton (Page 112)

None of given options

Question # 5 of 10 (Total Marks: 1)

Select correct option:

The production of the form: Nonterminal-> ^ is said to be _____ production

NULL (Page 99)

UNIT

Chomsky form production

None of the given options

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Question # 6 of 10 (Total Marks: 1)

Select correct option:

If a CFG has a null production, then it is _____

Posiible to construct another CFG without null production accepting the same language with the exception of the word Λ (Page 99)

Not possible to construct another CFG without null production accepting the same language with the exception of the word Λ

Called NULL CFG

Called Chmosky Normal Form (CNF)

Question # 7 of 10 (Total Marks: 1)

Select correct option:

In a STACK:

The element PUSHed first is POPed first

The element PUSHed first is POPed in the last (Page 107 concept)

The element PUSHed in last is POPed in last

None of given options

Question # 8 of 10 (Total Marks: 1)

Select correct option:

Kleene star closure can be defined

Over any set of string (Page 7)

Over specific type of string

Question # 9 of 10 (Total Marks: 1)

Select correct option:

While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by

A

B

null string (Page 26)

None of the given options

انسان کے لئے بری صحبت سے بڑھ کر بری کوئی چیز نہیں

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Some More Quizzes

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a given input, it provides the compliment of Boolean AND output.

NAND box (NOT AND) (Page 63)

DELAY box
OR box
AND box

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
It delays the transmission of signal along the wire by one step (clock pulse).

NAND box (NOT AND)
DELAY box (Page 63)

OR box
AND box

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
For the given input, it provides the Boolean OR output

NAND box (NOT AND)
DELAY box
OR box (Page 63)
AND box

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For the given input, AND box provides the Boolean AND output.

True (Page 63)
False

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.

True (Page 63)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Any language that can not be expressed by a RE is said to be regular language.

True
False (Page 71)

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

If L1 and L2 are regular languages _____ is/are also regular language(s).

L1 + L2

L1L2

L1*

All of above (Page 10)

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

Let L be a language defined over an alphabet Σ , then the language of strings, defined over Σ , not belonging to L, is called Complement of the language L, denoted by L^c or L' .

True (Page 66)

False

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

To describe the complement of a language, it is very important to describe the ----- of that language over which the language is defined.

Alphabet (Page 66)

Regular Expression

String

Word

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

For a certain language L, the complement of L^c is the given language L i.e. $(L^c)^c = L$

True

False (Page 66)

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

If L is a regular language then, ----- is also a regular language.

L^m

L^s

L^x

L^c (Page 66)

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ , not belonging to L. is called

Transition Graph of L

Regular expression of L

Complement of L (Page 66)

Finite Automata of L

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

If L1 and L2 are two regular languages, then $L_1 \cup L_2$ is not a regular.

True

False (Page 65)

Question # 4 of 10 (Total Marks: 1)**Select correct option:**

De-Morgan's law for sets is expressed by,

$$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$$

$$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$$

$$(L_1^c \cap L_2^c)^c = L_1 \cap L_2$$

$$(L_1^c \cap L_2^c)^c = L_1 \cup L_2$$
 CORRECT (page 68)

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.

True (Page 68)

False

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

L = language of words containing even number of a's. Regular Expression is

$$(a+b)^*aa(a+b)^*$$

$$(b+ab^*a)^*$$
 (Page 68)

$$a+bb^*aab^*a$$

$$(a+b)^*ab(a+b)^*$$

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

The regular expression defining the language $L_1 \cap L_2$ can be obtained, converting and reducing the previous --- into a --- as after eliminating states.

GTG, TG

FA, GTG (Page 69)

FA, TG

TG, RE

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

The language that can be expressed by any regular expression is called a Non regular language.

True

False (Page 71)

خاموشی غصے کا بہترین علاج ہے

Question # 9 of 10 (Total Marks: 1) Select correct option:
The languages ----- are the examples of non regular languages.

PALINDROME and PRIME (Page 71)

PALINDROME and EVEN-EVEN
EVEN-EVEN and PRIME
FACTORIAL and SQUIRE

Question # 10 of 10 (Total Marks: 1) Select correct option:
Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ^* such that all the strings of the form $xy^n z$ for $n=1,2,3, \dots$ are the words in L. called.

Complement of L
Pumping Lemma (Page 72)
Kleene's theorem
None in given

Question # 1 of 10 (Total Marks: 1) Select correct option:
Languages are proved to be regular or non regular using pumping lemma.
True (Page 74)
False

Question # 2 of 10 (Total Marks: 1) Select correct option:
----- is obviously infinite language.
EQUAL-EQUAL
EVEN-EVEN
PALINDROME (Page 75)
FACTORIAL

Question # 3 of 10 (Total Marks: 1) Select correct option:
If, two strings x and y, defined over Σ , are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
True (Page 75)
False

Question # 4 of 10 (Total Marks: 1) Select correct option:
Myhill Nerode theorem is consisting of the followings,

L partitions Σ^* into distinct classes.
If L is regular then, L generates finite number of classes.
If L generates finite number of classes then L is regular.
All of above (Page 75)

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

The language Q is said to be quotient of two regular languages P and R, denoted by--- if $PQ=R$.

$R=Q/P$

Q=R/P (Page 78)

$Q=P/R$

$P=R/Q$

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

If two languages R and Q are given, then the prefixes of Q in R denoted by $\text{Pref}(Q \text{ in } R)$.

True (Page 78)

False

Question # 7 of 10 (Total Marks: 1)**Select correct option:**

Let $Q = \{aa, abaaabb, bbaaaaa, bbbbbb\}$ and $R = \{b, bbbb, bbbaaa, bbbaaaa\}$ Pref (Q in R) is equal to,

{b,bbba,bbbbaa} (Page 78)

{b,bba,bbaaa}

{ab,bba,bbbba}

{b,bba,bbba}

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

If R is regular language and Q is any language (regular/ non regular), then $\text{Pref}(Q \text{ in } R)$ is -----.

Non-regular

Equal

Regular (Page 79)

Infinite

Question # 9 of 10 (Total Marks: 1)**Select correct option:**

_____ states are called the halt states.

ACCEPT and REJECT (Page 105)

ACCEPT and READ

ACCEPT AND START

ACCEPT AND WRITE

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

The part of an FA, where the input string is placed before it is run, is called _____

State

Transition

Input Tape (Page 105)

Output Tape

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Question # 1 of 10 (Total Marks: 1)**Select correct option:**

In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

ACCEPT

REJECT (Page 105)

STATR

READ

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

Between the two consecutive joints on a path

One character can be pushed and one character can be popped

Any no. of characters can be pushed and one character can be popped (Page 122)

One character can be pushed and any no. of characters can be popped

Any no. of characters can be pushed and any no. of characters can be popped

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

The PDA is called non-deterministic PDA when there are more than one out going edges from..... state

START or READ

POP or REJECT

READ or POP (Page 111)

PUSH or POP

Question # 4 of 10 (Total Marks: 1)**Select correct option:**

Identify the TRUE statement:

A PDA is non-deterministic, if there are more than one READ states in PDA

A PDA is never non-deterministic

Like TG, A PDA can also be non-deterministic (Page 111)

A PDA is non-deterministic, if there are more than one REJECT states in PDA

Question # 5 of 10 (Total Marks: 1)**Select correct option:**

There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.

True (Page 79)

False

Question # 6 of 10 (Total Marks: 1)**Select correct option:**

If an effectively solvable problem has answered in yes or no, then this solution is called -----

Decision procedure (Page 80)

Decision method

Decision problem

Decision making

Question # 7 of 10 (Total Marks: 1)

Select correct option:

The following problem(s) ----- is/are called decidable problem(s).

The two regular expressions define the same language

The two FAs are equivalent

Both a and b (Page 80)

None of given

Question # 8 of 10 (Total Marks: 1)

Select correct option:

To examine whether a certain FA accepts any words, it is required to seek the paths from ----- state.

Final to initial

Final to final

Initial to final (Page 81)

Initial to initial

Question # 9 of 10 (Total Marks: 1)

Select correct option:

The high level language is converted into assembly language codes by a program called compiler.

TRUE (Page 87)

FALSE

Question # 10 of 10 (Total Marks: 1)

Select correct option:

Grammatical rules which involve the meaning of words are called -----

Semantics (Page 87)

Syntactic

Both a and b

None of given

Question # 1 of 10 (Total Marks: 1)

Select correct option:

Grammatical rules which do not involve the meaning of words are called -----

Semantics

Syntactic (Page 87)

Both a and b

None of given

Question # 2 of 10 (Total Marks: 1)

Select correct option:

The symbols that must be replaced by other things are called _____

Productions

Terminals

Non-terminals (Page 87)

None of given

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Question # 3 of 10 (Total Marks: 1) Select correct option:

The grammatical rules are often called _____

Productions (Page 87)

- Terminals
- Non-terminals
- None of given

Question # 4 of 10 (Total Marks: 1) Select correct option:

The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.

Capital, bold

Small, capital (Page 87)

- Capital, small
- Small, bold

Question # 5 of 10 (Total Marks: 1) Select correct option:

The language generated by _____ is called Context Free Language (CFL).

FA

TG

CFG (Page 87)

TGT

Question # 6 of 10 (Total Marks: 1) Select correct option:

$\Sigma = \{a,b\}$ Productions $S \rightarrow XaaX$

$X \rightarrow aX$

$X \rightarrow bX$

$X \rightarrow \Lambda$

This grammar defines the language expressed by _____

$(a+b)^*aa(a+b)^*$ (Page 89)

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

$(a+b)^*aa(a+b)^*aa$

$(a+b)^*aba+b)^*$

Question # 7 of 10 (Total Marks: 1) Select correct option:

$S \rightarrow aXb|bXa$

$X \rightarrow aX|bX|\Lambda$

The given CFG generates the language in English _____

Beginning and ending in different letters (Page 91)

- Beginning and ending in same letter
- Having even-even language
- None of given

Question # 8 of 10 (Total Marks: 1)**Select correct option:**

The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

TRUE

FALSE (Page 95)**Question # 9 of 10 (Total Marks: 1)****Select correct option:**

The language generated by that CFG is regular if _____

No terminal $\rightarrow$ semi wordNo terminal $\rightarrow$ word**Both a and b (Page 97)**

None of given

Question # 10 of 10 (Total Marks: 1)**Select correct option:**

The production of the form no terminal $\rightarrow \Lambda$ is said to be null production.

TRUE**(Page 99)**

FALSE

Question # 1 of 10 (Total Marks: 1)**Select correct option:**

CNF is stands for

Context Normal Form

Complete Normal Form

Chomsky Normal Form (Page 102)

Compared Null Form

Question # 2 of 10 (Total Marks: 1)**Select correct option:**

Proof(Kleene's Theorem Part II)

If a TG has more than one start states, then

Introduce the new start state (Page 26)

Eliminate the old start state

Replace the old start state with final state

Replace the old final state with new start state

Question # 3 of 10 (Total Marks: 1)**Select correct option:**

Which of the following regular expression represents same language?

a. $(a+ab)^*$ b. $(ba+a)^*$ c. $a^*(aa^*b)^*$ d. $(a^*b^*)^*(a+b)^*a(a+b)^*b(a+b)^*+(a+b)^*b(a+b)^*a(a+b)^*$ **Muhammad Moaaz Siddiq – MCS(4th)****Moaaz.pk@gmail.com****Campus:- Institute of E-Learning & Modern Studies
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$\{x\}^*, \{x\}^+, \{a+b\}^*$

Select correct option:

a and b (correct)

a and c

c and d

Question # 4 of 10 (Total Marks: 1)

Select correct option:

Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only

FA2 only

FA1 or FA2 (Page 32)

FA1 and FA2

Question # 5 of 10 (Total Marks: 1)

Select correct option:

Which of the following statement is NOT true about TG?

There exists exactly one path for certain string (Page 19)

There may exist more than one paths for certain string

There may exist no path for certain string

There may be no final state

Question # 6 of 10 (Total Marks: 1)

Select correct option:

Kleene's theorem states

All representations of a regular language are equivalent.

All representations of a context free language are equivalent.

All representations of a recursive language are equivalent

Finite Automata are less powerful than Pushdown Automata. (Page 105)

Question # 7 of 10 (Total Marks: 1)

Select correct option:

A language accepted by an FA is also accepted by

TG only

GTG only

RE only

All of the given (Page 25)

جھوٹ رزق کو کھا جاتا ہے

Quiz No. 4

Question # 1 of 10 (Total Marks: 1)

Select correct option:

Consider the Following CFG: (NOTE: ^ means NULL) $S \rightarrow Xa$ $X \rightarrow aX|bX|^\wedge$
above given CFG can be represented by RE _____

a^*b^*

a^*b^*a

$(a+b)^*a$

$a(a+b)^*a$

Question # 2 of 10 (Total Marks: 1)

Select correct option:

Identify FALSE statement:

Every Regular Expression be expressed by CFG and every CFG can be expressed by a Regular Expression (Page 97)

Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression.
For a PDA, there exists a CFG, that represents the same language as represented by PDA.
None of the given options

Question # 3 of 10 (Total Marks: 1)

Select correct option:

Null production is a

Word

String

Terminal

All of the given options

Question # 4 of 10 (Total Marks: 1)

Select correct option:

In nondeterministic PDA a string is supposed to be accepted, if there exists at least one path traced by the string, leading to _____ state.

ACCEPT (Page 111)

REJECT

START

READ

افضل انسان وہ ہے جو اپنی اصلاح کی کوشش کرتا ہے

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Question # 5 of 10 (Total Marks: 1) Select correct option:

The CFG which generates the regular language is called

Regular expression

Finite Automata

Regular grammar (Page 97)

None of the given options

Question # 6 of 10 (Total Marks: 1) Select correct option:

If a CFG has a null production, then it is possible to construct another CFG accepting the same language without null production

TRUE (Page 99)

FALSE

CS402 – Quiz No.2 (15 Jun 2013)

Question # 1 of 10 (Total Marks: 1) Select correct option

In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

Always easy

Impossible (Page 81)

may be good

always impossible

Question # 2 of 10 (Total Marks: 1) Select correct option

If there is no final state of two FAs then their _____ also have no _____ state

initial, union

final, union

union,final (Page 83)

union, initial

Question # 3 of 10 (Total Marks: 1) Select correct option

Set of all palindromes over {a,b} is:

Regular

Regular and finite

Regular and infinite

Non-regular (Page 71)

Question # 4 of 10 (Total Marks: 1) Select correct option

In the context of Myhill Nerode theorem, for even-even language sigma star can be partitioned into _____ number of classes.

3

4 (Page 77)

5

6

Question # 5 of 10 (Total Marks: 1) Select correct option

The product of two regular languages is _____.

Regular (Page 78)

infinite

non-regular

closure of a regular language

Question # 6 of 10 (Total Marks: 1) Select correct option

If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

accept all

accept no (Page 85) rep

accept some

reject no

Question # 7 of 10 (Total Marks: 1) Select correct option

An FA has same initial and _____ state, then it means that it has no _____ state.

initial, final

final, initial

initial, initial

none of the given options

Question # 8 of 10 (Total Marks: 1) Select correct option

A problem that has decision procedure is called _____ problem.

Regular language

un-decidable

Infinite

Decidable (Page 80)

اطمینان قلب چاہتے ہو تو حسد سے دور رہو

Question # 9 of 10 (Total Marks: 1) Select correct option

For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters, is_____.

Select correct option:

$N^m + N^{m+1} + N^{m+2} + \dots + N^{2m-1}$

$m^N + m^{N+1} + m^{N+2} + \dots + m^{2N-1}$ (Page 86)

N^m

m^N

Question # 10 of 10 (Total Marks: 1) Select correct option

If $(L1 \cap L2^c) \cup (L1^c \cap L2)$ is regular language that accepts the words which are in L1 but not in L2 or else in L2 but not in L1 . The corresponding FA cannot accept any word which is in _____ L1 and L2.

Not both

Both (Page 80)

At least in one

None of the given options

Question # 1 of 10 (Total Marks: 1) Select correct option

While determining regular expression for a given FA, it is _____ to write its regular expression.

Always possible easily

Sometime impossible (Page 80)

always impossible

None of the given options

Question # 2 of 10 (Total Marks: 1) Select correct option

Incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates_____ number of classes.

infinite

specified

finite (Page 75)

odd

ہر چیز کی ایک پہچان ہوتی ہے اور عقلمند کی پہچان غور و فکر کرنا ہے اور غور و فکر کی پہچان خاموشی ہے

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 Proude To Be Virtulian MOAAZ SIDDIQ	CS402- Theory of Automata Solved Subjective From Final term Papers	Feb 14,2013
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FINAL TERM EXAMINATION Spring 2012 CS402- Theory of Automata

What is the concept of the Union of FA's ?

Answer:- (Page 32)

FA3 be an FA corresponding to $r_1 + r_2$, and then the initial state of FA3 must correspond to the initial state of FA1 and the initial state of FA2.

What does mean the LANGUAGE IS CLOSED?

Answer:- (Page 90)

Closed w.r.t. concatenation i.e. the language expressed by RE of type r^* .

Stack consistence means that in the PDA?

Answer:- (Page 123)

when a row pops a character it should be there at the top of the STACK

-Where Null string is use the most?

Answer:-

The choice of null string depends on the requirements of the language. In some case we need to have null string to be accepted by the FA.

PUSHDOWN AUTOMATON (PDA)?

Answer:- (Page 119)

PUSHDOWN STACK or PUSHDOWN STORE

PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column.

Initially the STACK is supposed to be empty i.e. each of its storage location contains a blank.

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

Prefixes of a language in another language?

Answer:- (Page 78)

Prefixes of a language in another language

If two languages R and Q are given, then the language the prefixes of Q in R denoted by $\text{Pref}(Q \text{ in } R)$ is the set of strings of letters that, when concatenated to the front of some word in Q to produce some word in R i.e.

$\text{Pref}(Q \text{ in } R)$ = the set of all strings p such that there exists words q in Q and w in R such that $pq = w$. Following are the examples in this regard

Example

Let $Q = \{aa, abaaabb, bbaaaaa, bbbbbb, bbbbbb\}$ and $R = \{b, bbbb, bbbbaaa, bbbbaaaaa\}$

It can be observed that aa and bbaaaaa occur at the ending parts of some words of R, hence these words help in defining the language $\text{pref}(Q \text{ in } R)$. Thus $\text{pref}(Q \text{ in } R) = \{b, bbba, bbbbaaa\}$

Conversion form of PDA?

Answer:- (Page 119)

Conversion form of PDA

A PDA is in conversion form if it fulfills the following conditions:

There is only one ACCEPT state.

There are no REJECT states.

Every READ or HERE is followed immediately by a POP i.e. every edge leading out of any READ or HERE state goes directly into a POP state.

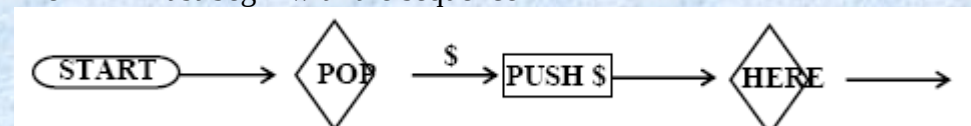
No two POPs exist in a row on the same path without a READ or HERE between them whether or not there are any intervening PUSH states (i.e. the POP states must be separated by READs or HEREs).

All branching, deterministic or nondeterministic occurs at READ or HERE states, none at POP states and every edge has only one label.

Even before we get to START, a "bottom of STACK" symbol \$ is placed on the STACK. If this symbol is ever popped in the processing it must be replaced immediately. The STACK is never popped beneath this symbol.

Right before entering ACCEPT this symbol is popped out and left.

The PDA must begin with the sequence



The entire input string must be read before the machine can accept the word.

Is automata is a programming subject or theoretical ??? marks 3

Answer:-

In theoretical computer science, automata theory is the study of mathematical objects called abstract machines or automata and the computational problems that can be solved using them. Automata mean "self-acting".

Automata theory is also closely related to formal language theory. An automaton is a finite representation of a formal language that may be an infinite set. Automata are often classified by the class of formal languages they are able to recognize.

بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

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Parsing Techniques (5 number)

Answer:- (Page 136)

Recall the CFG for arithmetic expression

$S \rightarrow S+S | S*S | \text{number}$

It was observed that the word $3+4*5$ created ambiguity by considering its value either 23 or 35. To remove this ambiguity, the CFG was modified to $S \rightarrow (S+S) | (S*S) | \text{number}$

There arises a question that whether a new CFG can be defined without having parentheses with operator hierarchy (i.e. * before +)? The answer is yes. Following is the required PLUS TIMES grammar $S \rightarrow E$, $E \rightarrow T+E | T$, $T \rightarrow F*T | F$, $F \rightarrow (E) | i$

Where i stands for any identifier i.e. number or of storage location name (variable). Following is the derivation of $i+i*i$

$S \Rightarrow E$

$\Rightarrow T+E$

$\Rightarrow F+E$

$\Rightarrow i+E$

$\Rightarrow i+T$

$\Rightarrow i+F*T$

$\Rightarrow i+i*T$

$\Rightarrow i+i*F$

$\Rightarrow i+i*i$

-What are live and dead productions. (5 number)

Answer:- (Page 127)

Live production: A production of the form nonterminal $\rightarrow$ string of two nonterminals is called a live production.

Dead production: A production of the form nonterminal $\rightarrow$ terminal is called a dead production.

FINAL TERM EXAMINATION

Spring 2012

CS402- Theory of Automata

1: How can we define languages elaborate any five ways.

Answer:- (Page 4)

Defining Languages

The languages can be defined in different ways, such as Descriptive definition, Recursive definition, using Regular Expressions (RE) and using Finite Automaton (FA) etc.

اللہ کا خوف سب سے بڑی دانائی ہے

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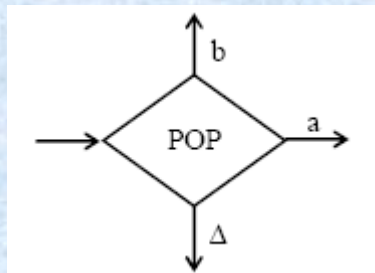
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2: Describe the POP operation and draw symbol for POP state in context of Push down stack.

Answer:- (Page 107)

POP :

POP is an operation that takes out a letter from the top of the STACK. The rest of the letters are moved one location up. POP state is expressed as



3: Write two difference and two similarities between DFA and NFA.

Answer:- [Click here for detail](#)

Difference

1-In FA Finite number of states, having one initial and some (maybe none) final states. While in NFA Finite many states with one initial and some final state. 2-In FA for each state and for each input letter there is a transition showing how to move from one state to another while in NFA there may be more than one transition for certain letters and there may not be any transition for certain letters. 3-In FA $\square$ is valid while in NFA $\square$ is not valid.

Common

Every Language that can be recognized by a DFA can also be recognized by a NFA. The reverse is True. Both DFA and NFA can only have one start state. But they can have multiple Final states. Finite set of input letters

FINALTERM EXAMINATION

Spring 2012

CS402- Theory of Automata

Concept of unit production in CFG? [3 marks]

Answer:- (Page 100)

The productions of the form nonterminal $\rightarrow$ one nonterminal, is called the unit production. Unit production is removed in CFG

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

While converting mealy to Moore num of states remain same or not? justify [5]

Answer:- (Page 61)

Theorem

Statement

For every Mealy machine there is a Moore machine that is equivalent to it (ignoring the extra character printed the Moore machine).

Proof

Let M be a Mealy machine. At each state there are two possibilities for incoming transitions

The incoming transitions have the same output character.

The incoming transitions have different output characters.

If all the transitions have same output characters, then shift that character to the corresponding state.

If all the transitions have different output characters, then the state will be converted to as many states as the number of different output characters for these transitions, which shows that if this happens at state q then q will be converted to q_1 and q_2 i.e. if at q_i there are the transitions with two output characters then q_{i1} for one character and q_{i2} for other character.

Shift the output characters of the transitions to the corresponding new states q_1 and q_2 . Moreover, these new states q_1 and q_2 should behave like q as well. Continuing the process, the machine thus obtained, will be a Moore machine equivalent to Mealy machine M.

FINAL TERM EXAMINATION
Spring 2012
CS402- Theory of Automata

Consider the language L which is EVEN-EVEN, defined over $\Sigma = \{a,b\}$. In how many classes does L may partition Σ^* . Explain briefly.(Marks 3)

Answer:- (Page 77)

Consider the language L which is EVEN'EVEN, defined over $\Sigma = \{a,b\}$. It can be observed that L partitions Σ^* into the following four classes

C1= set of all strings with even number of a's and odd number of b's.

C2= set of all strings with odd number of a's and odd number of b's.

C3= set of all strings with odd number of a's and even number of b's.

C4= set of all strings with even number of a's and even number of b's.

Q.3: What does mean the LANGUAGE IS CLOSED?(Marks 3)

Answer:- Rep

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

Q7: If two FA have no final state how the intersection of those FA will have final state? (marks 2)

Answer:- (Page 83)

If Both the FAs have no final state, so these FAs accept nothing. This implies that their union will not also accept any string. Hence FA corresponding to the language $(L1 \cap L2^c) \cup (L1^c \cap L2)$ accepts nothing. Thus both the languages are equivalent.

Q:8 give RE for EVEN - EVEN language. (Marks 2)

Answer:- (Page 16)

Consider the EVEN) EVEN language, defined over $\Sigma = \{a, b\}$. As discussed earlier that EVEN)EVEN language can be expressed by the regular expression $(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^* b$

use of push and pop states

Answer:- (Page 107)

A PUSH operator adds a new letter at the top of STACK,

POP is an operation that takes out a letter from the top of the STACK. The rest of the letters are moved one location up.

FINAL TERM EXAMINATION

Spring 2012

CS402- Theory of Automata

Write point of kleene's theorem? 2marks

Answer:- (Page 25)

Kleene's Theorem

If a language can be expressed by

FA or

TG or

RE

Then it can also be expressed by other two as well.

It may be noted that the theorem is proved, proving the following three parts

Kleene's Theorem Part I

If a language can be accepted by an FA then it can be accepted by a TG as well.

Kleene's Theorem Part II

If a language can be accepted by a TG then it can be expressed by an RE as well.

Kleene's Theorem Part III

If a language can be expressed by a RE then it can be accepted by an FA as well.

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

What is meant by decidable problem? 2marks

Answer:- (Page 80)

Decidable problem

A problem that has decision procedure is called decidable problem e.g. the following problems

The two regular expressions define the same language.

The two FAs are equivalent.

Define strings. With example. 3marks

Answer:- (Page 3)

Concatenation of finite number of letters from the alphabet is called a string.

Write regular expression contain even words defined over $\Sigma = \{a, b\}$ 3marks

Answer:- (Page 9)

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

Find Pref (Q in R) for:

$Q = \{10, 11, 00, 010\}$

$R = \{01001, 10010, 0110, 10101, 01100, 001010\}$ 3 marks

Answer:-

$\text{Pref}(Q \text{ in } R) = \{10, 01, 011, 001\}$

Explain Semi word and word with example?

Answer:- (Page 97)

Semiword

A semiword is a string of terminals (may be none) concatenated with exactly one nonterminal on the right i.e. a semiword, in general, is of the following form

$(\text{terminal})(\text{terminal}) \cdots (\text{terminal})(\text{nonterminal})$

$S \rightarrow aaaaS$

word

A word is a string of terminals. Λ is also a word.

$S \rightarrow aaaa$

a) Write RE defined over $\Sigma = \{a, b\}$ strings not ending on aa, ab. 5marks

Answer:-

$(a+b)^*(ba+bb)$

b) Write RE defined over $\Sigma = \{a, b\}$ strings must end on aa,ab

Answer:-

$(a+b)^*(aa+ab)$

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

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What does mean the LANGUAGE IS CLOSED? 3marks

Answer:- Rep

Explain CFG and even-even language. 5marks

Answer:- (Page 87-90)

CFG

CFG is a collection of the followings

An alphabet Σ of letters called terminals from which the strings are formed, that will be the words of the language.

A set of symbols called non-terminals, one of which is S, stands for “start here” .

A finite set of productions of the form

Non-terminal $\rightarrow$ finite string of terminals and /or non-terminals.

Following grammar generates EVEN-EVEN language.

$\Sigma = \{a,b\}$

productions:

$S \rightarrow SS$

$S \rightarrow XS$

$S \rightarrow \Lambda$

$S \rightarrow YSY$

$X \rightarrow aa$

$X \rightarrow bb$

$Y \rightarrow ab$

$Y \rightarrow ba$

OR

Consider the following CFG

$S \rightarrow aaS|bbS|abX|baX|\Lambda$

$X \rightarrow aaX|bbX|abS|baS,$

The corresponding language is EVEN-EVEN.

Differentiate b/w FA, TG and GTG?

Answer:-

FA

A Finite automaton (FA), is a collection of the followings

Finite number of states, having one initial and some (maybe none) final states.

Finite set of input letters (Σ) from which input strings are formed.

Finite set of transitions i.e. for each state and for each input letter there is a transition showing how to move from one state to another.

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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TG

A Transition graph (TG), is a collection of the followings

Finite number of states, at least one of which is start state and some (maybe none) final states.

Finite set of input letters (Σ) from which input strings are formed.

Finite set of transitions that show how to go from one state to another based on reading specified substrings of input letters, possibly even the null string (Λ).

GTG

A generalized transition graph (GTG) is a collection of three things

Finite number of states, at least one of which is start state and some (maybe none) final states.

Finite set of input letters (Σ) from which input strings are formed.

Directed edges connecting some pair of states labeled with regular expression.

It may be noted that in GTG, the labels of transition edges are corresponding regular expressions

FINALTERM EXAMINATION

Fall 2011

CS402- Theory of Automata

1. Can we accept the string going from final to initial state?

Answer:- (Page 81)

NO...

To examine whether a certain FA accepts any words, it is required to seek the paths from initial to final state.

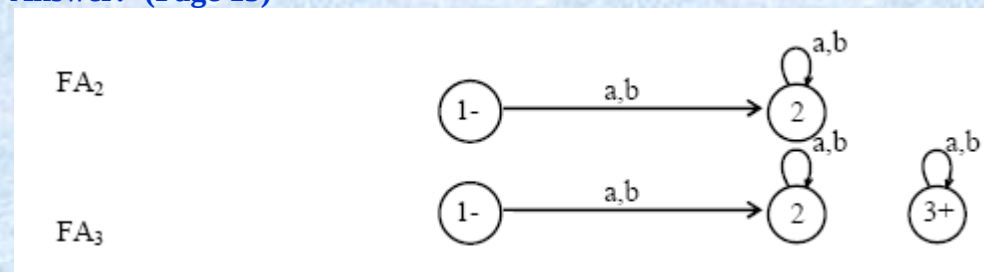
2. State uses of PDA in computing?

Answer:-

It provides theoretical basis for how computing machine can perform computation. It is used for constructing compiler parser design.

3. if there is no initial state in FA then that FA does not accept any language Discuss two situations when an FA does not accept any string not even the null string?

Answer:- (Page 15)



In FA₂, there is no final state and in FA₃, there is a final state but FA₃ is disconnected as the states 2 and 3 are disconnected.

4. Describe pop operation? and draw symbol for pop state in context of push down stack?

Answer:- Rep

5. Describe unit production in detail?

Answer:- Rep

6. Push and pop operation?

Answer:- Rep

7. Prove kleens theorem part two?

Answer:- (Page 25)

Kleene's Theorem Part II

If a language can be accepted by a TG then it can be expressed by an RE as well.

8. Difference between push down stack and push down store?

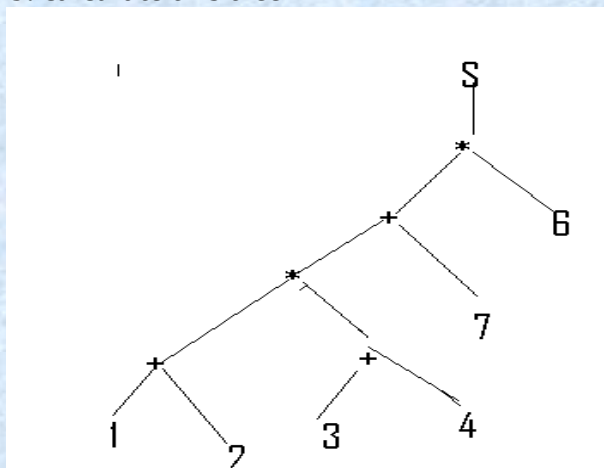
Answer:- (Page 107)

There is no difference between PUSHDOWN STACK or PUSHDOWN STORE

PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column.

Initially the STACK is supposed to be empty i.e. each of its storage location contains a blank.

9. calculate this tree



Answer:- (Page 95)

It can be written as $*+*+1\ 2+3\ 4\ 7\ 6$

The above arithmetic expression in (o'o'o) form can be calculated as

$$*+*+1\ 2+3\ 4\ 7\ 6 = *+*3+3\ 4\ 7\ 6$$

$$= *+*3\ 7\ 7\ 6 = *+21\ 7\ 6 = *28\ 6 = 168$$

خود کو تمہیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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10. Five conditions of PDA conversion?

Answer:- (Page 119)

A PDA is in conversion form if it fulfills the following conditions:

There is only one ACCEPT state.

There are no REJECT states.

Every READ or HERE is followed immediately by a POP i.e. every edge leading out of any READ or HERE state goes directly into a POP state.

No two POPs exist in a row on the same path without a READ or HERE between them whether or not there are any intervening PUSH states (i.e. the POP states must be separated by READs or HEREs).

All branching, deterministic or nondeterministic occurs at READ or HERE states, none at POP states and every edge has only one label.

FINAL TERM EXAMINATION

Fall 2011

CS402- Theory of Automata

Q1: what is POP state and draw its diagram.

Answer:- Rep

Q6 : Consider the following CFG

S aXb|bXa

XaX|bX|

What does it mean?

Answer:- (Page 91)

The above CFG generates the language of strings, defined over $\Sigma = \{a,b\}$, beginning and ending in different letters.

Q7: Explain Distinguishable strings and Indistinguishable strings?

Answer:- (Page 53)

Distinguishable strings and Indistinguishable strings

Two strings x and y , belonging to Σ^* , are said to be **distinguishable** w.r.t a language $L \subseteq \Sigma^*$ if there exists a string z belonging to Σ^* s.t. $xz \in L$ but $yz \notin L$ or $xz \notin L$ but $yz \in L$.

Two strings x and y , belonging to Σ^* , are said to be **indistinguishable** with respect to a language $L \subseteq \Sigma^*$ if for every string z belonging to Σ^* , either both xz or $yz \in L$ or both don't belong to L .

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اُس سے ڈر کر بھاگتی ہے

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FINAL TERM EXAMINATION
Fall 2011
CS402- Theory of Automata

1. What is Row Language?

Answer:- (Page 123)

Row language whose alphabet is $\Sigma = \{\text{Row1, Row2, } \dots, \text{Row7}\}$ i.e. the alphabet consists of the letters which are the names of the rows in the summary table.

2. What does FA stands for?

Answer:- (Page 11)

Finite Automaton

3. What are live and dead productions.

Answer:- (Page 123)

Live production: A production of the form nonterminal $\rightarrow$ string of two nonterminals is called a live production.

Dead production: A production of the form nonterminal $\rightarrow$ terminal is called a dead production.

4. What do you mean by wanted and unwanted branches?

Answer:- (Page 137)

wanted branches (the branches that lead to the required word)

unwanted branches (the branches that don't lead to the required word)

5. Given the CFG, had to write the language (EQUAL)

Answer:- (Page)

$\Sigma = \{a, b\}$

productions:

$S \rightarrow aB$

$S \rightarrow bA$

$A \rightarrow a$

$A \rightarrow aS$

$A \rightarrow bAA$

$B \rightarrow b$

$B \rightarrow bS$

$B \rightarrow aBB$

This grammar generates the language EQUAL (The language of strings, with number of a 's equal to number of b 's).

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گرجاتا ہے

6. Construct corresponding CFG for the given language

(1) All words of even length but not multiple of 3.

Answer(page 90)

Example

$$\Sigma = \{a,b\}$$

productions:

$$S \rightarrow SS$$

$$S \rightarrow XS$$

$$S \rightarrow \Lambda$$

$$S \rightarrow YSY$$

$$X \rightarrow aa$$

$$X \rightarrow bb$$

$$Y \rightarrow ab$$

$$Y \rightarrow ba$$

This grammar generates EVEN'EVEN language.

(2) Palindrome (both even and odd palindrome). (5 mark)

Answer(page 91)

Example

The CFG for odd length of Palindrom is given as:

$$S \rightarrow aSa \mid bSb \mid a \mid b$$

The CFG for even length of Palindrom is given as:

$$S \rightarrow aSa \mid bSb \mid aa \mid bb \mid \Lambda$$

7. Who invented Turing m/c

Answer:- (Page 140)

Alan Mathison Turing developed the machines called Turing machines.

8. Equivalent /non-equivalent langages

Answer:- (Page 80)

Determining whether the two languages are equivalent or not ?

If L_1 and L_2 are two regular languages, then they can be expressed by FAs. As shown earlier, L_1^c , L_2^c , $L_1 \cup L_2$, $L_1 \cap L_2$ are regular languages and the methods have already been developed to build their corresponding FAs. It can be observed that $(L_1 \cap L_2^c) \cup (L_1^c \cap L_2)$ is regular language that accepts the words which are in L_1 but not in L_2 or else in L_2 but not in L_1 . The corresponding FA cannot accept any word which is in both L_1 and L_2 i.e. if L_1 and L_2 are equivalent, then this FA accepts not even null string. Following are the methods that determine whether a given FA accepts any words

عقل مند اپنے عیب خود دیکھتا ہے اور بڑے قوفوں کے عیب دنیا دیکھتی ہے

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9. What are formal languages?

Answer:- (Page 3)

Formal Languages are Syntactic languages.

FINAL TERM EXAMINATION

Fall 2011

CS402- Theory of Automata

What is Transition?

Answer:- (Page 11)

Transition showing how to move from one state to another.

Alternative form of this production

$\Sigma = \{a,b\}$

productions:

$S \rightarrow aS \mid bS \mid a \mid b \mid \Lambda$

Answer:- (Page 88)

This grammar also defines the language expressed by $(a+b)^*$.

What is input Tap?

Answer:- (Page 105)

The part of an FA, where the input string is placed before it is run, is called the input TAPE.

The input TAPE is supposed to accommodate all possible strings. The input TAPE is partitioned with cells, so that each letter of the input string can be placed in each cell.

What is live production?

Answer:- Rep

Differentiate between Distinguishable and Indistinguishable strings.

Answer:- Rep

What is wanted and unwanted branches

Answer:- Rep

What is unit of production?

Answer:- Rep

بد صورت چہرہ بد صورت دماغ سے بہتر ہے

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Define two rules(Row Language.).

Answer:- (Page 125)

Following are the three rules of defining all possible productions of CFG of the row language
The trip starting from START state and ending in ACCEPT state with the NET style
Net(START, ACCEPT, \$) gives the production of the form $S \rightarrow \text{Net(START, ACCEPT, \$)}$

$(L1 \cup L2^c)$ intersection $(L1^c \cup L2)$ the language or accept any thing or not...

Answer:- (Page 80)

$(L1 \cap L2^c) \cup (L1^c \cap L2)$ is regular language that accepts the words which are in $L1$ but not in $L2$ or else in $L2$ but not in $L1$.

FINAL TERM EXAMINATION
Spring 2011
CS402- Theory of Automata

ambiguous grammer,

Answer:- (Page 95)

The CFG is said to be ambiguous if there exists atleast one word of it's language that can be generated by the different production trees.

Difference between semi-word and word with example?

Answer:- Rep

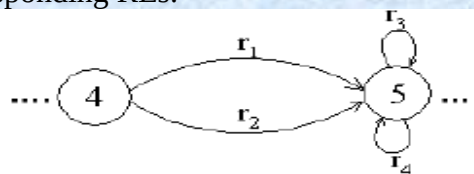
If there are more than one edges between two states then we can replace them by one edge in a TG.

Explain it with examples?

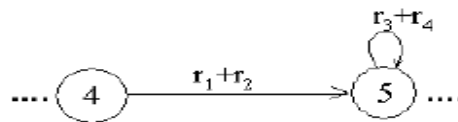
Answer:- (Page 27)

If a state has two (more than one) incoming transition edges labeled by the corresponding REs, from the same state (including the possibility of loops at a state), then replace all these transition edges with a single transition edge labeled by the sum of corresponding REs.

Example



The above TG can be reduced to



عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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How can you say that two FAs are equivalent?

Answer:- (Page 15)

It is to be noted that two FAs are said to be equivalent, if they accept the same language

What is a production?

Answer: - (Page 87)

Productions: The grammatical rules are often called productions.

FINALTERM EXAMINATION

Spring 2011

CS402- Theory of Automata

If L_1, L_2 and L_3 be any three finite languages over $\Sigma = \{a, b\}$, then how will be

$(L_1 \cap L_2) \cup (L_2 \cap L_3) \neq \emptyset$

Answer: -

$(L_1 \cap L_2) \cup (L_2 \cap L_3) \neq \emptyset$ is not always true. It depends on all the languages. If L_1 has some common words with L_2 or L_2 has some common words with L_3 , then this will not be equal to empty. However if L_1 does not have common words with L_2 or L_2 does not have common words with L_3 then this statement will be wrong.

FINALTERM EXAMINATION

Spring 2011

CS402- Theory of Automata

two different method for converting the NFA to FA 5marks

Answer: - (Page 43)

Method 1: Since an NFA can be considered to be a TG as well, so a RE corresponding to the given NFA can be determined (using Kleene's theorem). Again using the methods discussed in the proof of Kleene's theorem, an FA can be built corresponding to that RE. Hence for a given NFA, an FA can be built equivalent to the NFA

Method 2: Since in an NFA, there may be more than one transition for a certain letter and there may not be any transition for certain letter, so starting from the initial state corresponding to the initial state of given NFA, the transition diagram of the corresponding FA, can be built introducing an empty state for a letter having no transition at certain state and a state corresponding to the combination of states, for a letter having more than one transitions

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

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Explain the decidability and examples. 5marks

Answer: - (Page 80)

Decidability

Effectively solvable problem

A problem is said to be effectively solvable if there exists an algorithm that provides the solution in finite number of steps e.g. finding solution for quadratic equation is effectively solvable problem, because the quadratic formula provides an algorithm that determines the solution in a finite number of arithmetic operations, (four multiplications, two subtractions, one square root and one division).

similarity and dif b/w DFA and NFA 3 marks

Answer: - Rep

RE for Even-even 2 marks

Answer: - (Page 10)

$(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$

FINAL TERM EXAMINATION

Fall 2010

CS402- Theory of Automata

Question No: 27 (Marks: 2)

Differentiate between Regular and Non regular languages?

Answer: - (Page 10 & 71)

The language generated by any regular expression is called a regular language.

The language that cannot be expressed by any regular expression is called a Nonregular language.

Question No: 28 (Marks: 2)

What is meant by a "Transition" in FA?

Answer: - Rep

Question No: 29 (Marks: 2)

What are the halt states of PDAs?

Answer: - (Page 105)

ACCEPT and REJECT states are called the halt states.

Reject state is like dead non final state.

Accept state is like final state.

خوبصورتی علم و ادب سے ہوتی ہے لباس و حسن سے نہیں

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Question No: 30 (Marks: 2)

Identify the null productions and nullable productions from the following CFG:

$S \rightarrow ABAB$

$A \rightarrow a \mid \Lambda$

$B \rightarrow b \mid \Lambda$

Answer: - (Page 102)

Here $S \rightarrow ABAB$ is nullable production and $A \rightarrow \Lambda$, $B \rightarrow \Lambda$ are null productions.

Question No: 31 (Marks: 3)

Describe the POP operation and draw symbol for POP state in context of Push down stack.

Answer: - Rep

Question No: 32 (Marks: 3)

What does the the following tape of turing machine show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
READ ₉	READ ₃	b	b	abb	11

Answer: - (Page 124)

Row11 is not Net style sentence because the trip from READ₉ to READ₃ does not pop one letter from the STACK, while it adds two letters to the STACK. However Row11 can be concatenated with some other Net style sentences e.g. Row11Net(READ₃, READ₇, a)Net(READ₇, READ₁, b)Net(READ₁, READ₈, b) Which gives the nonterminal.

Net(READ₉, READ₈, b), now the whole process can be written as

Net(READ₉, READ₈, b) $\rightarrow$ Row11Net(READ₃, READ₇, a) Net(READ₇, READ₁, b)Net(READ₁, READ₈, b)

Which will be a production in the CFG of the corresponding row language.

Question No: 33 (Marks: 3)

Find Pref (Q in R) for:

$Q = \{10, 11, 00, 010\}$

$R = \{01001, 10010, 0110, 10101, 01100, 001010\}$

Answer: - Rep

Question No: 35 (Marks: 5)

Consider the language L which is EVEN-EVEN, defined over $\Sigma = \{a,b\}$. In how many classes does L may partition Σ^* . Explain briefly.

Answer: - Rep

Question No: 36 (Marks: 5)

What are the conditions (any five) that must be met to know that PDA is in conversion form?

Answer: - Rep

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CS402 Theory of Automata

Question No : 19 of 38

In PDA, an alphabet of STACK characters is represented by the symbol _____

Answer (Please select your correct option)

☐ Σ

☐ Γ

☐ $\$$

☐ Δ

Start Time: 11:36 AM

85:00

Time Left



A language can be represented by _____ RE / RE(s).

Answer (Please select your correct option)

☐ more than one

☐ only one

☐ only two

☐ only three

Start Time: 11:36 AM

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Λ is not a valid transition in _____

Answer (Please select your correct option)

☐

TG

☐

GTG

☐

NFA

☐

RE

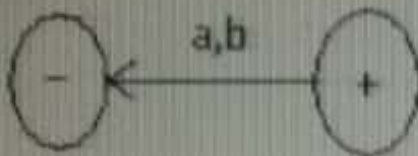
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Which language will be accepted by the given Finite Automaton (FA) ?



Answer (Please select your correct option)

☐ Having equal number of a's and b's

☐ It does not accept any language

☐ Having double a's followed by double b's

☐ Having one 'a' and bbb

Start Time: 11:36 AM

85:00

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CS402 Theory of Automata

Question No : 24 of 38

A nonregular language, by _____ theorem, can't be accepted by any FA or TG.

Answer (Please select your correct option)

☐ Palindrome

☐ Associative

☐ Closure

☐ Kleene's

Start Time: 11:36 AM

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 Done Start VU Examination System

Question No : 25 of 38

What will be the Regular Expression for the following CFG?

$$S \rightarrow aX \mid bX$$

$$X \rightarrow a$$

$$X \rightarrow b$$

$$X \rightarrow \epsilon$$

Answer (Please select your correct option)

☐ ab☐ $(a+b)^*$ ☐ a^*b^* ☐ $(a+b)^+$

Question No : 27 of 38

In context of new format of 'FA' _____ state does not has outgoing edge(s).

Answer (Please select your correct option)

☐

Start

☐

Read

☐

Pop

☐

Accept

Start Time: 11:35 AM

84:00

Time Left



27

Done

Grammatical rules which are concerned with the structure is called _____

Answer (Please select your correct option)

☐ Semantic

☐ Non-terminal

☐ Syntax

☐ Terminal

Start Time: 11:35 AM

83:00

Time Left



CS402 Theory of Automata

Question No: 29 of 38

By applying method II of Equivalent languages, an FA accepts no string if _____

Answer (Please select your correct option)

☐ Final state is not marked

☐ Initial state is not marked

☐ Final state is marked

☐ None of the given

Start Time: 11:38 AM

84:00

Time Left



29

Done

Start VU Examination Syste...

What is meant by "productions" in the context of Context Free Grammar (CFG)? Give an example.

Answer (Please [click here](#) to Add Answer)



Time: 11:36 AM

2:00

Time Left



Question No : 35 of 38

Find $\text{Pref}(Q \text{ in } R)$ where $Q = \{ bbbb, bbbbaa, bba \}$ and $R = \{ aa, abaaabb, bbbbaa, bbbbbbbbbb \}$

Answer (Please [click here](#) to Add Answer)



CS402 Theory of Automata

Question No : 34 of 38

Identify the words which are accepted by the following CFG.

$S \rightarrow abA$

$A \rightarrow baB$

$B \rightarrow aA|bb$

1. $abbaababba$
2. $abbaabb$
3. $abbbaabb$
4. $abbaababb$
5. $abbaabaababb$

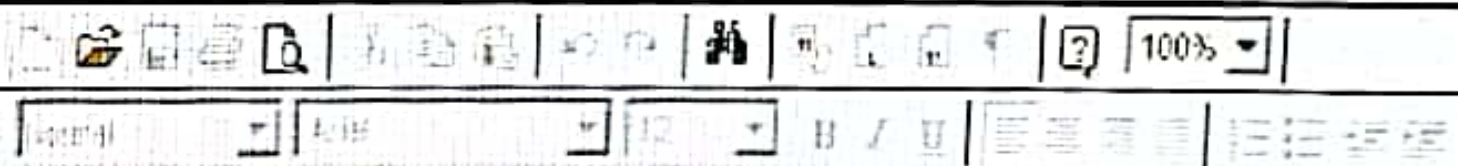
S402 Theory of Automata

Question No : 36 of 38

Develop corresponding Context Free Grammar (CFG) for the regular expression given below:

$a(a+b)^*b$

Answer ([Please click here to Add Answer](#))



CS402 Theory of Automata

Question No : 37 of 38

Draw an NFA which represents the following language.

$L = \{ \text{bab, abab, bbab, aabab, bbbab, abbab, babab} \dots \dots \dots \}$

Answer ([Please click here to Add Answer](#))



Kleene star closure is a _____ operation.

Answer (Please select your correct option)



unary



binary



tertiary



multiplicative

Start Time: 11:35 AM

89:00

Time Left



Question No : 3 of 38

If a language L accepts all words of odd length then L^c will accept _____.

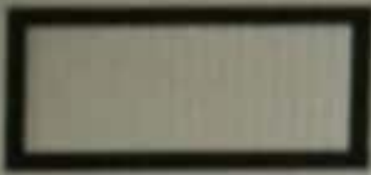
Answer (Please select your correct option)

☐ Infinite number of words

☐ All words of prime length

☐ All words of odd length

☐ All words of even length



Above symbol is used for _____ state in PDA.

Answer (Please select your correct option)

Pop



Reject



Push



Read



Start Time: 11:36 AM

87:00

Time Left



Before the CFG corresponding to any PDA is determined, the PDA should be converted into _____

Answer (Please select your correct option)

☐ Conversion Form

☐ Turing Machine

☐ Regular Expression

☐ Chomsky Normal Form

Start Time 11:36 AM

87:00

Time Left



Pumping lemma divides a string into _____ parts.

Answer (Please select your correct option)

☐ one

☐ two

☐ three

☐ four

Start Time: 11:38 AM

87:00

Time Left



Done

Start

VU Examination System

A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by _____ production tree(s)

Answer (Please select your correct option)

☐ more than one

☐ at least one

☐ one

☐ At most one

Start Time : 11:38 AM

87:00

Time Left



Done

Question No : 15 of 38

The process of finding the derivation of word generated by particular grammar is called _____

Answer (Please select your correct option)

☐ Processing

☐ Parsing

☐ Programming

☐ Planning

Start Time: 11:35 AM

86:00

Time Left



15

Done

Start VU Examination System

Question No : 13 of 38

The CFG $S \rightarrow aSa \mid bSb \mid a \mid b \mid \epsilon$ represents the language _____.

Answer (Please select your correct option)

☐ PALINDROME

☐ EQUAL

☐ ODD-ODD

☐ EVEN-EVEN

Start Time: 11:38 AM

86:00

Time Left



Question No : 16 of 38

The language of Palindromes defined over an alphabet set $\{a,b\}$ can be recognized by _____

Answer (Please select your correct option)

☐ FA

☐ NFA

☐ TG

☐ PDA

Start Time : 1:35 AM

86:00
Time Left



Question No : 18 of 38

The structure given below is called _____.

$$S \rightarrow aA|bB$$
$$A \rightarrow aS|a$$
$$B \rightarrow bS|b$$

Answer (Please select your correct option)

☐

RE

☐

CFG

☐

FDA

☐

TG

Start Time: 11:35 AM

86:00

Time Left



Question No : 14 of 38

If an FA has N states then it must accept the word of length _____

Answer (Please select your correct option)

☐ $N-1$

☐ $N+1$

☐ N

☐ $2N$

Start Time: 11:35 AM

86:00

Time Left



S402 Theory of Automata

Question No : 17 of 38

Let $A = \{0, 1\}$. The number of possible strings of length 'n' that can be formed by the elements of the set A is _____

Answer (Please select your correct option)

☐ $n!$

☐ n^2

☐ n^n

☐ 2^n

Start Time: 11:38 AM

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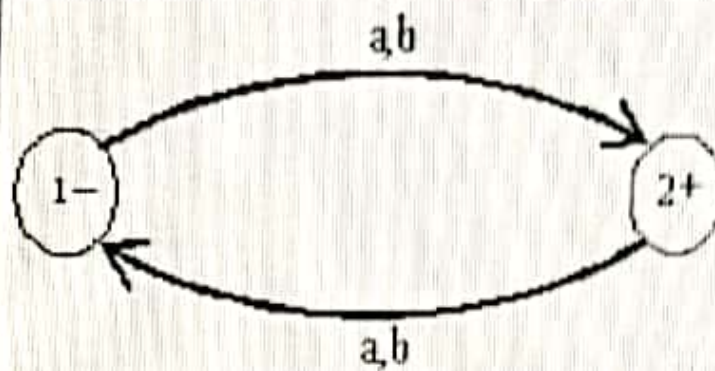
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17

Question No : 12 of 38

Below given FA accepts the string _____.



Answer (Please select your correct option)

☐ abbb

☐ abab

☐ aaab

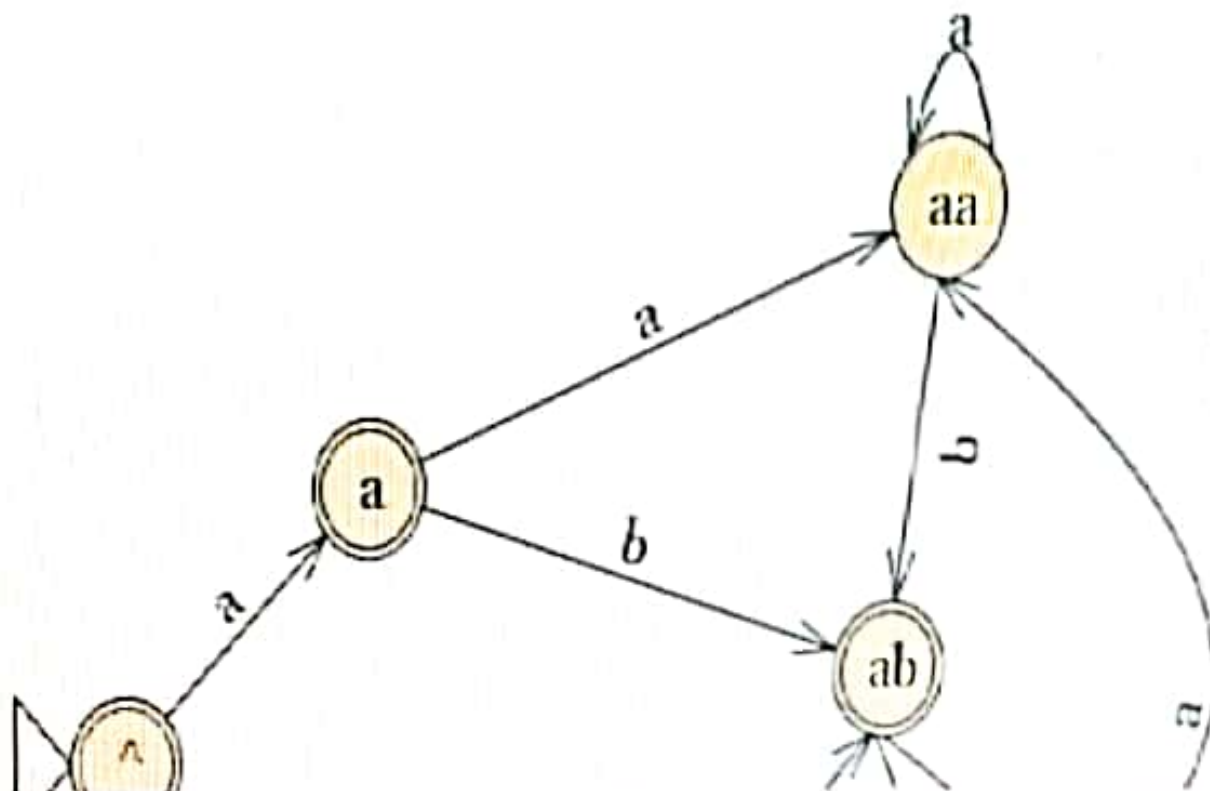
☐ aaa

Done

Start VU Examination System

Question No : 10 of 38

Below FA is drawn using _____ structure.



Answer (Please select your correct option)

graph

tree

simple

complex

Question No : 8 of 38

In Row Language, CFG is introduced in the form $Net(A, B, C)$, where A and B are _____ and C is _____

Answer (Please select your correct option)

- ☐ stack characters, joint
- ☐ pop characters, joint
- ☐ joints, stack character
- ☐ joints, push character

Start Time: 11:35 AM

87:00

Time Left



Left hand side of a production in Context Free Grammar (CFG) consists of _____

Answer (Please select your correct option)

- ☐ more than one terminal
- ☐ one non-terminal
- ☐ terminals and non-terminals
- ☐ one terminal

Start Time: 11:38 AM

87:00

Time Left



5

Done

Start VU Examination System

CS402 Theory of Automata

Question No : 4 of 30

Can a turing machine's head ever be in the same location in two successive steps?

Answer (Please select your correct option)

☐ Yes

☐ Yes but only in finite languages

☐ No

☐ Yes but only in infinite languages

Start Time: 11:32 AM

87:00

Time Left



4

Done

Start VU Examination Syste...

There can be more than _____ FA for a certain language but for _____ FA there is only one language associated with it.

Answer (You must select your correct options)

one, one

☐

one, two

☐

two, three

☐

two, one

☐

Start Time: 11:36 AM

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Time Left



2

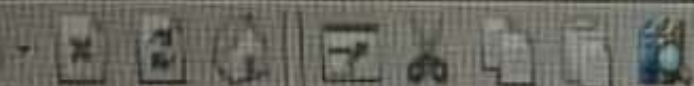


Consider the language L of string, defined over $\Sigma = \{0,1\}$, having double 0's or double 1's. What are the strings that cannot be accepted by this language?

Answer ([Please click here to Add Answer](#))

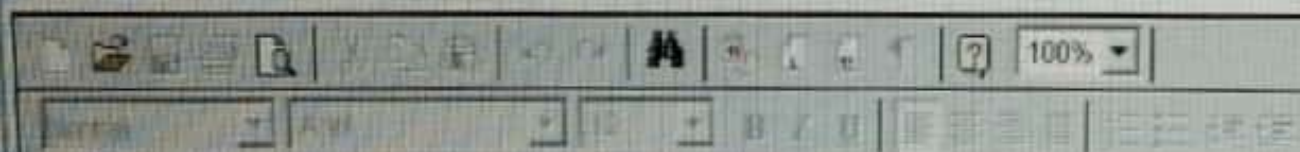


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Address: <http://server/vutes/client/Paper.aspx>**5402** Theory of Automata

Question No : 38 of 38

Explain any two rules to define all possible productions of Context Free Grammar (CFG) of "Row language".

Answer ([Please click here to Add Answer](#))

Start Time: 11:38 AM

80:00

Time Left



38

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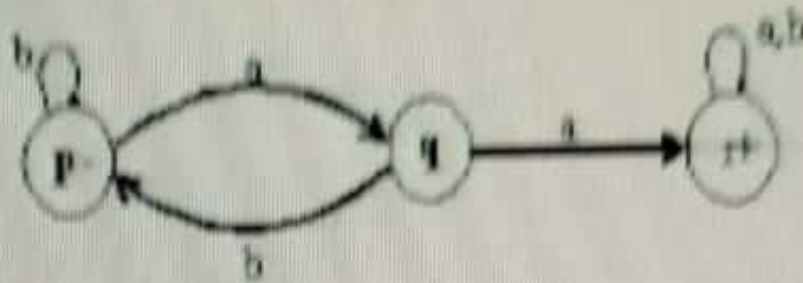
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Start VU Examination System...

CS402 Theory of Automata

Question No : 31 of 38

Draw the complement for the following FA.



Answer ([Please click here to Add Answer](#))



The language Q is said to be quotient of two regular languages P and R , denoted by _____.

Answer (Please select your correct option)

☐ $Q = R/P$ if $P/Q = R$

☐ $Q = R/P$ if $PQ = R$

☐ $Q = R * P$ if $PQ = R$

☐ $Q = R + P$ if $P^*Q = R$

Start Time: 11:36 AM

28

84:00



Time Left

Done

What will be the Regular Expression for the following CFG?

$S \rightarrow aX, bX$

$X \rightarrow a$

$X \rightarrow b$

$X \rightarrow a^*$

Answers (Please select your correct option)

☐ a^*

☐ a^*b^*

☐ a^*b^*

☐ a^*b^*

Question No : 26 of 38

A production of the form nonterminal $\rightarrow$ terminal is called a _____.

Answer (Please select your correct option)

☐ Dead Production

☐ Live Production

☐ Empty Production

☐ Waste Production

Start Time: 11:38 AM

84:00

Time Left



Done

Start

VU Examination Syste...

We can have more than one parse tree for a given string in case of _____ Context Free Grammar (CFG).

Answer (Please select your correct option)

☐ complicated

☐ ambiguous

☐ lazy

☐ simple

Start Time: 11:35 AM

85:00

Time Left



CS402 - THEORY OF AUTOMATA

FINAL TERM EXAMINATION

SPRING 2007

Question No: 1 (Marks: 1) - Please choose one

PDA is only used to represent a regular language.

- ▶ True
- ▶ False

Question No: 2 (Marks: 1) - Please choose one

If L is a regular language then L^C is also a regular language.

- ▶ True
- ▶ False

Question No: 3 (Marks: 1) - Please choose one

A production of the form non-terminal $\Rightarrow$ string of two non-terminal is called a live Production.

- ▶ True
- ▶ False

Question No: 4 (Marks: 1) - Please choose one

we can find a CFG corresponding to a DFA.

- ▶ True
- ▶ False

Question No: 5 (Marks: 1) - Please choose one

START, READ, HERE and ACCEPTS are conversions of the machine

- ▶ True
- ▶ False

Question No: 6 (Marks: 1) - Please choose one

A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees

- ▶ True
- ▶ False

Question No: 7 (Marks: 1) - Please choose one

Syntax tree or Generation tree or Derivation tree are same

tree ► True

► False

Question No: 8 (Marks: 1) - Please choose one

The symbols that cannot be replaced by anything are called terminals

► True

► False

Question No: 9 (Marks: 1) - Please choose one

The production of the form non-terminal $\Rightarrow$ one non-terminal is called unit production

► True

► False

Question No: 10 (Marks: 1) - Please choose one

DFA and PDA are equal in power.

► True

► False

Question No: 11 (Marks: 10)

a) Define Describe the following terms: [Note: maximum in 20 to 30 words for each]

I. CNF

II. Regular Grammar

b) Convert the following CFG into

CNF $S \rightarrow CDCD$

$C \rightarrow 0|\wedge$

$D \rightarrow 1|\wedge$

Question No: 12 (Marks: 10)

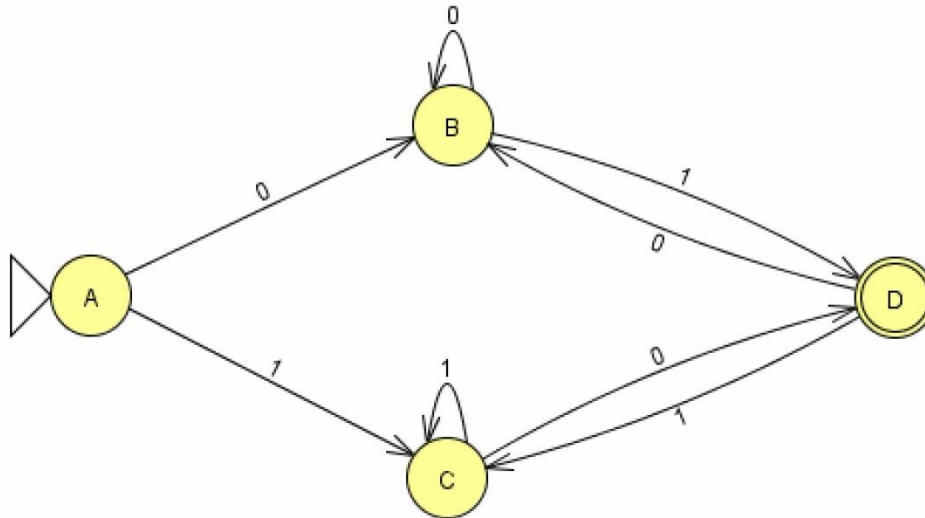
- a) Construct RE's for following languages over $\Sigma = \{0, 1\}$ (6)
- All words in which "1" never follows "0". ("0" never appears before "1")
 - All words which begin and end with different letters.

- b) How many minimum states can be there in an NFA of language having all word with "101" at the end? (4)

HINT: Build NFA for language for yourself but write only number of minimum states. No need to build NFA in software.

Question No: 13 (Marks: 10)

a) Is this an FA or NFA? (2)



b) Determine the CFG corresponding to the above FA or NFA (8)

Question No: 14 (Marks: 10)

a) Given CFG (Context Free Grammar): (6)

$S \rightarrow bS \mid aX \mid \Lambda$

$X \rightarrow aX \mid bY \mid \Lambda$

$Y \rightarrow aX \mid \Lambda$

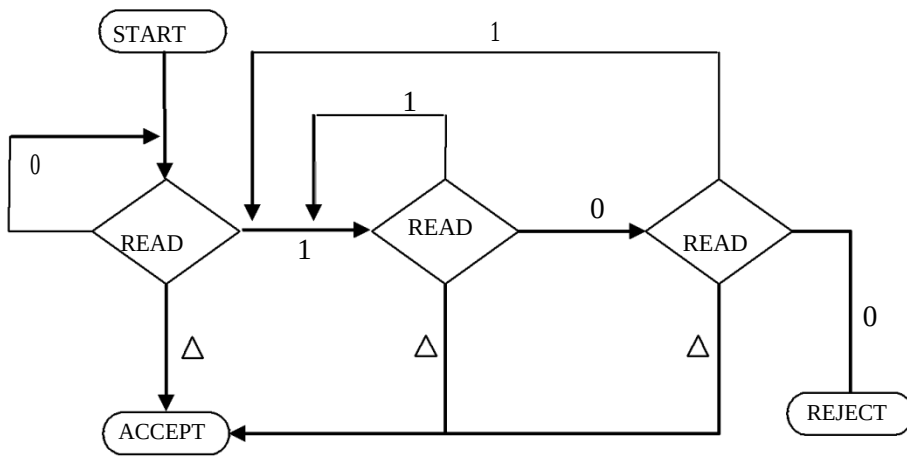
Derive following strings from above CFG. Show all steps. If string cannot be derived then describe it.

i. baabab

ii. ababaab

b) Describe language of following PDA (Push Down Automata): (4)

[Note: Don't write more than two to three lines for each. Only write to the point.]



Question No: 15 (Marks: 5)

Given a CFG below,

[5]

$S \rightarrow bS \mid aM$

$M \rightarrow bM \mid aF$

$F \rightarrow bF \mid aM \mid \wedge$

What is language accepted by above CFG?

CS402- Theory of Automata

Final Term Examination – Spring 2005

Time Allowed: 150 Minutes

www.vuzs.net/

Instructions

Please read the following instructions carefully before attempting any question:

1. This examination is closed book, closed notes, closed neighbors.
2. Answer all questions.
 - a. There is no choice.
 - b. You will have to answer correctly all questions in this examination to get the maximum possible marks.
3. Do not ask any questions about the contents of this examination from anyone.
 - a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
 - b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
4. You are allowed to use any Software for Diagrams and Symbols like MS Word, MathType and Visio etc.

****WARNING: Please note that Virtual University takes serious note of unfair means. Anyone found involved in cheating will get an `F` grade in this course.**

Total Marks: 50

Total Questions: 09

Question No. 1

Marks : 02

A Total Language Tree has

- ☐ All languages over Σ
- ☐ All strings over Σ
- ☐ All words of all languages over Σ

- All words of one language over Σ

Question No. 2

Marks : 10

(a) Derive any two words of length 4 from the following CFG.

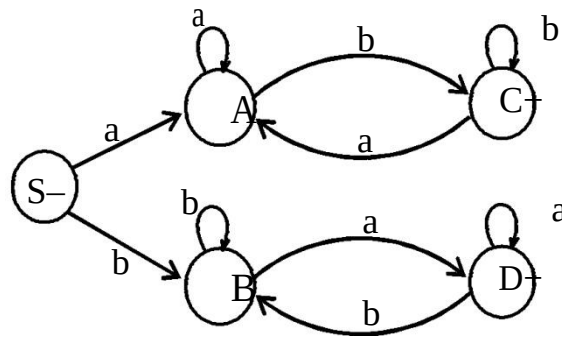
$S \rightarrow XaaX, X \rightarrow aX|bX|$

Write the corresponding RE as Well.

(5)

(b) Determine the CFG, corresponding to the following FA

(5)



Question No. 3

Marks : 02

What Turing Machine does not have?

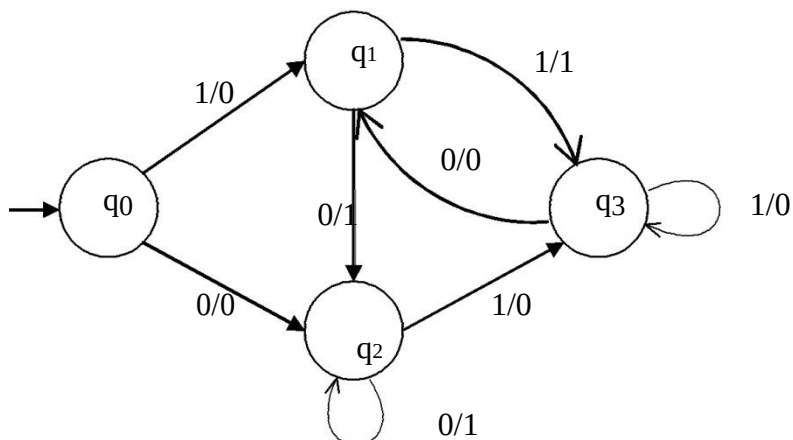
- Stack
- Tape
- Head
- Word

Question No. 4

Marks : 10

(a) Draw Moore Machine equivalent to following Mealy Machine.

(5)



(b) Use Pumping Lemma II to show that following language is non-regular.

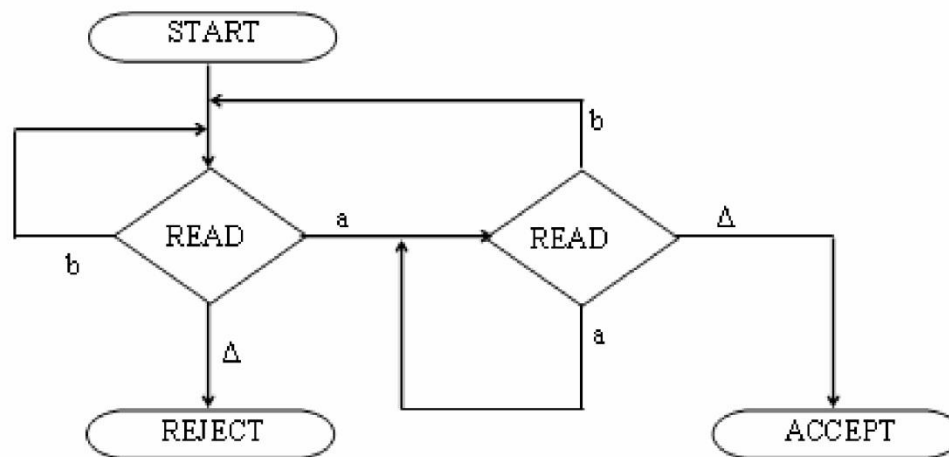
(5)

- i. Square (a^{n^2} , for $n = 1, 2, 3, \dots$)

Question No. 5

Marks : 10

Identify the language accepted by the following PDA. Build an FA accepting the corresponding language. Write the corresponding RE as well.



Question No. 6

Marks : 02

Two FAs represent same languages over some alphabet (may or may not be same for FAs), If

- ☐ They accept same words
- ☐ They accept same number of words
- ☐ They reject same words
- ☐ None of above

Question No. 7

Marks : 02

CFG given $S \rightarrow bS|Sb|aa$ represents language

- ☐ b^*aa
- ☐ aab^*
- ☐ b^*aab^*
- ☐ $b^*(aa)^*b^*$

Question No. 8

Marks : 10

a) Define the following terms

(6)

- i. Total language tree (TLT)
- ii. Ambiguous CFG.
- iii. Unit Production

(b) Find Context Free Grammar's (CFG's) for the following languages over the $\Sigma = \{a, b\}$.

(4)

- i. All the words that do not contain substring abb.
- ii. All the words that have exactly two or three b's.

Question No. 9

Marks : 02

A Language that is finite but not regular

- ☐ Λ
 - ☐ $(a+b)^*$
 - ☐ Φ
 - ☐ All strings of a's in $\Sigma = \{a, b\}$
-
-

CS402 Theory of Automata
Final Term Examination – Spring 2006
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Question No. 1

Marks : 1

A production of the form non-terminal $\Rightarrow$ non-terminal is called a dead Production.

1. True
2. False

Question No. 2

Marks : 3

Semi-word is a string having some terminals and one non-terminal at the right of string.

1. True
2. False

Question No. 3

Marks : 3

Two FAs are equivalent if they have same no. of states.

1. True
2. False

Question No. 4

Marks : 1

There exist exactly two different derivations in an ambiguous CFG for a word.

1. True
2. False

Question No. 5

Marks : 1

Construct RE's for following languages over $\Sigma = \{a, b\}$

- i. All words which contain substring "baba". [5]

- ii. All words which never end in substrings “aa” and “ab” [5]

Question No. 6

Marks : 1

Regular languages are closed under Union, Concatenation and Kleene star.

1. True
2. False

Question No. 7

Marks : 1

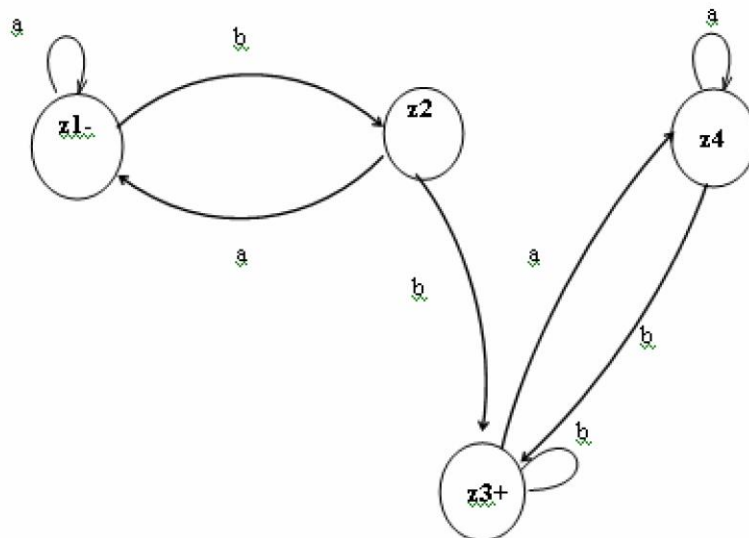
CFG may also represent a regular language.

1. True
2. False

Question No. 8

Marks : 1

Find the complement of the FA below,



Question No. 9

Marks : 1

PDA is stronger than

- FA. 3. True
4. False

Question No. 10

Marks : 3

Union of two FAs is an FA that accepts all the string of FA1 and FA2.

True

False

Question No. 11

Marks : 3

Given a CFG below,

- a) Remove Unit productions from the CFG. [5]

$$S \rightarrow S + T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow (S) \mid a$$

- b) Derive CNF corresponding to the CFG given below. [10]

$$S \rightarrow ABa$$

$$A \rightarrow aab$$

Question No. 12

Marks : 10

In non-deterministic PDA a string may be traced by more than one paths.

1. True
2. False

Question No. 13

Marks : 1

There always exist an FA for each PDA.

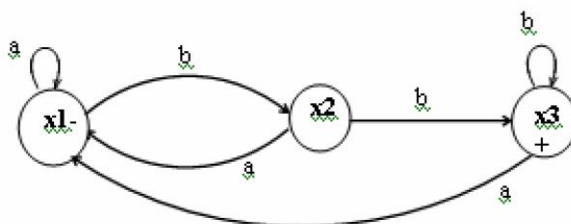
True

False

Question No. 14

Marks : 1

- a) Given an FA below, [5]



What is language accepted by above FA?

b) Draw a non-deterministic PDA for the above FA. [10]