

# VIRTUAL UNIVERSITY OF PAKISTAN

A Good Education is a Foundation For a Better Future

CORRECT ANSWER SOLVED BY HADI  
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## (Final Term Past Paper)

MADE AND SOLVED BY TEAM HADI

WARNING: Team HADI is not responsible for any mistake or wrong answer. All students reading and using this document may check and confirm the answers at their own.



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Best of luck!



Question No : 1 of 52

Marks: 1 (Budgeted Time 1 Min)

Which statement is true?

Answer ( Please select your correct option )

All words are strings



All strings are words

Both are always same

All letter are string

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Question No : 2 of 52

Marks: 1 (Budgeted Time 1 Min)

If  $L_1$  and  $L_2$  are expressed by  $r_1$  and  $r_2$ , respectively then the language expressed by  $(r_1)(r_2)$  will be \_\_\_\_\_

Answer ( Please select your correct option )

Regular

Ir-regular

Undermined

Such language does not exist

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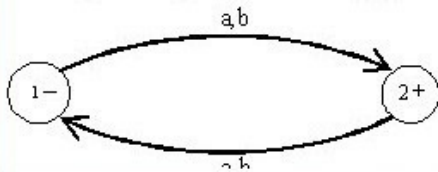
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Question No : 3 of 52

Marks: 1 (Budgeted Time 1 Min)

Below given FA generates the language having strings of \_\_\_\_\_



Answer ( Please select your correct option )

ODD length

conceptual  $RE=(a+b)((a+b)(a+b))^*$

EVEN length

Equal number of a's and b's

Odd number of a's and b's

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Question No : 4 of 52

Marks: 1 (Budgeted Time 1 Min)

If an FA accepts no string, then language is denoted by \_\_\_\_\_

Answer ( Please select your correct option )

$\{\}$

$\emptyset$

Both  $\{\}$  and  $\emptyset$

Null



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Question No : 5 of 52

Marks: 1 (Budgeted Time 1 Min)

Using tree structure, initial state can be represented by\_\_\_\_\_

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Answer ( Please select your correct option )

An arrow for J.C.Martin tree structure lec:7,page:18

+

- for simple tree structure lec:7,page:17

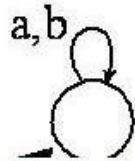
\*

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Question No : 6 of 52

Marks: 1 (Budgeted Time 1 Min)

Below given FA accepts \_\_\_\_\_ language.



Answer ( Please select your correct option )

Finite

page 17

Infinite

No

All

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Question No : 7 of 52

Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a \_\_\_\_\_ language

Answer ( Please select your correct option )

- non-regular
- regular
- regular but infinite
- regular but finite

conceptual

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Question No : 8 of 52

Marks: 1 (Budgeted Time 1 Min)

If  $L_1$  and  $L_2$  are two regular languages, then \_\_\_\_\_ is/are also regular.

Answer ( Please select your correct option )

Both  $L_1 \cup L_2, L_1 \cap L_2$

concept

$L_1^c \cap L_2$

$L_1 \cup L_2$

$L_1 \cap L_2$

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Question No : 9 of 52

Marks: 1 (Budgeted Time 1 Min)

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

Answer ( Please select your correct option )

- 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



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Question No : 10 of 52

Marks: 1 (Budgeted Time 1 Min)

Pumping lemma is generally used to prove that:

Answer ( Please select your correct option )

A given language is infinite

A given language is not regular

Conceptual

Whether two given regular expressions of a regular language are equivalent or not

A given language is finite

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Question No : 11 of 52

Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept \_\_\_\_ word.

Answer ( Please select your correct option )

- All Lecture:30,page:85 concept
- No
- One
- Two

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Question No : 12 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

Answer ( Please select your correct option )

$1(001)^*$  and  $(10)^*10$

$x(xxx)^*$  and  $(x)^*x$

concept

$x^+$  and  $x^*$

$x^+$  and  $x^*x^+$

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Question No : 13 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

Answer ( Please select your correct option )

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

$x(xxx)^*$  and  $(xx)^*x$

$x^+$  and  $x^*x^+$

concept

$x(x)^*$  and  $(x)^*x$

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Question No : 14 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following statement is correct?

Answer ( Please select your correct option )

The length of output string is greater than length of input string in moore machine.



The length of output string is greater than length of input string in mealy machine.

The length of output string is equal to length of input string in moore machine.

The length of output string is less than length of input string in mealy machine.

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Question No : 15 of 52

Marks: 1 (Budgeted Time 1 Min)

There exist \_\_\_\_\_ derivations of a certain word in ambiguous grammar.

Answer ( Please select your correct option )

more than one



Exactly one

exactly two

no

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Question No : 16 of 52

Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

Answer ( Please select your correct option )

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

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Question No : 17 of 52

Marks: 1 (Budgeted Time 1 Min)

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.

Answer ( Please select your correct option )

Accept      Lec:37,page:105

Pop

Push

Reject

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Question No : 18 of 52

Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by \_\_\_\_

Answer ( Please select your correct option )

Talik Khon and Daniel H

Tandao Kasami and Daniel H

Tandao Dagger and Daniel H

Talik Khon



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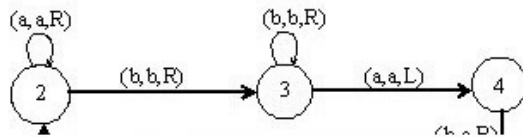
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Question No : 19 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following TM



Answer ( Please select your correct option )

Above TM accepts the non-CFL  $\{ a b c \}$ .

Above TM accepts the non-CFL  $\{ a^n b^n a^n \}$ .

Above TM accepts the non-CFL  $\{ a^n b^{n+2} a^n \}$ .

Above TM accepts the non-CFL  $\{ a^n + 2b^n a^n \}$ .

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Question No : 20 of 52

Marks: 1 (Budgeted Time 1 Min)

$\Sigma = \{a, b\}$  then string abbabb has length equal to \_\_\_\_\_.

Answer ( Please select your correct option )

Three

Four

Five

Six

No.of letters in string=length

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Question No : 21 of 52

Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called \_\_\_\_\_.

Answer ( Please select your correct option )

Infinite



Context Free Language (CFL)



Regular



Finite



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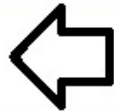
Question No : 22 of 52

Marks: 1 (Budgeted Time 1 Min)

If  $r_1$  and  $r_2$  are regular expressions then  $(r_1)(r_2)$  is a \_\_\_\_\_.

Answer ( Please select your correct option )

RE



TG

FA

GTG

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Question No : 23 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is RE for a language defined over  $\Sigma = \{a, b\}$  having words starting with a:

Answer ( Please select your correct option )

$(a + b)^*$

$aa(a + b)^+$

$a(a + b)^*$

$a^*(a + b)$



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Question No : 24 of 52

Marks: 1 (Budgeted Time 1 Min)

The \_\_\_\_\_ machine helps in building a machine that can perform the addition of binary numbers.

Answer ( Please select your correct option )

- Incrementing  
lec:22,page:60
- Complementing
- Decrementing
- Multiplication

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Question No : 25 of 52

Marks: 1 (Budgeted Time 1 Min)

Left hand side of a production in Context free grammar (CFG) consists of \_\_\_\_\_.

Answer ( Please select your correct option )

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



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Question No : 26 of 52

Marks: 1 (Budgeted Time 1 Min)

A regular language \_\_\_\_\_

Answer ( Please select your correct option )

Must be finite



Must be infinite

Can be finite or infinite

Complex Language

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Question No : 27 of 52

Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is \_\_\_\_\_.

Answer ( Please select your correct option )

Regular



Non Regular

Finite

Infinite

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Question No : 28 of 52

Marks: 1 (Budgeted Time 1 Min)

If a given Context Free grammar (CFG) contains a production of the form  $S \rightarrow \Lambda$ , then \_\_\_\_\_

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Answer ( Please select your correct option )

- The corresponding CFL is not empty.      **concept**
- The corresponding CFL is empty.
- The corresponding CFL is not empty if the language is regular
- The corresponding CFL is empty and non regular.

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Question No : 29 of 52

Marks: 1 (Budgeted Time 1 Min)

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

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Answer ( Please select your correct option )

Yes

Yes but only in finite languages

No

Yes but only in infinite languages

right by hadi

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Question No : 30 of 52

Marks: 1 (Budgeted Time 1 Min)

In \_\_\_\_\_ there are Finite set of states containing exactly one START state and some (may be none) HALT states that cause execution to terminate, when the HALT states are entered.

Answer ( Please select your correct option )

- TG
- Turing Machine
- GTG
- Finite Automata



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Question No : 31 of 52

Marks: 1 (Budgeted Time 1 Min)

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

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

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Answer ( Please select your correct option )

Statement 1 is true

Statement 2 is true

Both statements (1 & 2) are false

Statement 2 is false

Both statements true

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Question No : 32 of 52

Marks: 1 (Budgeted Time 1 Min)

We can have more than one parse trees for a given string in case of \_\_\_\_\_ Context Free Grammar (CFG).

Answer ( Please select your correct option )

- vague
- ambiguous
- hazy
- simple

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Question No : 33 of 52

Marks: 1 (Budgeted Time 1 Min)

The language of  $a^m b^n$  can be expressed by:

Answer ( Please select your correct option )

- FA
- TG
- GTG
- PDA concept (non regular language)

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Question No : 34 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following theorem partitions  $\Sigma^*$  into distinct classes?

Answer ( Please select your correct option )

Decidability theorem

Myhill Nerode theorem

Kleen's theorem

Emptiness theorem

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Question No : 35 of 52

Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be \_\_\_\_\_ in case of testing pumping lemma.

Answer ( Please select your correct option )

- context free
- irregular
- both regular and irregular
- regular

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Question No : 36 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

$S \rightarrow SX|XY$   
 $X \rightarrow ZZ$   
 $Y \rightarrow 1$   
 $Z \rightarrow 0$

Answer ( Please select your correct option )

00100

0010000

001

00010

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Question No : 37 of 52

Marks: 1 (Budgeted Time 1 Min)

A read state can have \_\_\_\_\_ outgoing edge/ edges.

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Answer ( Please select your correct option )

1

2

3

Any number of

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Question No : 38 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following states do not have outgoing edges:

Answer ( Please select your correct option )

Start

Read

Pop

Accept



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Question No : 39 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S---->01A

A---->10B

B---->0A|11

Answer ( Please select your correct option )

011011



011011011

011001011

011001001011

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Question No : 40 of 52

Marks: 1 (Budgeted Time 1 Min)

Let us consider the following Turing machine ( $T^M$ ):

(y, Y, R)	(f, f, L)
(f, f, R)	(v, v, L)

Answer ( Please select your correct option )

fffggg

fffgggf

fffgg

ffffegg

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Question No : 41 of 52

Marks: 2 (Budgeted Time 4 Min)

What is meant by "Left most Derivation" in context of CFG?

Answer ( Please [click here to Add Answer](#) )



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Question No : 42 of 52

Marks: 2 (Budgeted Time 4 Min)

Explain the language L of string, defined over  $\Sigma = \{0,1\}$ , having double 0's or double 1's?

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Answer ( Please [click here to Add Answer](#) )

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$(0+1)^*(00+11)(0+1)^*$

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Question No : 43 of 52

Marks: 2 (Budgeted Time 4 Min)

Consider the language defined by the following regular expression:

$b(a + b)^*a$

What will be the corresponding Context Free Grammar (CFG)?

Answer ( Please [click here to Add Answer](#) )



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Question No : 44 of 52

Marks: 2 (Budgeted Time 4 Min)

Consider live productions to be applied during derivation of a word. In your point of view what will be the ultimate result?

Answer ( Please [click here to Add Answer](#) )



Lec:43

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Question No : 45 of 52

Marks: 3 (Budgeted Time 6 Min)

What is meant by the following statement ?

"LANGUAGE IS CLOSED"

Answer ( Please [click here to Add Answer](#) )

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Question No : 46 of 52

Marks: 3 (Budgeted Time 6 Min)

Write three different parsing techniques.

Answer ( Please [click here to Add Answer](#) )



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Question No : 47 of 52

Marks: 3 (Budgeted Time 6 Min)

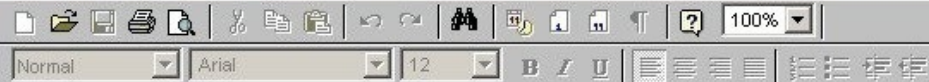
Illustrate Decidable Problem with the help of an example.

Marks [1+2]

Answer ( Please [click here](#) to Add Answer )

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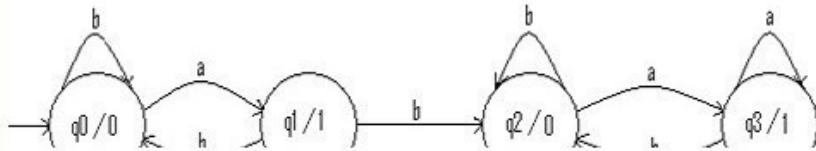
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Question No : 48 of 52

Marks: 3 (Budgeted Time 6 Min)

Consider the following Moore machine:



Answer ( Please [click here to Add Answer](#) )

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Marks: 5 (Budgeted Time 10 Min)

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EN, defined over  $\Sigma = \{a,b\}$ . In how many classes does L may partition  $\Sigma^*$ . Explain briefly.

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Answer ( Please [click here to Add Answer](#) )

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Lec:28,Page:77

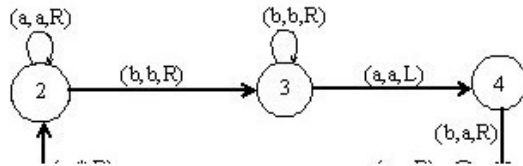
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Question No : 50 of 52

Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



Answer ( Please [click here to Add Answer](#) )

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Question No : 51 of 52

Marks: 5 (Budgeted Time 10 Min)

Derive Chomsky Normal Form (CNF) corresponding to the Context Free Grammar (CFG) given below:

$A \rightarrow BAB \mid B \mid \Lambda$

$B \rightarrow 00 \mid \Lambda$

Answer ( Please [click here to Add Answer](#) )



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Question No : 52 of 52

Marks: 5 (Budgeted Time 10 Min)

Suppose a Maze of 20 boxes; 1 box for initial and 1 for final state. 6 boxes are for non-moveable states while the rest can be used for transitions. Draw a Nondeterministic Finite Automaton (NFA) for the given Maze.

Marks [2.5+2.5]

Answer ( Please [click here to Add Answer](#) )

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