MIDTERM EXAMINATION
Spring 2009
CS402- Theory of Automata (Session - 1)

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

Alphabet S = {a,bc,cc} has _____ number of letters.

- ► One
- ► Two
- ► Three
- ► Four

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

In which of the following language Rev(s)=s

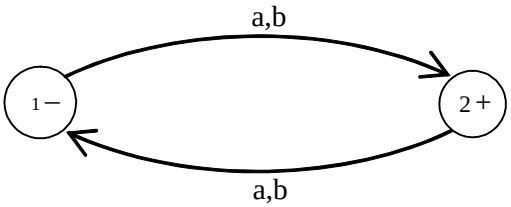
- ► EQUAL
- ► INTEGER
- ► PALINDROME
- ► FACTORIAL

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

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

- ► abbbab
- ► bbba
- ► bbbbab
- ► ababbb

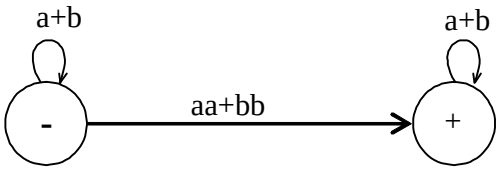
Question No: 4 (Marks: 1) - Please choose one



Above given FA generates the language having strings of _____

- ODD length
- EVEN length
- Equal number of a's and b's
- None of these

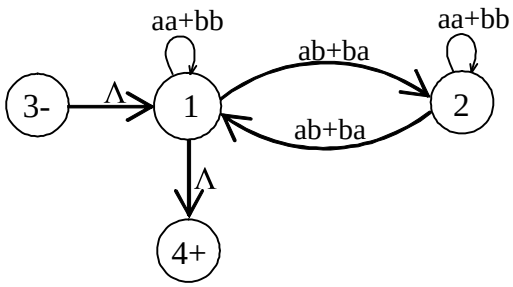
Question No: 5 (Marks: 1) - Please choose one



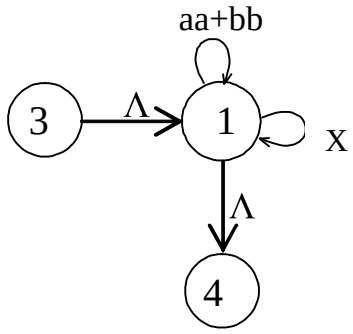
Above given GTG accepts the language in which strings

- Contains double a or double b
- Contains both a and double b
- Depends on the alphabet
- None of these

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



If above given TG is drawn like



Then what will be written in place of X.

- ► (ab+ba)(aa+bb)(ba+ab)
- ► (ab+ba)(aa+bb)(ab+ba)
- ► (ab+ba)(aa+bb)*(ab+ba)
- ► (ab+ba)(aa+bb)(ab+ba)*

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

FA3 expresses r1r2. Then initial state of FA3 will consist of

- ► Initial state of FA2
- ► Initial state of FA1
- ► Initial states of both FA1 & FA2
- ► Depends on FA's

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

FA3 expresses r1r2. Then there will be at least one final state of FA3 that consist of final state of FA1 and initial state of FA2.

- ► True
- ► False
- ► Depends on language
- ► None of these

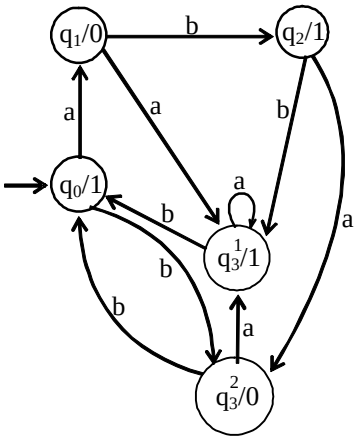
Question No: 9 (Marks: 1) - Please choose one

Two machines are said to be equivalent if they print the same output string when the different input string is run on them

- ► True
- ► False
- ► Depends on language
- ► May be or may not be

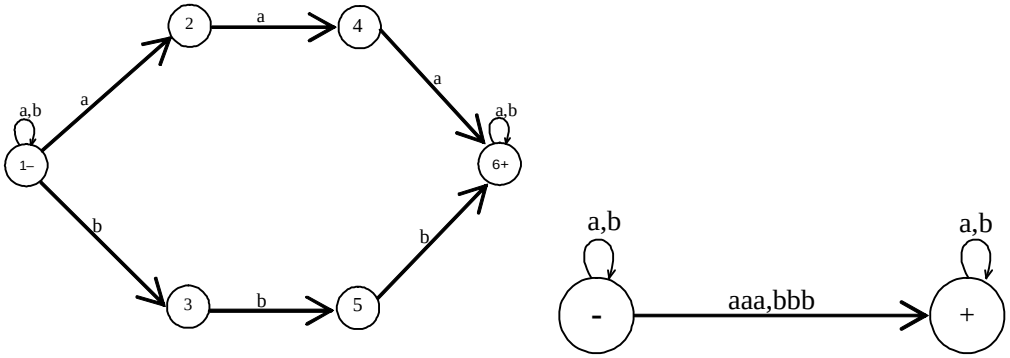
Question No: 10 (Marks: 1) - Please choose one

Running the string abbabbba on this Moore machine. The outputs will be_____



- ► 101111010
- ► 01111010
- ► 01011110
- ► 01010101

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



Above given TG's are _____.

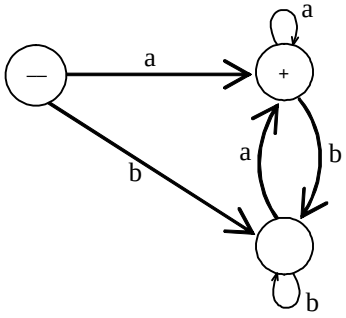
- ► None of these
- ► Equivalent
- ► Non-equivalent
- ► TG's are not valid

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

TG can have more than one initial state.

- ► True
- ► False
- ► Depends on alphabets
- ► None of these

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



Above given FA accepts null string.

► True

► False

► FA is not valid

► None of these

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

If in an NFA, $\wedge$ is allowed to be a label of an edge then that NFA is called _____.

► Will not remain NFA

► NFA with $\wedge$

► NFA with null string

► Either "NFA with null string" OR "NFA with $\wedge$"

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

One FA has n states and m letters in the alphabet. Then FA will have _____ number of transitions in the diagram.

► (n)+(m)

► (m)(n) OR (n)(m)

► None of the given options

► (m)-(n)

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

(a+b)*a(a+b)*b(a+b)* is the RE of language defined over S={a,b} having at least one a and one b

► True

► False

► Such a language does not exist

► None of the given options

Question No: 17 (Marks: 1)

Is the following statement trure?
A regular language can not be infinite.

Question No: 18 (Marks: 1)

Can you say that for a certain string there may be more than one paths in a TG?

Question No: 19 (Marks: 2)

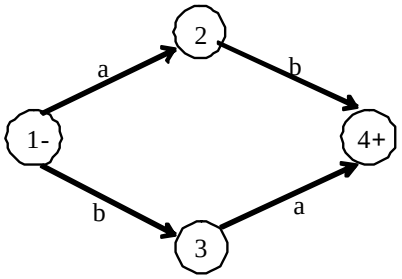
If a language can be accepted by an FA then it can be accepted by a TG as well.
What are the other two statements of kleenes's theorem?

Question No: 20 (Marks: 3)

Describe the method of NFA corresponding to Concatenation of FAs.

Question No: 21 (Marks: 5)

Draw FA corresponding to following NFA?



Question No: 22 (Marks: 10)

Let L be any language. Let us define the transpose of L to be the language of exactly those words that are the words in L spelled backward. If w $\in$ L then reverse (w) $\in$ L. for example, if L = {a, abb, bbaab, bbbaa}Then Transpose (L) = {a, bba, baabb, aabbb,
Prove that if there is an FA that accepts L, then there is a TG that accepts the transpose of L.