

(4)

TMC-303

4. (a) Show that following grammar is not SLR :

(CO4)

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow d$

- (b) Write the short notes on LEX and YACC.

(CO4)

- (c) Explain synthesized attribute and inherited attribute with suitable example. (CO4)

5. (a) Define symbol table. How symbol table is used by various phases of compiler. (CO5)

- (b) Explain local optimization with suitable example. (CO5)

- (c) Write the three address code for the following : (CO5)

(i) for ($i = 1; i \leq 10; i++$)

{

$a[i] = x * 5;$

(ii) while ($i < 10$)

{

$x = 0;$

$i = i + 1;$

}

TMC-303

420

H

Roll No.

TMC-303

M. C. A. (THIRD SEMESTER)

END SEMESTER

EXAMINATION, Dec., 2022

**AUTOMATA THEORY AND COMPILER
CONSTRUCTION**

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Illustrate finite automata. Design a DFA for the following language over

$\Sigma = \{a, b\}$: (CO1)

(i) having odd number of 'a'

P. T. O.

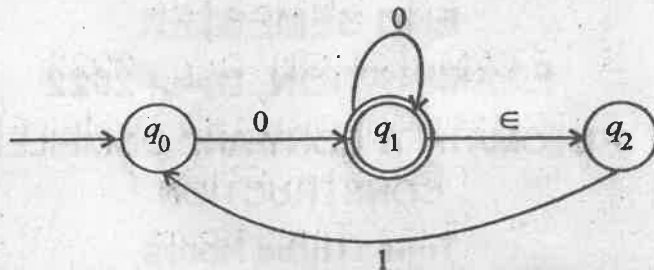
(2)

TMC-303

(ii) having even number of 'a' and even number of 'b'

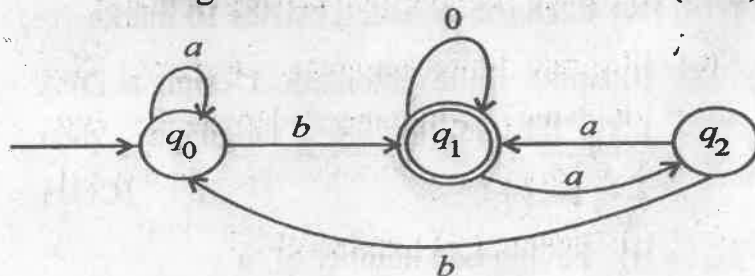
(iii) $L = \{b^m ab^n : m, n > 0\}$

(b) Construct DFA equivalent to the following NFA : (CO1)



(c) Discuss and differentiate between Moore and Mealy machine. Design a Mealy machine which will increment the given binary number by 1. (CO1)

2: (a) Prove the Arden's theorem. Find the regular expression for the given transition diagram. (CO2)



(3)

TMC-303

(b) What do you mean by an ambiguity ? Show that $S \rightarrow aS|Sa|a$ is an ambiguous grammar. (CO2)

(c) Explain PDA. Design a deterministic PDA which accepts a language : (CO2)

$$L = \{0^n 1^{2n} : n \geq 0\}$$

3. (a) Illustrate the different phases of compiler using one example. (CO3)

(b) What is the role of lexical analyzer ? How many tokens will be generated by lexical analyzer for the following expressions : (CO3)

- (i) `printf("Total = %d", i);`
- (ii) `int a [4] [5];`
- (iii) `if i >= j, then goto 100;`

(c) Compute the FIRST and FOLLOW function for the following grammar : (CO3)

$S \rightarrow ACB|CbB|Ba$

$A \rightarrow da|BC| \epsilon$

$B \rightarrow g| \epsilon$

$C \rightarrow h| \epsilon$