



Printed Pages : 4

CS – 604

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1038

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2007

COMPILER CONSTRUCTION

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1 Attempt any **four** parts of the following : **5x4=20**

- (a) Discuss how YACC can be used to generate a parser. Also, explain the format of its input specification file.
- (b) Prove that regular sets are closed under intersection. Present a method for constructing a DFA with an intersection of two regular sets.
- (c) Construct a finite automata that will accept those strings of a binary number that are divisible by three.
- (d) Find the DFA recognizing the language described by the regular expression.

$$a|abb|a^*b^+$$

- (e) Find the reduced grammar that is equivalent to the CFG given below :

$$S \rightarrow aC | SB$$

$$A \rightarrow bSCa$$

$$B \rightarrow aSB | bBC$$

$$C \rightarrow aBC | ad$$

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1

[Contd...

- (f) What is the language accepted by the finite automata whose transition diagram is given below : **(Fig. 1)**.

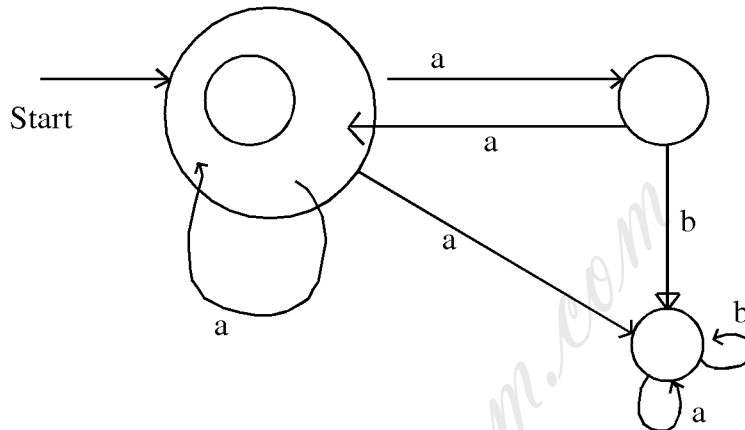


Fig. 1

2 Attempt any **two** parts of the following : **10x2=20**

- (a) Construct the LALR passing table for the following grammar :

$$S \rightarrow AA$$

$$A \rightarrow aA \mid b$$

- (b) Construct a predictive parsing table for the following grammar where S| is a start symbols and # is the end marker.

$$S \mid \rightarrow S\#$$

$$S \rightarrow qABC$$

$$A \rightarrow a \mid bbD$$

$$B \rightarrow a \mid \epsilon$$

$$C \rightarrow b \mid \epsilon$$

$$D \rightarrow c \mid \epsilon$$

- (c) Consider the grammar and test whether the grammar is LL(1) or not.

$$S \rightarrow |AB|\epsilon$$

$$A \rightarrow |AC|OC$$

$$B \rightarrow OS$$

$$C \rightarrow 1$$

3 Attempt any **two** parts of the following : **10x2=20**

- (a) Generate three address code for the following code :

```
switch a + b
{
    case 1 : x = x + 1
    case 2 : y = y + 2
    case 3 : z = z + 3
    default : c = c - 1
}
```

- (b) Construct an SLR(1) parsing table for the following grammar :

$$S \rightarrow A)$$

$$A \rightarrow A, P) (P, P$$

$$P \rightarrow \{\text{num}, \text{num}\}$$

- (c) Transform the following NFA into an optimal/minimal state DFA :

| | 0 | 1 | ε |
|---|------|------|---|
| A | A, C | B | D |
| B | B | D | C |
| C | C | A, C | D |
| D | D | A | - |

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[Contd...

4 Attempt any **two** parts of the following : **10x2=20**

- (a) Write the syntax directed translation to go along with the LR parser for the following:

$$S \rightarrow AE$$

$$A \rightarrow DS \text{ while}$$

$$D \rightarrow \text{do}$$

- (b) For the grammar having productions :

$$A \rightarrow (A)A \in$$

Compute FIRST and FOLLOW set of A.

- (c) A relation **R** on the set of integers defined as :

$$R = \{(a, b) | a - b \text{ is even integer}\}$$

Show that R is equivalence.

5 Attempt any **two** parts of the following : **10x2=20**

- (a) Give three-address code for the following code fragment :

if $a < b$ then
while $c > d$ do
 $x = x + y$

else

do

$$p = p + q$$

while $e \leq f$

- (b) Construct an LALR(1) parsing table for the following grammar :

$$D \rightarrow L:T$$

$$L \rightarrow L, id | id$$

$$T \rightarrow \text{integer}$$

- (c) Write a short note on code optimization.