

VI-SEMESTER
END SEMESTER EXAMINATION (Supl)B.Tech.(CO)
Sept- 2019

CO-302 Compiler Design

Time: 3:00 Hours

Max. Marks: 40

Note: Attempt any five questions

Q.No. 1

- A. Compute FIRST, FOLLOW sets, and Construct a predictive parsing table for the following grammar, where S is the start symbol. [5]

 $S \rightarrow iEtSS_1 \mid a$ $S_1 \rightarrow eS \mid \epsilon$ $E \rightarrow b$ (where 'e' denotes epsilon)

- B. Eliminate Left recursion from following grammar [3]

 $S \rightarrow aBDh$ $B \rightarrow Bb \mid c$ $D \rightarrow EF; E \rightarrow g \mid \epsilon; F \rightarrow f \mid \epsilon$

Q.No. 2

- A. Consider following grammar and test whether the grammar is LL(1) or not ? [4]

 $S \rightarrow 1AB \mid \epsilon$ $A \rightarrow 1AC \mid 0C$ $B \rightarrow 0S$ $C \rightarrow 1$

- B. Design predictive parsing table for the following grammar and differentiate between top down and bottom up parsing. [4]

 $S \rightarrow aAcD \mid BCe$ $A \rightarrow b \mid \epsilon$ $B \rightarrow Cf \mid d$ $C \rightarrow fe$ (where 'S' is start symbol)

Q.No. 3

What is loop unrolling? Explain and construct program flow graph for the following program fragment [8]

Fact(x) {

int f=1;

```

for(i=2; i<=x; i++)
f=f*i
return (f)

```

Q.No. 4

A. Explain why every S-attributed definition is L-attributed? with suitable example [4]

B. Generate three address code for the following program fragment [4]

```

Switch (i+j)
{
  case1: x=y+z
  default: p=q+r
  case2: u=v+w
}

```

Q.No. 5

A. Explain how commutativity and associativity can be used to generate more efficient code from the DAG by taking suitable source code. [4]

B. What is DAG? Construct DAG for the expression [4]
 $(((x + y) + (x + y)) + ((x + y) + (x + y)))$

Q.No. 6

A. Explain the midsquare method and folding method used for generating hash values. [4]

B. Explain common sub-expression elimination and dead code elimination code motion with suitable example [4]

Q.No. 7

A. Explain and find canonical collection of sets of LR(1) items for following grammar [4]

$S \rightarrow aAd \mid bBd \mid aBc \mid bAc$

$A \rightarrow e$

$B \rightarrow e$

B. Explain following with suitable examples [4]

a. Ambiguous grammar and cross compiler

b. Peephole optimization