

VI-SEMESTER
B.Tech.(CO)

END SEMESTER EXAMINATION

May- 2023

CO302 Compiler Design

Time: 3:00 Hours

Max. Marks: 40

Note: Attempt any five questions

Q.No. 1

A. Construct SLR (1) parsing table and compute FIRST & FOLLOW for the following grammar: [4] [CO#2]

 $S \rightarrow DcDg$ $S \rightarrow PgPc$ $P \rightarrow \epsilon$ $D \rightarrow \epsilon$

B. What is the role of context free grammar (CFG) in compiler design?

Construct CFG for Language $L = \{0^a 1^b \mid a \neq b\}$ and Eliminate Left recursion from following grammar [4] [CO#1] $S \rightarrow A$ $A \rightarrow Ad \mid Ae \mid aB \mid aC$ $B \rightarrow bBC \mid f$ $C \rightarrow g$

Q.No. 2

A. How top down parsing is different from bottom up parsing? Design predictive parsing table for the following grammar: [4] [CO#2]

 $S \rightarrow aBDh$ $B \rightarrow Bh \mid c$ $D \rightarrow EF$ $F \rightarrow f \mid \epsilon$ $E \rightarrow g \mid \epsilon$ (where 'S' is start symbol)

B. Explain the working of LALR parser and Construct canonical LR parsing table for following grammar [4] [CO#4]

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

Q.No. 3

A. Define CLOSURE(I) and GOTO(J,X) functions and construct the sets of LR(0) items for the following grammar. [4] [CO#3]

 $S' \rightarrow S$ $S \rightarrow iSeS \mid iS \mid a$ (where 'S' is start symbol)

B. Explain loop unrolling and Loop jamming with example and construct program flow graph for the following program fragment. [4] [CO#6]

```
int main() {  
    extern int f(int);  
    int i;  
    int *a;  
    for (i=0; i<10; i++ ) {  
        a(i)=f(i); }  
}
```

Q.No. 4

A. Translate the following expression into three address statements

```
a = a + b * c  
b = c + d * c  
d = b + c * e
```

Also give quadruple and triple representation of the same? [4] [CO#4]

B. What are the various three address code representations? Generate three address code for the following program fragment [4] [CO#3]

```
while (x < y and u < v) do  
    if x = 1 then y = y + 1  
    else  
        while x <= v do  
            x = x + 3
```

Q.No. 5

A. What is an operator precedence parsing? Explain operator precedence parsing Algorithm. [4] [CO#2]

B. What is DAG? What are its advantages in context of optimization? Construct DAG for the expression [4] [CO#6]

$Z = X - Y + X * Y * U - V / W + X + V$

Q.No. 6

A. Explain various data structures used for symbol table and also compare the mid-square method and folding method used for generating hash values. [4] [CO#3]

B. How is boot strapping of a compiler is done to a second machine? And also explain the function of each phase of compiler with suitable example. [4] [CO#1]

Q.No. 7

A. Explain error recovery strategies adopted by compiler. [4] [CO#5]

B. Explain following with suitable examples [4] [CO#2]

- Syntax directed translation Schemes
- LEX and YACC