Total No. of Questions : 12]

SEAT No. :

P1437

[Total No. of Pages : 5

[4759]-190

B.E. (Information Technology)

c: COMPILER DESIGN

(2008 Pattern) (Semester - I) (414443) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of the block diagram explain phases of the compiler. Also write down output of each phase of the compiler for expression X=Y * Z / 2 where X and Z are of float type and Y is of integer type. **[10]**

b) Explain Lex specification with example. **[6]**

OR

Q2) a) Explain the following terms- **[6]**

i) Cross compiler

ii) Bootstrapping

iii) Incremental compiler

b) Differentiate between compiler and an interpreter. **[4]**

c) Define token, pattern, lexeme. **[6]**

P.T.O.

Q3) For the following grammar

$S' \rightarrow S\#$

$S \rightarrow qABC$

$A \rightarrow a \mid bbD$

$B \rightarrow a \mid \varepsilon$

$C \rightarrow b \mid \varepsilon$

$D \rightarrow c \mid \varepsilon$

a) Compute First and Follow. **[9]**

b) Construct predictive parsing table. **[6]**

c) Show sequence of parsing steps for the string qbbcab# **[3]**

OR

Q4) Consider the following grammar, and construct the LR (1) parsing table. **[18]**

$S \rightarrow L = R$

$S \rightarrow R$

$R \rightarrow L$

$L \rightarrow * R$

$L \rightarrow id$

$L \rightarrow \varepsilon$

Q5) a) Write syntax directed translation to translate the following 'for' statement into three address code statements. **[8]**

$S \rightarrow$ for (E1, E2, E3)S_1

b) Write three address sequences for the following:

i) switch (ch) **[4]**

```
{
    case 1 : a = b * c;
             Break;
    case 2 : a = b / c;
             Break;
}
```

ii) while x > y do **[4]**

```
    if  c < d then
        a = b + c
    else
        a = b – c
```

OR

Q6) a) What is Backpatching? How flow translation of Boolean expression is done using backpatching? **[8]**

b) Differentiate between L - attributed definitions and S-attributed definitions. **[8]**

SECTION - II

Q7) a) Write short note on activation records. **[8]**

b) Explain different source language issues. **[8]**

OR

Q8) a) Explain following storage allocation schemes with proper examples: **[8]**

i) Stack storage allocation

ii) Heap storage allocation

b) Explain the significance and design of symbol table in the context of compiler. **[8]**

Q9) a) Discuss the various principle sources of code optimization. **[10]**

b) Write Quadruple andTriple representation of following expression.

a : =b / – c – b / – c + b * c **[8]**

OR

Q10)a) i) 'Loop Unrolling' involves replicating the body of the loop to reduce the required number of tests if number of iterations are constant. Apply the technique to the loop shown below **[5]**

1) Once and

2) Twice and explain its purpose in code optimization.

```
k = 200;
while (k > = 0)
{
    arr[k] = 0;
    k--;
}
```

ii) 'Loop Jamming' is a technique that merges the bodies of two loops if the two loops have the same number of iterations and they use the same indices. Apply this technique to following code fragment and explain its role in optimization. **[5]**

```
for (I = 0; I < 10; I ++)
    for(I = 0; I < 10; I ++)
        X [I, J] = 0;
    for (I = 0; I < 10; I ++)
        X[I, J] = 1;
```

b) Describe any code generation algorithm you know with suitable illustration. **[8]**

Q11)a) Explain different features of object oriented programming with example. **[8]**

b) How can overloading and overriding of functions in object oriented programming languages handle by compiler? Explain in detail. **[8]**

OR

Q12)a) Explain differences between class based language and object based language with example. **[8]**

b) Write short note on data abstraction and information hiding. **[8]**

EEE