MCA/IVS/403/13

MCA 4th Semester Examination, 2013

COMPILER DESIGN

PAPER – 403

Full Marks : 100

Time : 3 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

Q.No. 1 and any **four** from the rest

1. Answer any *seven* questions : 2 × 7

(*a*) What are the basic task of lexical analysis phase ?

(*b*) What is ambiguous grammar ? Give example.

(*c*) What is handle ?

(*d*) What is LR parser ?

(*e*) What do you mean by Inherited attributed ?

(*f*) What is leader ? Where it is used ?

(*g*) What is symbol table ? What are its contents ?

(*h*) Specify the advantage of LALR.

(*i*) What is the merit of quadraples ?

(*j*) Define annoted parse tree and give one example.

(*k*) Mention some of the major optimization techniques.

2. (*a*) Convert the regular expression (*b*/*a*)* *baa* to DFA using first POS Last POS and follow POS functions. 9

(*b*) Define token, pattern and lexemes with proper examples. 5

3. Consider the following grammar.

$$E \rightarrow E + T \mid T$$
$$T \rightarrow id/id\,(\,) \mid id\,(L)$$
$$L \rightarrow E\,;\, L \mid E$$

(*i*) Eliminate left recursion and then perform left factoring. 7

(*ii*) Show that the equivalent grammar is *LL* (1). 7

4. Consider the following grammar

$$E \rightarrow E - T \mid T$$
$$T \rightarrow F \mid *f$$
$$F \rightarrow i \mid (E)$$

(*i*) Compact Action /Goto table.

(*ii*) Demonstrate that the grammar is SLR or not. 14

5. Consider the grammar

$$E \rightarrow E + T \mid T$$
$$T \rightarrow TF \mid F$$
$$F \rightarrow F* \mid a \mid b$$

(*i*) Construct LR or CLR passing table for this grammar. 9

(*ii*) Construct LALR passing table. 5

6. (*a*) What do you mean by syntax directed definition and translation. 5

(*b*) Construct three address code for the boolean expression $a < b$ or $c < d$ and $e < f$. 5

(*c*) Write the steps for partitioning three address code to Basic Block. 4

7. What is Basic Block ? What is flow graph. Show the basic block and flow graph of the following expression 2 + 12

```
for i = 1 to 10 do
for j = 1 to 10 do
    a [ i,j ] = 0·0 ;
for i = 1 to 10 do
    a [ i,j ] = 1·0 ;
```

8. Write short notes on any *two* : 7 × 2

(*i*) Pheep hole optimization

(*ii*) Code generation

(*iii*) Type checking.

[*Internal Assessment* : 30 Marks]
