

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(CSE)/SEM-7/CS-701/2010-11

2010-11

LANGUAGE PROCESSOR

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Symbol table can be used for

- a) checking type compatibility
- b) suppressing duplicate error messages
- c) storage allocation
- d) all of these.

ii) Which data structure is mainly used during shift-reduce parsing ?

- | | |
|-------------|------------|
| a) Pointers | b) Arrays |
| c) Stacks | d) Queues. |

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[Turn over

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iii) Which of the following is not an intermediate code form ?

- a) Postfix notation b) Syntax trees
- c) Three address codes d) Quadruples.

iv) If x is a terminal then $FIRST(x)$ is

- a) ϵ b) $\{x\}$
- c) x d) none of these.

v) Which one of the following error will not be detected by the compiler ?

- a) Lexical error b) Syntactic error
- c) Semantic error d) Logical error.

vi) The grammar $E \rightarrow E + E \mid E * E \mid a$ is

- a) ambiguous
- b) unambiguous
- c) not given sufficient information
- d) none of these.

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vii) YACC builds up

- a) SLR parsing table
- b) LALR parsing table
- c) canonical LR parsing table
- d) none of these.

viii) If a grammer is in LALR (1) then it is necessarily

- a) LL(1)
- b) SLR(1)
- c) LR(1)
- d) none of these.

ix) Which one of the following is not true about dynamic checking ?

- a) It increases the cost of execution
- b) Type checking is done during execution
- c) All the type error are detected /
- d) None of these.

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- x) A basic block can be analyzed by
- a) DAG
 - b) Flow graph
 - c) Graph with cycles
 - d) None of these.
- xi) The method which merges the bodies of two loops is
- a) loop unrolling
 - b) loop ramming
 - c) constant folding
 - d) none of these.
- xii) A top down parser generates
- a) leftmost-derivation
 - b) rightmost-derivation
 - c) leftmost derivation in reverse
 - d) rightmost derivation in reverse.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. How the following statement is translated via the different phases of compilation ?

position := initial + rate * 70.

3. Convert the following NFA into its equivalent DFA :

The set of all strings with 0 and 1, beginning with 1 & ending with 00.

4. Explain inherited attribute and synthesized attribute for Syntax directed translation with suitable example.

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5. What is type checking ? Differentiate between Dynamic and Static Type checking.
6. Differentiate Quadruple, Triples and Indirect triples with example.

GROUP - C**(Long Answer Type Questions)**Answer any *three* of the following. $3 \times 15 = 45$

7. a) What are the analysis phase and synthesis phase of an assembler ?
- b) Suppose a robot can be instructed to move one step east, north, west or south from its current position. A sequence of such instruction is generated by the following grammar :

$$\text{Seq} \rightarrow \text{Seq}_1 \text{ instr} \mid \text{begin}$$
$$\text{Instr} \rightarrow \text{east} \mid \text{north} \mid \text{west} \mid \text{south}$$

- i) Construct a syntax directed definition to translate an instruction sequence into a robot position.
- ii) Draw a parse tree for : begin west south.

 $4 + 7 + 4$

8. Construct a predictive parsing table for the grammar :

$$S \rightarrow iEtSS' \mid a$$
$$S' \rightarrow eS \mid \epsilon$$
$$E \rightarrow b$$

Here S is star symbol & S' are non-terminals & i, t, a, e, b are terminals.

Explain the steps in brief.

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9. Construct DFA directly from [not by generating NFA] the regular expression

$$L = (a \mid b)^* ab$$

What are the main contributions of Syntax Directed Translation in Compiler ? Design a Dependency Graph and Direct acyclic graph for the string

$$a + a * (b - c) + (b - c) * d \qquad 7 + 3 + 5$$

10. Translate the expression $a = -(a + b) * (c + d) + (a + b + c)$ into

- a) Guardruple
- b) Triple
- c) Indirect Triple

Draw the flow graph for the following code :

- i) location = - 1
- ii) $i = 0$
- iii) $i < 100$ goto 5
- iv) goto 13
- v) $t_1 = 4i$
- vi) $t_2 = A[t_1]$
- vii) if $t_2 = x$ goto 9
- viii) goto 10
- ix) location = i
- x) $t_3 = i + 1$
- xi) $i = t_3$
- xii) goto 3
- xiii)

What do you understand by terminal table and literal table ?

$$6 + 6 + 3$$

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11. Write short notes on any *three* of the following : 3×5

- a) LEX and YACC
 - b) Activation record
 - c) Symbol Table
 - d) Peephole optimization
 - e) Cross compiler.
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