MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : IT-605C

COMPILER DESIGN

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 the following : $10 \times 1 = 10$

i) A compiler that runs on one machine and produces code for a different machine is called

a) cross compilation

b) 2 pass compilation

c) one pass compilation

d) none of these.

ii) Type checking is done normally during

a) Lexical Analysis

b) Syntax Analysis

c) Syntax directed translation

d) code generation.

iii) YACC builds up

a) SLR parsing table

b) LALR parsing table

c) Canonical LR parsing table

d) none of these.

iv) Shift reduce parsers are

a) Top-down parsers

b) bottom up parsers

c) may be top down or bottom up parsers

d) none of these.

v) Token is generated by

a) Lexical Analyzer

b) Syntax Analyzer

c) Intermediate Code Generator

d) Intermediate Code Optimizer.

vi) Peephole optimization is used in

a) Lexical Analysis

b) Syntax Analysis

c) Semantic Analysis

d) Code Optimization.

vii) Which of the following statement is true ?

a) Every Left Recursive grammar can be LL(1)

b) LL(1) grammar can be ambiguous

c) both (a) and (b)

d) none of these.

viii) Synthesized attributes are calculated

a) from the values of attributes of the children of the node

b) from the values of attributes of the parent of the node

c) from the values of attributes of the siblings of the node

d) none of these.

ix) Quadruples is a record structure of

a) three fields b) four fields

c) one field d) none of these.

x) The regular expression (a / b)*abb denotes

a) all possible combinations of a's and b's

b) set of all strings ending with abb

c) set of all strings starting with a and ending with abb

d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is 'handle' ?

Consider the grammar $E \rightarrow E + E \mid E * E \mid id$. From this, find the handles of the right sentential forms of reduction of the string id+id*id. 2 + 3

3. What is type checking ? Differentiate between Dynamic and Static type checking. 1 + 4

4. Eliminate the left recursion from the following production :

$A \rightarrow BC/a$

$B \rightarrow CA/Ab$

$C \rightarrow AB/CC/a$

5. What do you mean by ambiguous grammar ? Give example and explain why the grammar is ambiguous. 2 + 3

6. Generate annonated parse tree for the string "3+2–4" using the grammar

$E \rightarrow E + T \mid E - T \mid T \quad T \rightarrow 0 \mid 1 \mid 2 \mid \ldots\ldots \mid 9$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Consider the following grammar :

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

a) Obtain FIRST and FOLLOW sets of the above grammar.

b) Construct Predictive Parsing table of the above grammar. 5 + 10

8. a) Translate the following expression

$a = - b * (c + d) / e$ into quadruples and triple representation. 5

b) Consider grammar G = { V, T, S, P }; where

V = { S, A }, T = { a , b }, S is the start variable and

P = { S → AS | b, A → SA | a }

i) Compute the collection of sets of LR (0) item sets for the grammar.

ii) Construct SLR Parser table using SLR algorithm. 5 + 5

9. a) Construct the DAG for the following basic block :

d:= b*c e:=a+b b:=b*c a:=e–d

b) Explain in detail about code improving transformations.

c) 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) ..... 3 + 7 + 5

10. a) What is syntax-directed definition.

    b) Explain synthesized and inherited attributes.

    c) For the following regular expression construct a NFA and convert it to DFA.

    (0 + 1) * (00 + 11) 2 + 4 + 9

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

    a) Lex and YACC

    b) Intermediate Code Generation

    c) Peephole optimization

    d) Activation Record

    e) Dependency Graph.

http://www.makaut.com