GURU NANAK INSTITUTE OF TECHNOLOGY

An Autonomous Institute under MAKAUT

2022

COMPILER CONSTRUCTION

PGCSE302D

TIME ALLOTTED: 3HR **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)

Answer any ***ten*** from the following, choosing the correct alternative of each question: 10×1=10

		Marks	CO No
1. (i)	Firstpos of concatenate node with left child c1 and right child c2 is a) firstpos(c1) ∪ firstpos(c2) b) firstpos(c1) ∩ firstpos(c2) c) if (nullable(c1)) firstpos(c1) ∪ firstpos(c2) else firstpos(c1) d) if (nullable(c2)) firstpos(c1) ∪ firstpos(c2) else firstpos(c1)	1	CO1
ii)	Parse tree is generated in the phase of a) Syntax Analysis b) Semantic Analysis c) Code Optimization d) Intermediate Code Generation	1	CO3
iii)	Compiler translates the source code to a) Executable code b) Machine code c) Binary code d) Both b and c	1	CO1
iv)	Compiler should report the presence of _____ in the source program, in translation process. a) Classes b) Objects c) Errors d) Text	1	CO3
v)	What is the output of lexical analyzer? a) A parse tree b) A list of tokens c) Intermediate code d) Machine code	1	CO2
vi)	Grammars that can be translated to DFAs: a) Left linear grammar b) Right linear grammar c) Generic grammar d) All of these	1	CO1

vii) The grammar $S \rightarrow SS \mid (S) \mid \varepsilon$ is not suitable for predictive-parsing because the grammar is — 1 — CO2
a) Ambiguous
b) Left recursive
c) Right recursive
d) An operator grammar

viii) Grammar of the programming is checked at _____ phase of compiler. — 1 — CO4
a) Semantic analysis
b) Syntax analysis
c) Lexical analysis
d) Code generation

ix) An optimizer Compiler — 1 — CO5
a) is optimized to occupy less space
b) optimize the code
c) Both a) and b)
d) None of these

x) Consider the following Grammar: — 1 — CO4
$E \rightarrow E + n$
$E \rightarrow E * n$
$E \rightarrow n$
For a sentence $n + n \times n$, the handles in the right-sentential form of the reduction are
a) n, E+n and E+n*n
b) n, E+n and E+E*n
c) n, n+n and n+n*n
d) None of these

xi) Consider the following Grammar: — 1 — CO2
S->bA | aB
A->a| aS | bAA
B->b| bS | aBB
Which of the following strings is generated by the grammar?
a) Aaaabb
b) Aabbbb
c) Aabbab
d) None of these

xii) _____ is a process of finding a parse tree for a string of tokens. — 1 — CO3
a) Parsing
b) Analysing
c) Recognizing
d) Tokenizing

GROUP – B
(Short Answer Type Questions)

(Answer any *three* of the following) **3 x 5 = 15**

		Marks	CO No
2.	Briefly describe Thompson's Construction with a suitable example.	5	CO3
3. a.	What is 'handle' and 'handle prunning'?	2	CO2
b.	Define tokens, Patterns and lexemes.	3	CO1
4 a.	What is recursive descent parsing?	1	CO2
b.	Describe the drawbacks of recursive descent parsing for generating the string 'abc' from the grammar: S -> aBc , B -> bc | b	4	CO2
5 a.	Define an operator grammar.	1	CO2
b.	Write the rules to construct operator precedence parsing.	4	CO3
6.	Write down the output of each phase for the expression id: = id + id * 30	5	CO4

GROUP – C
(Long Answer Type Questions)

(Answer any *three* of the following) **3 x 15 = 45**

		Marks	CO No
7. a.	Construct DFA directly from [Not by generating NFA] the regular expression: L = (a | b)*abb	8	CO3
b.	Briefly describe epsilon-transition with a suitable example.	5	CO2
c.	What is cross-compiler?	2	CO2
8. a.	Describe LR parsing with block diagram.	6	CO3
b.	Construct SLR parsing table for the grammar given below: E -> E + T | T T -> T * F | F F -> (E) | id	9	CO4
9. a.	What is Left-Recursion? How it can be eliminated?	6	CO2
b.	What is CFG?	4	CO3
c.	What are the main contributions of Syntax Directed Translation in Compiler?	5	CO2
10. a.	Design a Dependency Graph and Direct Acyclic Graph for the string a + a * (b – c) + (b – c) * d	5	CO4
b.	Translate the expression a = – (a + b) * (c + d) + (a + b + c) into i. Quadruple ii. Triple iii. Indirect Triple iv. 3-address code	8	CO2
c.	What do you understand by terminal table and literal table?	2	CO3
11.	Write Short note: (Any three)	3*5=15	
a.	Symbol Table	5	CO2
b.	LEX and YAAC	5	CO4
c.	Activation Record	5	CO3
d.	Input Buffering	5	CO3
e.	Peephole optimization	5	CO5