National Institute of Technology Silchar
End Semester (UG) Examination, May 2022
Subject code: CS-307, Subject: Compiler Design
Semester: 6th, Department: Computer Science and Engineering
Duration: Two Hours, Total marks: 50

All questions are compulsory

Q.No.	Questions	Marks	CO
1 a	Explain briefly about Language Processing System.	4	CO1
b	What are the operations on languages in lexical analysis? Also provide the definition and notation.	2	CO1
c	Explain briefly about error recovery strategy.	4	CO1
2	From the NFA of the regular expression $((\epsilon/a)(ab)^*)^*a$ construct the minimized DFA.	10	CO
3 a(i)	Construct the SLR parsing table from the given CFG: $E \rightarrow E + T \mid T$ $T \rightarrow T F \mid F$ $F \rightarrow F * \mid a \mid b$	7	CO3
a(ii)	Given below are three SDD's. 1. $A \rightarrow B C D$ $A.syn = B.inh + C.inh$ $D.inh = A.inh + B.syn$ 2. $A \rightarrow B C D$ $A.syn = B.syn + D.syn$ 3. $A \rightarrow B C D$ $A.syn = D.inh$ $B.inh = A.syn + C.syn$ $C.inh = B.syn$ $D.inh = B.inh + C.inh$ For each SDD's check wether the rules are consistant with (i). an S-attributed definition, (ii). an L-attributed definition, or (iii). any evaluation order at all.	3	CO3
	OR		
b	Construct the LALR parsing table from the given CFG. $S \rightarrow X a Y \mid Y$ $X \rightarrow b Y \mid c$ $Y \rightarrow X$	10	CO3
4 a	For the given SDD and input **int w, x, y, z** construct the annotated parse tree and dependency graph $D \rightarrow T L$ $L.inh = T.type$ $T \rightarrow \textbf{int}$ $T.type = integer$ $T \rightarrow \textbf{float}$ $T.type = float$ $L \rightarrow L1 , \textbf{id}$ $L1.inh = L.inh$ $addType(\textbf{id}.entry, L.inh)$ $L \rightarrow \textbf{id}$ $addType(\textbf{id}.entry, L.inh)$	4	CO3
b	How three address code can be implemented. Provide example.	2	CO1
c	Write a Lex Program to Identify and Count Positive and Negative Numbers.	4	CO2
			PTO

Q.No.	Questions	Marks	CO
5 a	Construct the DAG for the following Basic Block 1. t1 := 4 * i 2. t2 := a[t1] 3. t3 := 4 * i 4. t4 := b[t3] 5. t5 := t2 * t4 6. t6 := prod + t5 7. prod := t6 8. t7 := i + 1 9. i := t7 10. if i $\leq$ 20 goto (1)	4	CO3
b	Explain briefly about loop optimization with the help of an example	6	CO3

Course Outcomes (CO):

1. Students will be aware of the major concepts in areas of language translation and compiler design.

2. Students will be able to develop a language translator or compiler covering a broad range of engineering and scientific applications.

3. Learn and apply the various concepts of context free grammars, compiler parsing techniques, construction of abstract syntax trees, symbol tables, actual code generation and code optimization techniques.