Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170701 Date:22/12/2021

Subject Name:Complier Design

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define following terms: i. Compiler ii. Interpreter iii.Token	**03**
	(b)	Explain activation tree?	**04**
	(c)	Explain a rule of Left factoring a grammar and give Example.	**07**
Q.2	**(a)**	Explain input buffering methods.	**03**
	(b)	Define the following terms and give suitable example for it. i. Augmented Grammar ii. LR(0) Item iii.LR(1) Item	**04**
	(c)	Draw the DFA for the regular expression (a|b)*abb using set construction method only.	**07**
		OR	
	(c)	Draw NFA from regular expression using Thomson's construction and convert it into DFA. (a | b)* a b* a	**07**
Q.3	**(a)**	Describe Ambiguous Grammar with example.	**03**
	(b)	Design FIRST and FOLLOW set for the following grammar. S→ 1AB | ε A→1AC | 0C B→0S C→1	**04**
	(c)	Explain operator grammar. Generate precedence function table for following grammar. E -> EAE | id A -> + | *	**07**
		OR	
Q.3	**(a)**	Differentiate Top Down Parsing and Bottom up parsing	**03**
	(b)	Explain error recovery strategies used by parser.	**04**
	(c)	Construct CLR parsing table for following grammar. S -> aSA | € A -> bS | c	**07**
Q.4	**(a)**	Explain various issues in design of code generator.	**03**
	(b)	Explain the following parameter passing methods. 1. Call-by-value 2. Call-by-reference 3. Copy-Restore 4. Call-by-Name	**04**
	(c)	Explain Peephole Optimization.	**07**
		OR	

Q.4	**(a)**	Draw a DAG for expression: a + a * (b – c) + (b – c) * d.	**03**
	(b)	Compare: Static v/s Dynamic Memory Allocation.	**04**
	(c)	Translate following arithmetic expression - (a * b) + (c + d) - (a + b + c + d) into 1] Quadruples 2] Triple 3] Indirect Triple	**07**
Q.5	**(a)**	Explain symbol table. For what purpose , compiler uses symbol table?	**03**
	(b)	Explain Basic-Block Scheduling.	**04**
	(c)	Explain synthesized attributes with the help of an example.	**07**

OR

Q.5	**(a)**	Define a following: i. Basic block ii. Constant folding iii. Handle.	**03**
	(b)	Write difference(s) between stack and heap memory allocation.	**04**
	(c)	Explain Pass structure of assembler.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3170701 Date:16/06/2022

Subject Name:Complier Design

Time:02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain the roles of linker, loader and preprocessor.	**03**
	(b)	What is Input Buffering? Why it is used?	**04**
	(c)	Explain the language dependent and machine independent phases of compiler. Also List major functions done by compiler.	**07**
Q.2	**(a)**	Describe the role of lexical analyzer.	**03**
	(b)	Write the regular expression R over {0,1} or {a,b}: 1) The set of all strings with even number of a's followed by an odd number of b's. 2) The set of all strings that consist of alternating 0's and 1's	**04**
	(c)	Explain activation record in detail.	**07**
		OR	
	(c)	What are conflicts in LR Parser? What are their types? Explain with an example.	**07**
Q.3	**(a)**	What do you mean by left recursion and how it is eliminated?	**03**
	(b)	What is ambiguous grammar? Show that S -> aS|Sa|a ia an ambiguous grammar.	**04**
	(c)	Consider the following grammar: S' = S# S -> ABC A -> a|bbD B -> a| Ɛ C -> b| Ɛ D -> c| Ɛ Construct FIRST and FOLLOW for the grammar also design LL(1) parsing table for the grammar	**07**
		OR	
Q.3	**(a)**	Differentiate between top down parser and bottom up parser.	**03**
	(b)	Explain handle and handle pruning	**04**
	(c)	Consider the following grammar S -> AA A -> aA A -> b And construct the LALR parsing table.	**07**
Q.4	**(a)**	Differentiate between S attributes and L attributes	**03**
	(b)	For the following production write the semantic action: 1. S -> E$	**04**

2. E -> E1 + E2
3. E -> E1 * E2
4. E - > digit

(c) Translate the following expression into quadruple, triple, and indirect triple: **07**

-(a+b)*(c+d)-(a+b+c)

OR

Q.4 **(a)** Differentiate between parse tree and syntax tree **03**

(b) What is dependency graph? Explain with example. **04**

(c) Generate the three address code for the following program segment: **07**

```
While(a<c and b>d)
  Do if a=1 then c = c+1
    Else
     While a<=d
      Do a= a+b
```

Q.5 **(a)** List the issues in code generation. **03**

(b) Discuss the functions of error handler. **04**

(c) What is DAG? What are its advantages in context of optimization? How does it help in eliminating common sub expression? **07**

OR

Q.5 **(a)** What is global optimization? Name the 2 types of analysis performed for global optimization. **03**

(b) Explain the following with example **04**

1) Lexical phase error
2) Syntactic phase error

(c) What is peephole optimization? Explain with example. **07**

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