Nirma University

Institute of Technology

Semester End Examination (RPR), May - 2019

B. Tech. in Computer Engineering, Semester-VII

IT794 Compiler Construction

Roll / Exam No.		Supervisor's initial with date	

Time: 3 Hours Max. Marks : 100

Instructions:
1. Attempt all questions.
2. Figures to right indicate full marks.
3. Use section-wise separate answer book.
4. Draw neat sketches wherever necessary.

SECTION – I

Q-1. Do as directed **[18]**

(A) CO1BL1 Describe compiler working using its phases. (06)

(B) CO1BL4 Explain with suitable example : shift/reduce conflict, reduce/reduce conflict. (04)

(C) CO1BL2 Explain front-end and back-end phases. What are advantages of separating front-end phases and back-end phases in two different pass? (04)

(D) CO1BL2 What is basic difference between SLR and LR(1) parser? (04)

Q-2. Answer the following. **[16]**

(A) CO2BL4 Is following Grammar LL(1)? Justify your answer using LL(1) parser table. (08)

$S \rightarrow A$
$A \rightarrow aB \mid Ad$
$B \rightarrow bBC \mid f$
$C \rightarrow g$

(B) CO2BL5 Draw DFA for following grammar and construct LALR(1) parse table. (08)

$S \rightarrow a \mid \wedge \mid (R)$
$T \rightarrow S, T \mid S$
$R \rightarrow T$

OR

(B) CO2BL5 Construct Recursive descent parser (RDP) parser for following Grammar. (08)

$S \rightarrow aAbS \mid bBaS \mid \varepsilon$
$A \rightarrow aAbA \mid \varepsilon$
$B \rightarrow bBaB \mid \varepsilon$

Q-3. Do as directed. **[16]**

(A) CO3BL4 Fill necessary token in following predictive parser table to implement panic mode error recovery. Demonstrate error recovery for input ") id + *) id + id)" . (08)

	Id	+	*	(	)	$
E	TE_R			TE_R		
E_R		$+TE_R$			ε	ε
T	FT_R			FT_R		
T_R	FT_R	ε	$*FT_R$		ε	ε
F	Id			(E)		

(B) CO3BL3 What is operator grammar? Explain error detection and recovery strategy used in operator-precedence parsing using an appropriate example. (04)

OR

(B) CO3BL3 Construct a minimum state DFA for following regular expression (04)
(a|b)*a(a|b)(a|b)

(C) CO3BL2 What is Sentinels? Explain significance of Sentinels in improving input buffering mechanism of lexical analyzer. (04)

SECTION – II

Q-4. Answer the following. **[16]**

(A) CO1BL1 Define following term using suitable example: (04)
i) Synthesis attribute ii) Inherited attribute

(B) CO1BL1 How does syntax directed definition differ than translation scheme? (04)

OR

(B) CO1BL1 "Every S-attributed definition is L-attributed definition". Write your opinion about this statement with proper justification. (04)

(D) CO1BL1 Explain use of symbol table in following compiler phases: (04)
i) Syntax Analyzer ii) Semantic Analyzer

Q-5. Do as directed **[20]**

(A) CO2BL4 What is dead code? Find the dead code from the following statements (08)

```
T2=10
T3=30
T1= T2 + T3
T5=60
T6=70
T1= T5 × T7
Print (T1)
```

OR

(A) CO2BL4 What is translation of xxxxyzz as per syntax directed definition described below: (08)

$S \rightarrow xxW$ { print "1" }
$S \rightarrow y$ { print " 2 " }
$S \rightarrow Sz$ { print " 3 " }

(B) CO2BL6 Write syntax directed definition to convert given binary number to its equivalent decimal number. (08)

(C) CO2BL6 Suppose we have the following C declarations: (04)

```
struct { int a , b ; } CELL;
CELL foo[100] , *PCELL;
PCELL bar( int x , CELL y) {...}
```

Draw graphical presentation of type expressions for the types of foo and bar.

Q-6. Answer the following. **[14]**

(A) CO3BL2 Describe any two representation of intermediate code generation. What are challenges to implement these intermediate code representations? (06)

OR

(A) CO3BL2 Eliminate Left recursion for following grammar: (06)

$S \rightarrow Aa \mid b$
$A \rightarrow Ac \mid sd \mid \varepsilon$

(B) CO3BL4 What is difference in code optimization phase before and after intermediate code generation? Explain any two code optimization (08)