Code No: RT31051 (R13) (SET - 1)

# III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016 COMPILER DESIGN

(Computer Science and Engineering)

Time: 3 hours	Max. Marks: 70
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Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in <b>Part-A</b> is compulsory
3. Answer any <b>THREE</b> Questions from <b>Part-B</b>
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#### PART -A

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1	a) b)	What is the difference between pass and phase? Why left recursion has to be eliminated from grammar?	[3M] [3M]
	c)	Differentiate between LR and LALR parsers.	[4M]
	d)	What is Attribute grammar? Give Example.	[4M]
	e)	What is the use reference counting garbage collector?	[4M]
	f)	Define common sub expression. How to identify it?	[4M]
		<u>PART -B</u>	
2	a)	Write short notes on functions of semantic analysis.	[8M]
	b)	What is the role of regular expression in lexical analysis? Explain with examples.	[8M]
3	a)	Write about different grammars used to specify the syntax of languages and explain with an example how grammars can be used to derive input strings in different ways.	[8M]
	b)	Check whether the given grammar G: S $\rightarrow$ 1AB  $\epsilon$ A $\rightarrow$ 1AC 0C B $\rightarrow$ 0S C $\rightarrow$ 1 is LL(1) or not?	[8M]
4	a)	What is Dangling ELSE ambiguity? How it can be solved with LR parsers? Explain with an example.	[8M]
	b)	Construct CLR parse table for S→AA A→aAld	[8M]
5	a)	Explain how to generate three address codes with syntax directed definitions with an example.	[8M]
	b)	Write short notes on i) Formats of three address code ii) Construction syntax tree for expressions	[8M]
6	a)	What is meant by activation of procedure? How it can be represented with activation tree and record? Explain with quick sort example.	[8M]
b)	b)	Explain the functional issues to be considered while generating the object code.	[8M]
7		Consider the pseudo code for quick sort and perform all the function preserving transformation techniques on flow graph of it.	[16M]

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#### PART -A

1	a)	Differentiate front end and back end.	[3M]
	b)	Show that the grammar E→E+E E*E (E) id is ambiguous.	[4M]
	c)	Write the rules to compute operator precedence	[3M]
	d)	Generate three address code for the given pseudo code while(i<=10) { A=A*B+20	[4M]
	۵)	i++ print(A value) }	[ <b>/ ]                                  </b>
	e)	Write short notes on parameter passing mechanisms.	[4M]
	f)	Write about inter procedural optimization.	[4M]
		<u>PART -B</u>	
2	a)	What is Scanner? Design simple scanner and explain with scanner algorithm.	[8M]
	b)	How to specify the tokens? Differentiate token, lexeme and pattern with suitable examples. And draw transition diagrams also.	[8M]
3	a)	Discuss the process of error recovery in predictive parsing	[6M]
	b)	What is LL(1) parser? Construct the LL(1) parser for $G: S \rightarrow (L) a L \rightarrow L,S S$ and check the acceptance of input string $(a,(a,a))$	[10M]
4	a)	With neat sketch explain the structure of LR parser and the rules to compute LR	[8M]
		item.	
	b)	What is operator grammar? How $G: S \rightarrow a ^{1}(T)$ $T \rightarrow T,S S$ can be parsed through operator precedence parser.	[8M]
5	a)	Differentiate synthesized and inherited attributes with example.	[8M]
	b)	What is an Abstract syntax tree? How to construct it? Explain by writing syntax	[8M]
	0)	directed definition.	[01/1]
6	a)	What is symbol table? Explain the different organization of symbol table.	[8M]
	b)	Write short notes register allocation and assignment with graph coloring technique.	[8M]
7	a)	Explain about i) Instruction Scheduling ii) Elimination of Loop invariant variable	[8M]
	b)	Generate the flow graph for dot product of two matrices and perform some local optimizations.	[8M]

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2. Answering the question in Part-A is compulsory3. Answer any THREE Questions from Part-B

#### PART -A

	PARI -A			
1	<ul><li>a)</li><li>b)</li><li>c)</li><li>d)</li><li>e)</li><li>f)</li></ul>	What is the role of lexical analyzer? How to left factor the grammar? Give Example. Show that Bottom up parsing is right most derivation in reverse order. What is syntax directed definition? Give example. What is the role of Control stack in runtime support package? What is the use of machine idioms? Give example.	[3M] [4M] [4M] [4M] [3M] [4M]	
	1)	PART -B	[41/1]	
2	a)	Relate transition diagrams and Scanner. Draw Transition diagram for recognition of tokens, Reserved words and identifiers.	[8M]	
	b)	Compiler is translator and interpreter is simulator-Justify this statement with differences between them.	[8M]	
3	a) b)	Discuss the following i) Left Recursion ii) Recursive descent parser State and explain the rules used to compute first and follow functions with the help of $E \rightarrow E + T \mid T \rightarrow T * F \mid F \rightarrow F * \mid a \mid b$	[8M] [8M]	
4		Construct SLR parser for the given grammar and check the acceptance of input string of your own $\mathbf{R} \rightarrow \mathbf{R} +  \mathbf{+R}  \mathbf{RR}  \mathbf{R}^*  \otimes  \mathbf{a}  \mathbf{b}$	[16M]	
5	a) b)	Discuss various methods to get the evaluation order of semantic rules. What is the role of type system in type checker? Write the syntax directed definition for type checker.	[8M] [8M]	
6	a) b)	Explain various ways to access non local variables.  What is machine dependent optimization? Explain how peephole techniques functions in this?	[8M] [8M]	
7	a) b) c)	Explain the following Common sub expression and dead code elimination Copy propagation, constant folding. Strength Reduction	[6M] [5M] [5M]	

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