Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(OLD) • EXAMINATION – WINTER 2016

Subject Code: 170701 Date: 29/11/2016

Subject Name: Compiler 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.**

Q.1	**(a)**	Describe all phases of a compiler.	**07**
	(b)	(i) What is a symbol table? Discuss the most suitable data structure for it by stating merits / demerits. (ii) Explain linker & loader.	**07**
Q.2	**(a)**	(i) Consider the grammar S -> SS+ | SS* | a Show that the string aa+a* can be generated by the grammar. Construct the parse tree for the grammar. Is the grammar ambiguous? (ii) Write unambiguous production rules for if then else construct.	**07**
	(b)	Construct DFA without constructing NFA for following regular expression: a*b*a(a | b)b*a# Minimize the same.	**07**
		OR	
	(b)	Construct NFA for following regular expression using Thompson's notation and then convert it into DFA. a(b | c)*a*c#	**07**
Q.3	**(a)**	Apply shift reduce parser for parsing following string using unambiguous grammar. id - id * id - id	**07**
	(b)	(i) Compare top-down and bottom-up parser. (ii) Explain right-most-derivation-in-reverse with the help of an example.	**07**
		OR	
Q.3	**(a)**	Explain SLR parser. How is its parse table constructed?	**07**
	(b)	Construct a precedence graph, precedence table for operator precedence parser to be used for parsing a string consisting of id, - , * , $. Parse following string. $ id - id * id * id $	**07**
Q.4	**(a)**	Write production and semantic rules for producing and analyzing statements like : int * ip , i , j , *ip1; float * fp , f;	**07**
	(b)	Explain synthesized attributes with the help of an example.	**07**
		OR	
Q.4	**(a)**	Draw transition diagrams corresponding to production rules for arithmetic expressions consisting of operators + and ^ for predictive parser. Explain how parsing takes place for the same using transition diagrams.	**07**
	(b)	(i) Explain various parameter passing methods. (ii) Explain left factoring with the help of an example.	**07**

Q.5 **(a)** Draw syntax tree and DAG for following statement. Write three address codes from both. **07**

a = (a + b * c) ^ (b * c) + b * c ^ a ;

(b) Explain activation record. How is task divided between calling & called program for stack updating? **07**

OR

Q.5 **(a)** For a statement given below, write output of all phases (except that of optimization phase) of a complier. **07**

a = a + b * c ;

(b) Explain peephole optimization. **07**

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