Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VI Examination-Nov/Dec-2011

Subject code: 160706 **Date: 02/12/2011**

Subject Name: System Programming

Time: 10.30 am -1.00 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)** List various phases of a language processor. Explain roles of first two phases of it. Also explain symbol table. **07**

(b) Write unambiguous production rules (grammar) for arithmetic expression containing +, - , *, / and ^ (exponentiation). **07**
Construct parse tree and abstract syntax tree for :
<id> – <id> * <id> ^ <id> + <id>

Q.2 **(a)** Construct DFA for following regular expression: **07**
a* (b* | c*) (a | c) * #

(b) Describe working of LL(1) parser and parse following string : **07**
|- <id> * <id> * <id> + <id> -|

OR

(b) What is operator precedence parsing? Show operator precedence matrix for following operators: **07**
+, - , * , (,).
Parse following string:
|- <id> + <id> * <id> -|

Q.3 **(a)** Explain analysis and synthesis phases of an assembler by clearly stating their tasks. **07**

(b) Describe following data structures: **07**
OPTAB, SYMTAB, LITTAB and POOLTAB.

OR

Q.3 **(a)** Explain and show usage by giving examples of following assembler directives: **07**
ORIGIN, EQU, LTORG, START.

(b) Explain & compare various intermediate code forms (representations) for an assembler. **07**

Q.4 **(a)** Define two macros of your choice to illustrate nested calls to these macros. Also show their corresponding expansion. **07**

(b) Explain with examples - expansion time variables, expansion time statements - AIF and AGO for macro programming. Show their usage for expansion time loop by giving example. **07**

OR

Q.4 **(a)** Describe tasks and data structures considered for the design of a macro preprocessor. **07**

(b) Explain attributes of formal parameters, default specifications of parameter and semantic expansion for macro by giving examples. **07**

Q.5 **(a)** Compare one pass and two pass compilers. Explain various parameter passing mechanisms for functions. **07**

(b) Describe various optimizing transformations commonly used in compilers. **07**

OR

Q.5 **(a)** What is program relocation? Explain characteristics of self re-locating programs. **07**

(b) What is an overlay? Explain overlay structured program and its execution. **07**
