Seat No.: ________ Enrolment No.___________

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 160706 **Date: 04-06-2013**

Subject Name: System Programming

Time: 10.30 am - 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)** Fill in the Blanks **04**

(i) A ______________________bridges an execution gap to the machine language of a computer system.
(1) Detranslator, (2) Preprocessor, (3) Language translator

(ii) A ______________________bridges the specification gap between two programming languages.
(1) Interpreter (2) Language Migrator (3) Compiler

(iii) ______________________ is designed to hold the value of formal parameters during expansion of macro call.
(1) Actual Parameter Table (2) Macro Name Table (3) Expansion time variable table

(iv) Syntax analysis processes the string of tokens built by _______________ to determine the statement class.
(1) Semantic Analysis (2) Lexical Analysis (3) Itself

Define following terms: **03**
(i) Assembler (ii) Macro (iii) Parsing

(b) Write complete grammar for an arithmetic expression containing operators ó+ô, ói ó, ó*ô, ó$ô using recursive specification and Backus Naur Form (BNF) where ó$ô is exponentiation operator. **07**

Q.2 **(a)** (i) Build a DFA for following regular expression. **05**

(a | b)*aab#

(ii) A language consists of all strings of aôs and bôs which ends with b and does not contain aa. Write regular expression for the language. **02**

(b) Parse following strings using given LL(1) parsing table (TABLE-I) **07**

(i) id*id + id * id (ii) id + id + id + id

TABLE-I

Non-terminal	Source symbol			
	<id>	+	*	$
E	E→TEô			
Eô		Eô→+TEô		Eô→ Ů
T	T→ VTô			
Tô		Tô→Ů	Tô→*VTô	Tô→ Ů
V	V→<id>			

OR

(b) Explain relocation and linking requirements in segmented addressing with suitable example. **07**

Q.3 **(a)** Explain recursive decent parser with suitable example. Also state its drawbacks. **07**

(b) (i) Compare top-down and bottom-up parser. **03**

(ii) Explain following terms: (1) Loaders (2) Self Relocating Programs **04**

OR

Q.3 **(a)** Write operator precedence table for arithmetic operators ñ+ò, ñ*ò, ñ-ò, ñ/ò . Parse following expression using the table. *id * id + id * id* **07**

(b) Briefly explain the tasks performed by analysis and synthesis phases of simple assembly schemes. **07**

Q.4 **(a)** (i) Write difference between one pass and two pass assembler. **03**

(ii) Explain Symbol table and Mnemonics table with suitable example. **04**

(b) Given an assembly language program for finding factorial of a given number N with Mnemonic code details. Write an equivalent machine language program. **07**

	START 101	Mnemonics CODE
	READ N	STOP 00
	MOVER BREG, ONE	ADD 01
	MOVEM BREG, TERM	MULT 03
AGAIN	MULT BREG, TERM	MOVER 04
	MOVER CREG, TERM	MOVEM 05
	ADD CREG, ONE	COMP 06
	MOVEM CREG, TERM	BC 07
	COMP CREG, N	READ 09
	BC LE, AGAIN	PRINT 10
	MOVEM BREG, RESULT	LE 02
	PRINT RESULT	START 01
	STOP	END 02
N	DS 1	
RESULT	DS 1	Ordinal number of BREG and CREG is 2 & 3 respectively
ONE	DC ó1ô	
TERM	DS 1	
	END	

OR

Q.4 **(a)** What are advanced assembler directives. Explain any two with suitable example. **07**

Q.4 **(b)** Explain macro expansion in details. **07**

Q.5 **(a)** What is macro-preprocessor? Explain steps of macro-preprocessor design. **07**

(b) What are the issues in code generation in relation to compilation of expression? Explain each issue in brief. **07**

OR

Q.5 **(a)** Explain following advanced macro facilities: **07**

(i) Alteration of flow of control during expansion

(ii) Expansion time variables

(b) What is meant by optimizing transformations? Explain any three with suitable example. **07**

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