

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 \div , \times , $+$, $-$, $*$, $\$$ using recursive specification and Backus Naur Form (BNF) where $\$$ is exponentiation operator. 07

Q.2 (a) (i) Build a DFA for following regular expression. 05 $(a \mid b)^*aab\#$

- (ii) A language consists of all strings of a 's and b 's 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			
	$\langle id \rangle$	$+$	$*$	$\$$
E	$E \rightarrow TE\emptyset$			
$E\emptyset$		$E\emptyset \rightarrow +TE\emptyset$		$E\emptyset \rightarrow$
T	$T \rightarrow VT\emptyset$			
$T\emptyset$		$T\emptyset \rightarrow$	$T\emptyset \rightarrow *VT\emptyset$	$T\emptyset \rightarrow$
V	$V \rightarrow \langle id \rangle$			

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 $\tilde{+}$, $\tilde{*}$, $\tilde{-}$, $\tilde{/}$. **07**
 Parse following expression using the table. $id * id + id * id$
- (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**

AGAIN	START	101	<u>Mnemonics CODE</u>
	READ	N	
	MOVER	BREG, ONE	
	MOVEM	BREG, TERM	
	MULT	BREG, TERM	
	MOVER	CREG, TERM	
	ADD	CREG, ONE	
	MOVEM	CREG, TERM	
	COMP	CREG, N	
	BC	LE, AGAIN	
	MOVEM	BREG, RESULT	
	PRINT	RESULT	
	STOP		
	END		
N	DS	1	Ordinal number of BREG and CREG is 2 & 3 respectively
RESULT	DS	1	
ONE	DC	-10	
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**
