GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3160715   **Date:13-12-2023**
Subject Name: System Software
Time:02:30 PM TO 05:00 PM   **Total Marks:70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain different kinds of system software.	**03**
	(b)	Difference between Procedure oriented language and Problem oriented language.	**04**
	(c)	Explain the various stages of the life cycle of a source program with a neat diagram.	**07**

Q.2	**(a)**	Eliminate left recursion $E \rightarrow E + T \mid T$	**03**
	(b)	Describe following data structures: OPTAB, SYMTAB, LITTAB and POOLTAB.	**04**
	(c)	Compare Top Down and Bottom Up Parsing. Find out First and Follow and construct LL (1) parser table for following Grammar: E→TE' E'→+TE'|ε T→FT' T'→*FT'|ε F→(E) | id	**07**

OR

	(c)	Consider following assembly language program: Show (i) Contents of Symbol Table (ii) Intermediate codes using Variant-I representation.	**07**

```
            START 101
            READ N
            MOVER BREG, ONE
            MOVEM BREG, TERM
AGAIN       MULT BREG, TERM
            MOVER CREG, TERM
            ADD CREG, ONE
            MOVEM CREG, TERM
            COMP CREG, N
            BC LE, AGAIN
            MOVEM BREG, AGAIN
            PRINT RESULT
            STOP
N           DS 1
RESULT      DS 1
ONE         DC '1'
TERM        DS 1
            END
```

Instruction opcode: STOP – 00, ADD – 01, MULT – 03, MOVER – 04, MOVEM –05, COMP – 06, BC – 07, READ – 09, PRINT – 10, LE – 02

Assembler directives: START – 01, END – 02

Declaration statements: DC – 01, DS – 02

Register code: BREG – 02, CREG – 03

Q.3	**(a)**	Draw a flowchart of maintaining Table of Incomplete Instruction (TII) in assembler.	**03**
	(b)	Explain REPT and IRP statement with proper example.	**04**
	(c)	Explain advanced assembler directives with suitable example.	**07**

OR

Q.3	**(a)**	Explain memory allocation in block structured language.	**03**
	(b)	What is the difference between Keyword parameters and positional parameters?	**04**
	(c)	Explain lexical and semantic expansion of macro with example.	**07**
Q.4	**(a)**	Write regular expressions of a given language. The language consists no. of zero should be multiple of 3	**03**
	(b)	Explain in brief design of an absolute Loader.	**04**
	(c)	Explain Self relocating program and overlay structure program.	**07**

OR

Q.4	**(a)**	Write a regular expression for a language containing both 11 and 00 as substring	**03**
	(b)	Write and explain the algorithm for macro expansion.	**04**
	(c)	What is program relocation? How relocation is performed by linker? Explain with example.	**07**
Q.5	**(a)**	Explain types of grammar.	**03**
	(b)	Explain the front end of toy compiler with suitable example.	**04**
	(c)	What is interpreter? Explain pure & impure interpreters.	**07**

OR

Q.5	**(a)**	Explain Boostrap loader.	**03**
	(b)	Given following expression: x = -a * b + -a * b (1) Write three address codes for the expression. (2) Give triple implementation for the three-address code of the expression.	**04**
	(c)	What is interpreter? Explain benefits of interpreter. Compare interpreter and compiler.	**07**

****