Enrolment No./Seat No_____________

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160715 Date:24-05-2024

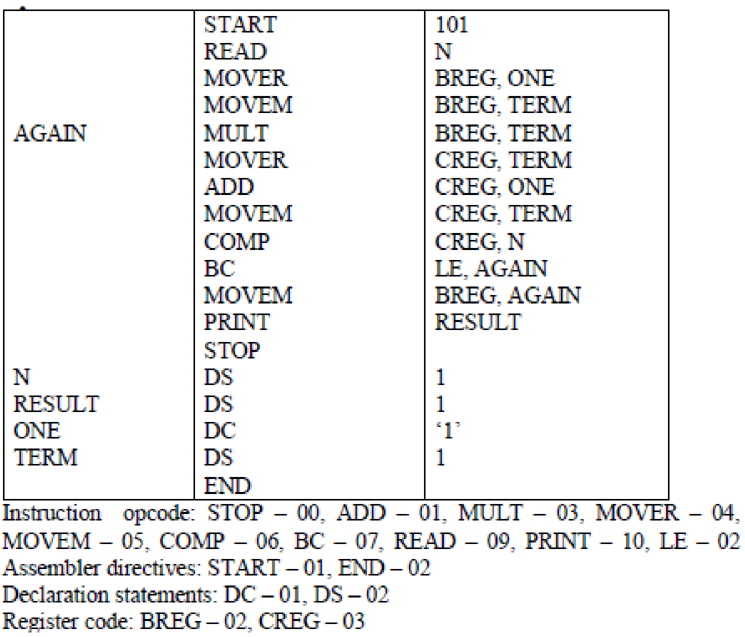
Subject Name: System Software

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain fundamental of language processing.	**03**
	(b)	Define following terms: 1) Language Migrator 2) Execution gap 3) Token 4) Handle	**04**
	(c)	Explain with examples - expansion time variables, expansion time Statements -AIF and AGO for macro programming.	**07**
Q.2	**(a)**	Apply rule to remove left recursion from following grammar. S→ A A→ Ad | Ae | aB | aC B→ bBC | f C→ g	**03**
	(b)	Construct LL(1) parsing table for following grammar. S→ iCtSeS | iCtS | a C→ b	**04**
	(c)	Describe following data structures: OPTAB, SYMTAB, LITTAB and POOLTAB	**07**
		OR	
	(c)	Explain and compare two variants of the intermediate code generated from multi pass assembler.	**07**
Q.3	**(a)**	Compare top-down and bottom-up parser.	**03**
	(b)	Explain inherited and synthesized attributes in detail with example.	**04**
	(c)	Consider following assembly language program: Create equivalent machine code	**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

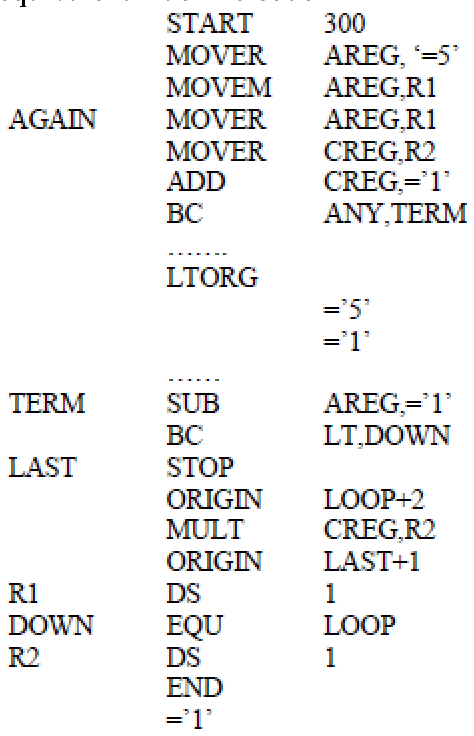
Register code: BREG – 02, CREG – 03

OR

Q.3 **(a)** Compare and Contrast macro preprocessor and macro assembler. **03**

(b) Explain use and field of following tables of a macro KPDTAB, MDT, EVTAB, SSTAB **04**

(c) Consider following assembly language program: Create equivalent machine code **07**



```
           START     300
           MOVER     AREG, '=5'
           MOVEM     AREG,R1
AGAIN      MOVER     AREG,R1
           MOVER     CREG,R2
           ADD       CREG,='1'
           BC        ANY,TERM
           .......
           LTORG
                     ='5'
                     ='1'
           ......
TERM       SUB       AREG,='1'
           BC        LT,DOWN
LAST       STOP
           ORIGIN    LOOP+2
           MULT      CREG,R2
           ORIGIN    LAST+1
R1         DS        1
DOWN       EQU       LOOP
R2         DS        1
           END
           ='1'
```

Q.4 **(a)** Explain DAG with example. **03**

(b) Explain design of a linker by addressing issues of relocation and linking. **04**

(c) Given a grammar, **07**

E →TA,
A → +TA | ε
T →VB
B →*VB | ε
V →id | (E)

Develop an LL (1) parser table and parse following string using the parsing table. id * (id + id)

OR

Q.4 **(a)** Discuss parameters for Activation Records **03**

(b) Explain characteristics of self-relocating programs. **04**

(c) Define Operator precedence grammar. Convert following production rules of grammar into suitable Operator precedence grammar. **07**

E → EAE | id
A → - | *

Q.5 **(a)** Explain Left factoring with example. **03**

(b) List out various Code Optimization techniques used in Compiler. Explain any two techniques with suitable example. **04**

(c) Generate Quadruple, Triple, Indirect Triple for following expression: ans=a+b*c/2.0 **07**

OR

Q.5 **(a)** Explain the terms Binding and Binding Times. **03**

(b) Explain pure and impure interpreters. **04**

(c) What is Symbol table? Explain how one can organize Symbol table using Linear Data Structure? **07**

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