Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160706 Date: 25/10/2016

Subject Name: System Programming

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.**

Q.1 **(a)** Define: language processor. **07**
Also list different types of Language Processors.
Construct DFA for- 0*1*(0/1)#

(b) Define: Ambiguous Grammar. **07**
Define: Pass of compiler.
Consider following grammar-
S → iCtSeS | iCtS | a
C → b

check whether the given grammar is ambiguous or not.

Q.2 **(a)** Write unambiguous production rule for desk calculator (+, -, *, /, ^). **07**
Apply shift-reduce parser on : id*id+id/id

(b) i) Eliminate left recursion from following grammar. **07**
S → A

A → Ad | Ae | aB | aC

B → bBC | f

C → g

ii) Explain Left Factoring with appropriate example.

OR

(b) Define: Operator Precedence Parser. **07**
Apply Operator Precedence Parser on - id*id+id-id*id

Q.3 **(a)** Explain Analysis Phase of Language Processor in detail. **07**

(b) Explain in detail-use of various data structures (tables) needed in PASS I of the assembler. Explain various suitable data structures for the symbol table. **07**

OR

Q.3 **(a)** Given assembly program and instruction opcode. Show Data Structure of pass1 Assembler. **07**

```
START   200
        READ    N
        MOVER   AREG , '=1'
AGAIN   MULT    AREG , N
        MOVEM   AREG, RESULT
        PRINT   RESULT
        ADD     BREG,'=1'
        COMP    BREG . '=10'
        BC      LE, AGAIN
        LTORG
        '=1'
        '=10'
        STOP
RESULT  DS      1
N       DS      1
        END
        '=1'
```

Instruction opcode:

MOVER : 04	MOVEM: 05	MULT: 03	ADD: 01
COMP: 06	BC: 07	PRINT: 10	READ:09
STOP:00			
ASSEMBLERDIRECTIVES:			
START: 01	END:02	LTORG:05	
DECLARATION STATEMENT			
DC:01	DS:02		

(b) Explain in brief design of a Two Pass Assembler. **07**

Q.4 **(a)** Explain in brief the design of a macro assembler. **07**

(b) i) Illustrate expansion of nested macro calls by giving example. **07**
ii) Write and explain the algorithm for macro expansion.

OR

Q.4 **(a)** i) Define a macro taking A and B as parameters to compute A = A * B + B * B + A **07**
ii) Compare and Contrast macro preprocessor and macro assembler.

Q.4	**(b)**	Explain in brief self relocating programs in detail.	**07**
Q.5	**(a)**	Explain in detail: Peephole optimization.	**07**
	(b)	Explain design of a linker by addressing issues of relocation and linking.	**07**

OR

Q.5	**(a)**	Explain Symbol Table management in detail. Also discuss various data structures used for Symbol table organization.	**07**
	(b)	i) Explain in detail- Different Intermediate code representations. ii) Explain following with example. * Triple * Quadruple	**07**

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