

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-
 $S \rightarrow iCtSeS \mid iCtS \mid a$
 $C \rightarrow b$

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**
 $S \rightarrow A$
 $A \rightarrow Ad \mid Ae \mid aB \mid aC$
 $B \rightarrow bBC \mid f$
 $C \rightarrow g$

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. **07**

ii) Explain following with example.

* Triple

* Quadruple
