

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (OLD) - EXAMINATION – SUMMER 2018

Subject Code:160706

Date:03/05/2018

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) List out all phases of a language processor. Explain first three phases of it. **07**
(b) Given following expression = $(a+b) * (c+d) + (a+b+c)$ **07**
1. Draw a syntax tree for the expression.
2. Write three-address code for the expression.
3. Give triple representation for the three address code of the expression.

- Q.2** (a) Construct DFA for following regular expression: **07**
 $(a | b)^* abb (a | b)^* \#$
(b) Describe working of LL(1) parser and parse following string : **07**
 $\{ - \langle id \rangle * \langle id \rangle * \langle id \rangle + \langle id \rangle - \}$

OR

- (b) Compare Top Down and Bottom Up Parsing. Find out First and Follow. **07**
 $E \rightarrow TE'$
 $E' \rightarrow +TE' | \epsilon$
 $T \rightarrow FT'$
 $T' \rightarrow *FT' | \epsilon$
 $F \rightarrow (E) | id$

- Q.3** (a) Explain in brief design of a single pass Assembler. **07**
(b) Given the source program: **07**

```
START      100
A          DS      3
L1         MOVER AREG,B
           ADD AREG,C
           MOVEM AREG,D
           MOVER BREG,='2'
           MOVER CREG,='4'
D          EQU      A+1
L2         PRINT    D
           LTROG
           = '2'
           = '4'
C          ORIGIN   A-1
           DC        5
           ORIGIN   L2+3
           STOP
B          DC        '19'
           END       L1
           = '5'
```

- 1) Show the contents of symbol table at the end of pass I.
- 2) Explain the significance of EQU and ORIGIN statements in the program and explain how they are processed by the assembler.
- 3) Show the intermediate code generated from the program.

OR

- Q.3 (a)** Explain following Assembler Directives: **07**
ORIGIN, EQU, LTORG, START
- (b)** Let us consider a two pass assembler and assume that each instruction is **07**
one word. Given an assembly program and code for Mnemonics.

START 101		<u>Mnemonics</u>	<u>CODE</u>
READ A		STOP	00
READ B		MULT	03
MOVER BREG, A		MOVER	04
MULT BREG, B		MOVEM	05
MOVEM BREG, D		READ	09
STOP		DS	02
A	DS 1	START	01
B	DS 1	END	02
D	DS 1	Ordinal number of BREG is 2	
END			

- (i) Show content of symbol table at the end of pass-one of an assembler.
- (ii) Write intermediate code representation of the assembly program. Use variant-II of intermediate code representation.
- Q.4 (a)** Explain in brief the design of a macro preprocessor. **07**
- (b)** Differentiate one pass and two pass assembler. Explain how forward references are handled in **07**
two pass assembler.

OR

- Q.4 (a)** What is macro expansion? Explain advance macro facilities. **07**
- (b)** Describe following data structures: **07**
OPTAB, SYMTAB, LITAB, POOLTAB.
- Q.5 (a)** Write a short note on MS-DOS Linker. **07**
- (b)** Explain and differentiate one pass and two pass compilers. **07**

OR

- Q.5 (a)** Explain different code optimization techniques. **07**
- (b)** What is program relocation? Explain characteristics of self relocating programs. **07**
