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1212E1510

Candidate's Seat No:____

IMSc CS Sem.-7 Examination

System Software

December-2025

Time : 2.30 Hours] **[Max.Marks : 70**

Section I

Q-1 Do as Directed [Any Seven] [7]

1. Define Language Processor.
2. What is a macro call?
3. What is forward reference.
4. Name any two language processing activities.
5. What does an assembler generate as output?
6. The program begins at address 300 and has 7 instructions. What is the address of the last instruction?
7. In a two-pass assembler, which pass generates the symbol table?
8. What is allocation data structure used for in language processing?
9. Define Lexical Analysis

Q-2 Attempt the following:

a. Explain the language processing activities in detail. Draw the complete diagram of language processing system. [7]

b. Explain the design of a Two-Pass Assembler. Write the algorithm for Pass-I and Pass-II. [7]

OR

Q-2 Attempt the following:

a. Describe the different data structures used in language processing. Explain search data structures and allocation data structures with examples. [7]

b. A program contains the following assembly instructions. Construct the symbol table and show Pass-I output of a two-pass assembler. [7]

```
START  20  0
LOOP   MOVER AREG,NUM
       ADD   BREG,VALUE
       MOVEM AREG,RESULT
```

P.T.O

```
NUM   DC   5
VALUE DC   20
RESULT DS  1
END
```

Q-3 Attempt the following:

a. Explain Macro Definition and Macro Expansion with a detailed example. Show how a macro processor expands nested macros. [7]

b. Explain the Pass Structure of Assemblers in detail. Describe the major data structures (OPTAB, SYMTAB, LITTAB, POOLTAB) used in assembling. Illustrate with an example program. [7]

OR

Q-3 Attempt the following:

a. Write a macro which takes A, B, C and D as parameters and calculate A*B+C*D in AREG [7]

b. Explain the algorithm of macro definition processing. [7]

Section II

Q-1 Do as Directed [Any Seven] [7]

1. Define a token.
2. What is relocation?
3. What is the function of a linker?
4. Define External Symbol
5. Define kernel space
6. What is leftmost derivation?
7. Expand the term DFA.
8. What is the difference between lexical error and syntax error?

Q-2 Attempt the following:

a. Explain the phases of a compiler with a neat diagram. Describe each phase in detail. [7]

b. Explain the process of constructing a Predictive Parsing Table for the following grammar: [7]

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$E \rightarrow TE'$
$E' \rightarrow +TE' \mid \varepsilon$
$T \rightarrow FT'$
$T' \rightarrow *FT' \mid \varepsilon$
$F \rightarrow (E) \mid id$

OR

Q-2 Attempt the following:

a. Construct the DFA for the following regular expressions: [7]
(a) (a|b)* abb
(b) a(b|ab)*

b. Discuss the importance of Intermediate Code Generation in compiler design. Give examples of different types of intermediate code representations. [7]

Q-3 Attempt the following:

a. Explain the structure and purpose of the following linker data items: [7]
- ESTAB (External Symbol Table)
- RLD (Relocation Dictionary)
- LEXT (List of External Symbols and References)

b. Explain the function of the following components in device drivers: [7]
- Open()
- Close()
- Read()
- Write()
- IOCTL()

Describe how they interact with the kernel.

OR

Q-3 Attempt the following:

a. Explain in detail the two-pass linking process used in typical systems. What tasks are completed during each pass? [7]

b. What is the difference between a character driver and a block driver? [7]