Roll No.: (E)

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: CSE**	**Semester**	**:III**
Title of the Course	**: Systems Programming**	**Course Code**	**: CSL 203**

Time: 3 Hours **Maximum Marks: 50**

Note: All Sections are compulsory. Assume any missing data if necessary.

Section A

The question in this section is compulsory.

1. There is a distinction between hardware (physical devices) and software (information stored as a binary pattern on cards, tape, and disc with the ultimate purpose of being loaded in memory). Label each of the following as hardware or software: (10)
   a. Compiler
   b. Processor
   c. Operating System
   d. Loader
   e. Assembler
   f. Monitor
   g. Disk drive
   h. I/O channel
   i. Core memory
   j. File

Section B

Attempt any four (04) questions from this section.

1. Explain the working of a two pass assembler in detail with an example. (5)
2. Explain the working of direct-linking loader in detail. (5)
3. Describe the function of each of the RLD, ESD, TXT and END cards. (5)
4. What are the different types of jumps available in assembly level language? Explain at least four in detail with an example. (5)
5. Explain various modules of compiler in detail. (5)

Section C

Attempt any two (02) questions from this section.

1. Consider the grammar for arithmetic expression (x-2 *y) as given below:
   1. Goal → expr
   2. expr → expr + term
   3. | expr – term
   4. | term

5. term → term * factor
6. | term/ factor
7. | factor
8. Factor → number
9. | id

Using the above production rules derive left most derivation and right most derivation for the expression (x-2 *y) in sentential form. Also state whether the above given grammar is ambiguous or not along with reasons. (10)

2. Consider the program using macros as given below:

```
MACRO
 ADD1   &ARG
L 1,  &ARG
A 1, =F'1'
ST 1,  &ARG
MEND
MACRO
ADDS &ARG1, &ARG2, &ARG3
ADD1 &ARG1
ADD1 &ARG2
ADD1 &ARG3

  ADD3 DATA 1, DATA 2, DATA 3

  DATA 1 DC F'5'
  DATA DC F '10'
DATA DC F '15'
```

Expand the above macro program. (10)

3. Write short notes on the following:
   a. Memory partitioning (2)
   b. Paging (2)
   c. Demand paging (2)
   d. Segmentation (2)
   e. Demand paging and segmentation (2)