Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech. / M. Tech. / Ph.D.

Mid-Semester Examination September, 2019

Branch	**: CSE (BTech)**	**Semester**	**: 3rd**
Title of the Course	**: System Programming**	**Course Code**	**: CSL203**

Time: 2 Hours **Maximum Marks: 25**

Note : Attempt all Questions. There is an internal choice in Q5.

Q1. (a) Explain the instruction format of the instruction. **(1)**

ST 2 , 964 (4, 1)

(b) Write a micro-program for the above mention instruction with comments. **(3)**

Q2. Represent the following numbers in the corresponding data format. **(0.5 *5 +1.5 = 4)**

a) $(131)_{10}$ into short form fixed point
b) $(131)_{10}$ into long form fixed point
c) $(131)_{10}$ into packed decimal
d) $131)_{10}$ into unpacked decimal format
e) $(13.45)_{10}$ into single precision IEEE 754 format.
f) $(13.45)_{10}$ into floating point representation where sign field takes 1 bit, bias is computed using 9 bits and mantissa takes 6 bits.

Q3. Construct the following: **(2+2+2 =6)**

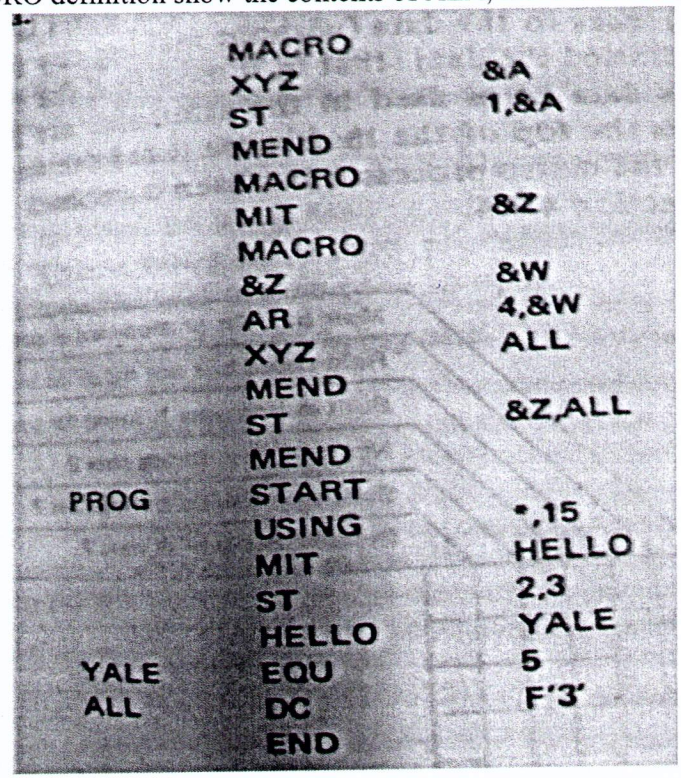
a) Variable tables (symbol table, literal table and base table) , (1+0.5+0.5)
b) MOT, POT (1+1)
c) Also show the relative assembled location mnemonic program after pass1 and pass2 for the following assembly language program. (1+1)

```
TEST    START
BEGIN   BALR 15, 0
        USING BEGIN+2 , 15
        SR 4 , 4
        L 3, = F'10'
LOOP    L 2, DATA(4)
        A 2, = F'49'
        ST 2, DAT(4)
        A 4, =F'4'
        BCT 3,*-16
        BR 14
        LTORG

DATA    DC F'1,3,3,3,3,4,5,9,0'

        END
```

Q4. Consider the problem of finding the sum of 10 numbers. These numbers are stored in 10 adjacent words in the memory of machine. The program is stored in core at absolute location72. Make necessary assumptions related to the relative locations in memory. Write the following programs: **(6)**

a) Machine language program using Instruction as data
b) Machine language program using loops
c) Assembly language program using literals.

Q5. For the following MACRO definition show the contents of ALA, MNT and MDT **(3)**



```
        MACRO
        XYZ     &A
        ST      1,&A
        MEND
        MACRO
        MIT     &Z
        MACRO
        &Z      &W
        AR      4,&W
        XYZ     ALL
        MEND
        ST      &Z,ALL
        MEND
PROG    START
        USING   *,15
        MIT     HELLO
        ST      2,3
        HELLO   YALE
YALE    EQU     5
ALL     DC      F'3'
        END
```

or

Q5. Draw the flow chart for processing macro calls and expansion. **(3)**

Q6. How the constants are represented with DC pseudo-op in assemblers. Discuss. **(2)**
