

INDIAN STATISTICAL INSTITUTE

Mid-Semester Examination

B. Stat. I year, 1st Sem, AY 2025–2026

Introduction to Programming and Data Structures

Date: 12.09.2025

Maximum Marks: 50

Time: 2 Hours

1. Given a dataset as a list of float values, write a Python program, with appropriate comments, to calculate the mean and the variance of the dataset, without using any statistical packages. $[(3 + 4) + 3 = 10]$
2. Define mutable and immutable objects in Python with examples. What is the difference between list, tuple and string? $[(2+2)+(2+2+2) = 10]$
3. Consider N to be the last four digits of your Roll No. Write a program (either in C or in Python), with appropriate comments, to find the smallest prime greater than N. $[7 + 3 = 10]$
4. Perform $64 - 31$ using 1's complement arithmetic. $[5]$
5. Suppose we define a C array as: `int a[4][5][6]`; During execution, if the base address of the above array in a byte-addressable memory is 1020 and the address of an element is given as 1496, find the indices of that element, assuming `sizeof(int) = 4` bytes. $[5]$
6. Write the outputs, with proper explanations, of the following C programs. $[5 + 5 = 10]$

```
(a) #include <stdio.h>
int main()
{
    int i, j = 0;
    for(i = 0; i < 20; i++) {
        if((i+j) % 10 == 0) {
            i += 1; j += i;
        }
    }
    printf("i = %d, j = %d\n", i, j);
    return(0);
}
```

```
(b) #include <stdio.h>
int main()
{
    int i = 1, j = 100;
    while (1) {
        if (j/i != 0) {
            i = i+j; j = i-j; i = i-j;
        }
        if(i%j == 0) break;
        i -= 1; j += 1;
    }
    printf("i = %d, j = %d\n", i, j);
    return(0);
}
```