# 2021

## STATISTICS — HONOURS — PRACTICAL

### Paper : CC-7P

### Full Marks : 30

*The figures in the margin indicate full marks.*

1. Consider the function $f(x) = 1 - x + 2x^2 + 3x^3$. Write three functions in C such that they will return the values of $f(x)$, $\frac{df(x)}{dx}$ and $\frac{d^2 f(x)}{dx^2}$, respectively, when referenced in the main function. Using these, write a program in C to calculate $x$ such that $\frac{df(x)}{dx} = 0$ considering $-1.10$ as the initial. 12

2. Consider the following score distribution in an examination:

| Marks | Number of candidates |
|-------|----------------------|
| 0-20 | 8 |
| 20-30 | 89 |
| 30-40 | 55 |
| 40-60 | 51 |
| 60-80 | 7 |

   Write a program in C to find the number of students scoring below 65 using Lagrange interpolation formula. 10

3. Write a program in C to calculate $A^2 - 2A + I_3$, where A is a 3×3 matrix given by

$$A = \begin{pmatrix} 1 & 5 & 1 \\ -1 & -7 & -1 \\ 0 & 2 & 1 \end{pmatrix},$$

   and $I_3$ is the identity matrix of order 3×3. Your output must return the value of $A^2 - 2A + I_3$ together with the original matrix. 8

_____