

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 $\frac{d^2f(x)}{dx^2}$, 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.

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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.

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