STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI 600086
(For candidates admitted during the academic year 2023 – 24 & thereafter)

B.SC. DEGREE EXAMINATION, APRIL 2026
BRANCH I – MATHEMATICS
SIXTH SEMESTER

COURSE : MAJOR ELECTIVE
PAPER : NUMERICAL METHODS WITH PROGRAMS IN C++ (PRACTICAL)
SUBJECT CODE : 23MT/ME/NM45
TIME : 75 MINUTES **MAX. MARKS: 40**

<table>
<tr><th>Q. No.</th><th>SECTION D (1 × 20 = 40)
Answer any ONE question</th><th>CO</th><th>KL</th></tr>
<tr><td>1</td><td>Write a C++ program to find the derivative at $x = 1931$, of a tabulated function by Newton's Forward Interpolation Formula
<table>
<tr><td>x</td><td>1931</td><td>1941</td><td>1951</td><td>1961</td><td>1971</td></tr>
<tr><td>y</td><td>40.62</td><td>60.80</td><td>79.95</td><td>103.56</td><td>132.65</td></tr>
</table></td><td>4</td><td>4</td></tr>
<tr><td>2</td><td>Write a C++ program to solve a system of linear algebraic equations using Gauss-Jacobi's iteration method
$7.6\,x_1 - 2.4x_2 + 1.3x_3 = 20.396$
$3.7\,x_1 + 7.9x_2 - 2.5x_3 = 35.866$
$1.9\,x_1 - 4.3x_2 + 8.2x_3 = 32.514$</td><td>4</td><td>4</td></tr>
<tr><th>Q. No.</th><th>SECTION E (1 × 20 = 20)
Answer any ONE question</th><th>CO</th><th>KL</th></tr>
<tr><td>3</td><td>Write a C++ program to evaluate $\int_0^1 \frac{1}{1+x^2}\,dx$ numerically using Trapezoidal and Simpson's rule.</td><td>5</td><td>5</td></tr>
<tr><td>4</td><td>Write a C++ program to find the derivative to interpolate and extrapolate using the given pairs of values of x and y by Newton's backword Interpolation Formula
<table>
<tr><td>x</td><td>1961</td><td>1971</td><td>1981</td><td>1991</td><td>2001</td></tr>
<tr><td>y</td><td>46</td><td>66</td><td>81</td><td>93</td><td>101</td></tr>
</table></td><td>5</td><td>5</td></tr>
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