

M.A./M.Sc. Semester II Examination, 2020 (CBCS)

Subject: Mathematics

Course: MMATG – 210 (Numerical Methods (Practical))

Time: 1 Hour

Full Marks: 20

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

[Notations and symbols have their usual meanings]

Answer any **one** question. Only **first** answer will be evaluated. Answer should be limited to two-A4-size pages.

1. Write down an appropriate c-program along with the corresponding working formula and algorithm to compute the value of the integral $\int_0^1 \left(\frac{1}{x+1} + \frac{R}{100} \right) dx$ correct upto four places of decimal places using 10 equal step lengths in Romberg method, where R denote the last three digits of your examination roll number. The output should contain the value of the integral and all input data.
2. Write down an appropriate c-program along with the corresponding working formula and algorithm to compute the numerically greatest eigenvalue and corresponding eigenvector correct up to 4 places of decimal of the following matrix

$$A = \begin{pmatrix} 5.37 + \frac{R}{100} & 2.13 & 1.25 & 2.12 \\ 2.13 & 3.29 + \frac{R}{100} & 1.56 & 4.62 \\ 1.25 & 1.56 & 2.47 + \frac{R}{100} & 1.03 \\ 2.32 & 4.32 & 1.03 & 3.37 + \frac{R}{100} \end{pmatrix},$$

where R denote the last three digits of your examination roll number.

The output should contain the greatest eigenvalue and the corresponding eigenvector, and all input data.