



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours Part-III Examination, 2021

MATHEMATICS

PAPER-XV

NUMERICAL ANALYSIS & COMPUTER SCIENCE AND PROGRAMMING

Full Marks: 50

ASSIGNMENT

*The figures in the margin indicate full marks.
All symbols are of usual significance.*

GROUP-A

Answer all questions

10×3 = 30

1. (a) What do you mean by the degree of precision of a quadrature formula? Show that the degree of precision of Simpson's one-third rule is 3. 5
- (b) Using 4th order Runge-Kutta method, find the solution of the initial value problem: 5

$$u'' = 2u^3, \quad 2 \leq t \leq 2.2, \quad h = 0.1, \quad u(2) = 1, \quad u'(2) = 2$$

2. (a) Find the number of significant figures in $V_A = 1.8921$, given its relative error as 0.1×10^{-2} . 2
- (b) Define rate of convergence of an iterative method. Show that the Newton-Raphson method has second order convergence. 5
- (c) If $f(0) = 1$, $f(1) = 3$, $f(3) = 55$, find the unique polynomial of degree 2 or less, which satisfies the given data. 3

3. (a) Determine the largest eigen value and the corresponding eigen vector of the matrix. 5

$$\begin{bmatrix} 4 & 1 & 0 \\ 1 & 20 & 1 \\ 0 & 1 & 4 \end{bmatrix}$$

correct up to three decimal places by using Power method.

(b) What is partial pivoting? Solve the following system of equations: 5

$$2x_1 + 2x_2 + x_3 = 1$$

$$4x_1 + 2x_2 + 3x_3 = 2$$

$$x_1 + x_2 + x_3 = 3$$

by using Gauss elimination method with partial pivoting.

GROUP-B

Answer *all* questions

10×2 = 20

4. (a) Write down the difference between the functions of assembler and compiler. 2
(b) Convert the number 143 to binary, octal and hexadecimal forms. 3
(c) What is syntax error? Distinguish between “**scanf**” and “**printf**” statements. 3
(d) What is segmentation fault? When it appears? 2
5. Design an algorithm, draw a flow chart and write a C-program to solve the equation $(px^2 + qx + r) = 0$, $p \neq 0$. 10

—×—