Shree H.N.Shukla College of Science Rajkot

MATHEMATICS

T.Y.B.Sc. (Sem. VI) (CBCS)

UNIT TEST

PAPER- 603

Numerical Analysis - II

Time: 1 hour] **[Total Marks: 30**

Instruction: (i) All questions are compulsory.

(ii) Figures to the right indicate full marks of the question.

1. (A) Answer the following: **[05]**

(1) Which formula mean of Gauss's forward & Gauss's backward interpolation formula?

(2) What is the special case of Bessel's formula?

(3) State Gauss's backward interpolation formula.

(4) What is the fifth divided difference of the polynomial of degree four?

(5) If $f(x)=x^3$ then find (1, 3, 5, 7)

(B) Attempt any one: **[02]**

(1) If $f(x)=x^3$ show that $f(a^3, b^3, c^3)=a+b+c$

(2) Derive Inverse Interpolation.

(C) Attempt any one: **[03]**

(1) Given $y_1=22$, $y_2=30$, $y_4=82$, $y_7=106$ and $y_8=206$. Find y_6 using Lagrange's interpolation formula.

(2) Find a polynomial satisfied by the following table.

X	-4	-1	0	2	5
F(x)	1245	33	5	9	1335

(D) Attempt any one: **[05]**

(1) Derive Gauss's forward interpolation formula.

(2) Use Sterling formula to find f(1.63) given

X	1.50	1.60	1.70	1.80	1.90
F(x)	17.609	20.412	23.045	25.527	27.875

2. (A) Answer the following: **[05]**

(1) Which formula known as Newton-cote's formula?

(2) What is Numerical Integration?

(3) For what value of n in general quadrature formula, given Simpson's $\frac{3}{8}$ rule?

(4) Write Trapezoidal rule.

(5) Write Simpson's $\frac{1}{3}$ rule.

(B) Attempt any one: **[02]**

(1) Derive Trapezoidal rule.

(2) Derive $D = \frac{1}{h}\left[\Delta - \frac{1}{2}\Delta^2 + \frac{1}{3}\Delta^3 - \frac{1}{4}\Delta^4 + \ldots\ldots\ldots\ldots.\right]$

(C) Attempt any one: **[03]**

(1) Derive Picard's method.

(2) Solve $y'=y+x^2$, $y(0)=1$ for $y(0.02)$, $y(0.04)$

(D) Attempt any one: **[05]**

(1) Find the first, second and third derivatives of f(x) at x=1.5 is

X	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**
F(x)	**3.375**	**7.000**	**13.625**	**24.000**	**38.875**	**59.000**

(2) Solve $y'=1-y$, $y(0)=0$ in the range $0 \le x \le 0.3$ using (i) Euler's method (ii) Improved Euler's method (iii) Modified Euler's method by choosing h=0.1

****BEST OF LUCK****