P. S. SCIENCE & H. D. PATEL ARTS COLLEGE, KADI

Internal Examination

B. Sc. Semester - III **[Mark : 40**

6-10-2015] **Mathematics - 302** **[1-30 to 3-00**

1. **[A]** Show that n^{th} difference of a polynomial of degree n is constant and $(n + 1)^{th}$ difference will be zero, where values of independent variable are supposed to be given at equal intervals.

OR

[A] Obtain Newton Gregory formula for Balckward interpolation.

[B] **Attempt any two.**

(i) Obtain the polynomial p(x). Where tabulated values of p(x) as below.

x	0	1	2	3	4
p(x)	1	5	21	55	13

(ii) The deta regarding the population of a town for different years is given below. Find the estimation of the population for the year 1895.

year x	1970	1980	1990	2000	2010
population y (In thousand)	40	62	78	93	103

(iii) Given x and y in the following table.

x	0	1	2	3	4
y(x)	0	1	8	27	64

Find y(4.6) using proper interpolution formula

2. **[A]** Obtain Gauss-Backward interpolution formula

[P.T.O.

OR

[A] Obtain Newton's divided difference interpolution formula.

[B] Attempt any two

(i) Use Gauss forward formula to find the value of y when x = 3.2 from the following table.

x	1	2	3	4	5
y	2	9	28	65	126

(ii) Use stirling's formula to find y_{26} given that $y_1 = 12$, $y_{11} = 15$, $y_{21} = 20$, $y_{31} = 27$, $y_{41} = 39$, $y_{51} = 52$.

(iii) Find the polynomial of the lowest degree which assumes the values 3, 12, 15, -21 when x has the values 3, 2, 1, -1 resp.

3. [A] Obtain a general Quadrature formula for equdistant ordinates.

OR

[A] Obtain Simpson's three-eighth rule

[B] Attempt any two

(i) Give the following pairs of values of x and y = f(x) determine the first derivative of f(x) at x = 4

x	1	2	4	8	10
y = f(x)	0	1	5	21	27

(ii) Evalute $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule.

(iii) compute the approximate value of $\int_0^{\pi/2} \sin x dx$

by Trapezoidal rule.
