

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

B.Sc. Sem - III

[Marks 40

17/09/2017

Mathematics:CC-MATH- 302

[1.45 to 3.45

1. (A) If $P_n(x) = C_0x^n + C_1x^{n-1} + C_2x^{n-2} + \dots + C_{n-1}x + C_n$ is n^{th} degree polynomial then prove that $\Delta^n P_n(x) = C_0 n! h^n$

Or

1. (A) Obtain Newton Gregory formula for backward interpolation
(B) Attempt any two.
(i) Express $P_n(x) = x^3 + 4x^2 - 7x - 15$ in the form $(x - 4)^r$ where $h = 2$
(ii) Find third degree polynomial $P(x)$ which pass through the points $(0,1), (1,1), (2,2), (3,8)$. Also find $P(4)$
(iii) Given x and y in the following table

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

Find $y(3.5)$

2. (A) Obtain Gauss Backward Interpolation formula.
Or
2. (A) Obtain Lagrange's interpolation formula for unequal interval.
(B) Attempt any two.
(i) Use Gauss forward interpolation formula to find the value of y when $x = 3.2$ from the following table

| | | | | | |
|--------|---|---|----|----|-----|
| x | 1 | 2 | 3 | 4 | 5 |
| $y(x)$ | 2 | 9 | 28 | 65 | 126 |

- (ii) Obtain the value of x , for $y = 30$ by successive approximation method from the following table

| | | | | |
|--------|----|----|----|----|
| x | 10 | 12 | 14 | 16 |
| $y(x)$ | 25 | 32 | 40 | 50 |

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

3. (A) Obtain General Quadrature formula for equi-distant ordinates and deduce Simpson's one-third rule.

Or

(A) Obtain Picard's method of successive approximation.

(B) Attempt any two.

- (i) Calculate by Simpson's one-third rule an approximate value of

$$\int_{-3}^3 x^4 dx$$

by taking seven equi-distant ordinates. Compare it with exact value.

- (ii) Use Picard's method to approximate y when $x = 0.1, x = 0.2$, given that $y = 1$ when $x = 0$, and $\frac{dy}{dx} = x + y$. Check the result with the exact value.

- (iii) Evaluate:

$$\int_0^6 \frac{dx}{1+x^2}$$

by using Simpson's $3/8$ rule and Trapezoidal rule.

.....