One Two academy

Maximum Marks: 45   **Numerical Methods**   **Duration: 90 minutes**

Std 12 Business Mathematics and Statistics

Answer the following   **5 x 1 = 5**

1. Lagrange's interpolation formula can be used for
   (a) equal intervals only   (c) unequal intervals only
   (b) both equal and unequal intervals   (d) none of these.

2. If c is a constant then $\Delta c =$
   (a) C   (b) Δ (c) Δ^2 (d) 0

3. If h = 1, then $\triangle(x^2) =$ _____.

4. $E \equiv$ _____.

5. Define extrapolation

Answer any four of the following   **4 x 2 = 8**

6. Mention any 2 properties of the operator E.

7. Evaluate $\Delta(\log ax)$.

8. Find $\Delta \log x$

9. If $f(x) = x^2 + 3x$ than show that $\Delta f(x) = 2x+4$.

10. Prove that $\triangle \nabla = \triangle - \nabla$.

11. If $f(x) = x^2 + 2x + 2$ and the interval differencing is unity then find $\triangle f(x)$.

Answer any four of the following   **4 x 3 = 12**

12. If h = 1 then prove that $(E^{-1}\Delta)x^3 = 3x^2 - 3x + 1$

13. Using Newton's forward interpolation formula find the cubic polynomial.

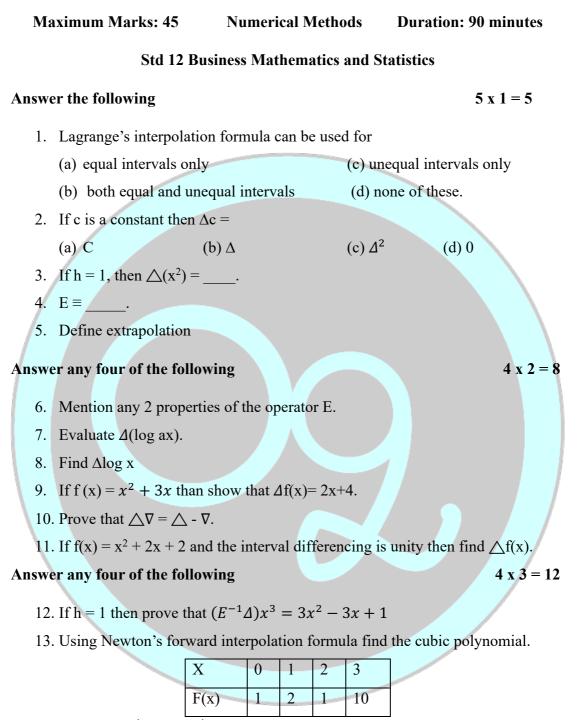| X	0	1	2	3
F(x)	1	2	1	10

14. Evaluate $\Delta \left(\frac{1}{(x+1)(x+2)} \right)$ by taking '1' as the interval of differencing.

15. Given $U_0 = 1$, $U_1 = 11$, $U_2 = 21$, $U_3 = 28$ and $U_4 = 29$ find $\Delta^4 U_0$.

16. From the following table find the missing value

x	2	3	4	5	6
f(x)	45	49.2	54.1	-	67.4

17. Evaluate $\triangle^3 \left[\dfrac{1}{x}\right]$ by taking '1' as the interval of differencing.

Answer any four of the following   **4 x 5 = 20**

18. Using Lagrange's interpolation formula find a polynomial which passes through the points (0, –12), (1, 0), (3, 6) and (4,12).

19. Using interpolation estimate the business done in 1985 from the following data

Year	1982	1983	1984	1986
Business done in lakhs	150	235	365	525

20. Find f (2.8) from the following table:

X	0	1	2	3
F(x)	1	2	11	34

21. The population of a city in a censes taken once in 10 years is given below. Estimate the population in the year 1955.

Year	1951	1961	1971	1981
Population in Lakhs	35	42	58	84

22. The area A of the circle of diameter 'd' is given for the following values:

D	80	85	90	95	100
A	5026	5674	6362	7088	7854

Find the approximate values for the areas of circles of diameter 82 and 91 respectively.

23. Find the missing entries from the following.

x	0	1	2	3	4	5
f(x)	0	-	8	15	-	35

All the Best