

Unit IV
Interpolation and extrapolation
Section - A

One mark questions:

1. What is interpolation? (K)
2. What is extrapolation? (K)
3. Mention an assumption of interpolation and extrapolation. (K)
4. Mention a method of interpolation. (K)
5. Write down the formula of Binomial expansion method for 4 known values of 'y'. (U)

6. Expand $(y-1)^5$. (U)
7. Write the formula of Newton's advancing difference method of interpolation. (U)
8. Write the formula use to find the value of 'x' in Newton's advancing difference method of interpolation. (U)

Section - B

Two mark questions:

9. Differentiate between interpolation and extrapolation. (K)
10. Write two assumptions of interpolation and extrapolation. (K)
11. Mention two methods of interpolation. (K)
12. Write down the conditions for applying of Binomial expansion method of interpolation and extrapolation. (K)
13. Write down the conditions for applying Newton's advancing difference method of interpolation. (K)

Section - C

Five mark questions:

14. Following is data regarding annual net life insurance premium. Using binomial expansion method estimate the premium at the age 30 and 45. (A)

Age (in Years)	20	25	30	35	40	45
Premium (in Rs.)	1426	1581	-	1996	2256	-

15. For the following data estimate the production for the year 2001 and 2005 by binomial expansion method of interpolation and extrapolation. (A)

Year	1995	1997	1999	2001	2003	2005
Production ('000 tons)	20	40	70	?	130	?

16. For the following data estimate the production for 2006 and 2010 by binomial expansion method of interpolation and extrapolation. (A)

Year	2005	2006	2007	2008	2009	2010
Production (tons)	5	?	10	15	20	?

17. For the following data interpolate and extrapolate the sales for the year 2007 and 2011. (U)

Year	2006	2007	2008	2009	2010	2011
Sales	13	?	25	38	65	?

18. Interpolate and extrapolate the production for the years 1989 and 1991 with the help of the following table. (U)

Year	1986	1987	1988	1989	1990	1991
Production	120	122	126	-	135	-

19. The annual sales of a company are given below. Interpolate and extrapolate the sales for the year 2002 and for the year 2005. (U)

Year	2000	2001	2002	2003	2004	2005
Sales (Rs.lakhs)	125	163	-	238	282	-

20. Interpolate and extrapolate the production for the years 1965 and 1975 with the help of the following table. (U)

Year	1950	1955	1960	1965	1970	1975
Production (tons)	100	120	150	-	210	-

21. Interpolate and extrapolate the business for the years 1982 and 1984 from the following data. (U)

Year	1978	1979	1980	1981	1982	1983	1984
Business (in lakhs)	80	150	235	365	-	780	-

22. Interpolate and extrapolate the production for the years 2000 and 2010 with the help of the following table. (U)

Year	1980	1985	1990	1995	2000	2005	2010
Production (tons)	5	12	19	26	-	40	-

23. Cost of living indices of working class of a certain place for some years are given below. Interpolate and extrapolate the missing index number for 1996 and 1999. (U)

Year	1993	1994	1995	1996	1997	1998	1999
Index No.	200	202	206	?	222	240	?

24. Interpolate and extrapolate the production for the years 1982 and 1985 from the following data. (U)

Year	1979	1980	1981	1982	1983	1984	1985
Production (tons)	100	120	150	-	525	780	-

25. By binomial expansion method estimate the number of persons at ages 24 and 30 years with the help of the following data. (A)

Age (Years)	18	20	22	24	26	28	30
No. of persons	20	22	26	?	35	39	?

26. Interpolate and extrapolate the missing values in the following the data. (U)

X	5	10	15	20	25	30	35
Y	5	8	?	13	15	15	?

27. Following is data regarding annual net life insurance premium. Using Newton's advancing difference method estimate the premium at the age of 26 years. (A)

Age (in Years)	20	25	30	35
Premium (in Rs.)	1426	1581	1771	1996

28. The following table shows the expectation of life at different ages. Interpolate the expectation of life at the age 15. (A)

Age (in Years)	10	20	30	40
Expectation of life (in years)	50	42	33	22

29. Using Newton's forward difference method interpolate the value of 'y' when x = 25. (U)

X	10	20	30	40	50
Y	55	48	39	26	7

30. Below are given the wages earned by workers per day in a certain factory. Using Newton's advancing difference method estimate the number of workers earning up to Rs.550 per day. (A)

Wages per day up to (Rs.)	500	600	700	800
No. of workers	50	150	300	500

31. Below are given the wages earned by workers per day in a certain factory. Using Newton's advancing difference method estimate the number of workers earning up to Rs.650 per day. (A)

Wages per day up to (Rs.)	500	600	700	800	900
No. of workers	20	120	240	430	740

32. From the following data estimate the number of persons earning wages below Rs.70 per day using Newton's advancing difference method. (U)

Wages per day	Below 40	40 - 60	60 - 80	80 - 100	100 - 120
No. of persons	500	280	200	140	100

33. From the following data interpolate the number of persons below the age 30 years. (U)

Age (in Years)	Below 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of persons ('000)	30	35	28	19	8

34. From the following table interpolate the number of workers getting salary below Rs.25000. (U)

Wages ('000 Rs.)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of workers	50	80	100	75	40