

1. Define Statistics. State Scope and Importance of statistics.
2. Explain with suitable example:
 - (i) Primary data and Secondary data
 - (ii) Qualitative and Quantitative data.
 - (iii) Discrete and continuous variable
3. Distinguish between: i) Qualitative & Quantitative data ii) Primary & Secondary data iii) Variable & Constant.
4. Define with example:
 - i) Frequency
 - ii) Frequency distribution
 - iii) Cumulative frequency
 - iv) l.c.f. & g.c.f.
 - v) Class interval
 - vi) Class limit
 - vii) Class mark
 - viii) Class width
5. Prepare a frequency distribution by exclusive method taking 10 as class interval and prepare cumulative frequency distribution table.
21,41,25,46,51,22,27,28,29,30,43,44,52,61,75,82,91,29,42,43,44,33,65,62,72,73,74,35,43,44,45,32,33,37,42,49,54,64,73,74,75,84,92,42,46,47,48,50,49,50
6. Following are the marks obtained by 40 students in exam. Prepare a frequency distribution by inclusive method taking 4 as class interval. Find lcf, gcf.
10,17,15,22,11,16,19,24,29,18,28,26,32,14,17,20,23,27,30,12
15,18,24,36,18,15,21,28,33,38,34,13,10,16,20,22,29,19,23,31
7. Write a short note on: i) Histogram ii) Simple bar diagram iii) Pie Chart iv) Ogive curves. How is it constructed?
8. Represent the following data by suitable diagram.
Class: B.Com-I B.Com-II B.Com-III
Students: 33 16 45
9. Describe Bar diagram. Draw a suitable diagram to present the following data.

City	Mumbai	Pune	Nagpur	Nashik	Satara	Kolhapur
Population (in '000)	250	200	180	120	110	130

10. Describe Pie chart. Draw a pie chart to represent the following data.

Item	Food	clothing	Rent	Medicine	Others
Expenditure	644	200	420	80	90

11. Describe Histogram. Draw histogram to represent the following data. And locate the mode.

Age(in years)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of persons	28	45	70	90	65	40	15

12. Describe Ogive curve. Draw an Ogive Curve (less than & greater than) to represent the following data. And find the median.

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	17	35	40	70	55	30	23	17

13. For the data given below find graphically the Two quartiles, Median, D4, P4

X	:25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70
F	: 10	13	18	21	24	28	20	11	9

14. Write a Short note on i) SRS ii) Stratified sampling

15. Distinguish between SRSWOR and SRSWR.

16. Define census, population, sample and sampling methods.

17. What is sampling? State the advantages of sampling over census method.

18. What do you mean by measure of central tendency? What are the requirements of a good measure of central tendency?

19. Define arithmetic mean. State merits and demerits. State properties of mean.

20. Define combined mean and Weighted A.M., find Weighted A.M. of marks of students.

Marks	40	47	52	42	62	50
Weights	4	2	3	5	2	3

21. Define median. How it is determined graphically? State merits and demerits.

22. Define Mode. How it is determined graphically? State merits and demerits.

23. State the empirical relation between mean, mode, median. Use to estimate mean of the distribution whose median and mode are 43 and 40 respectively.

24. Calculate Mean, median and Mode for following

Age	: 0-10	10-20	20-30	30-40	40-50
Persons:	5	8	15	12	10

25. Calculate missing frequency of the following if Mean=37

X	35	36	37	38	39
F	4	10	?	8	5

26. Calculate missing frequency of the following if Mean=25

Age:	13	14	15	16	17
Freq:	2	4	?	9	6

27. Calculate missing frequency of the following if Median of distribution is 33.

Age	10-20	20-30	30-40	40-50	50-60
Person	18	23	?	15	14

28. Define arithmetic mean and mode. State the merits & demerits. The mark obtained by 250 students in statistics are given below: Find mean, mode, median

Marks	: 0-10	10-20	20-30	30-40	40-50
No. of students	: 5	65	85	78	17

29. The following data are the daily wages of workers in a factory.

300, 240, 250, 330, 360, 400, 500, 375, 275, 350.

Find mean, median and estimate the value of mode using empirical relation.

30. State the empirical Relation between mean, median and mode. Find Mode if Mean is 22 and Mode is 25.

31. The average daily income of factory workers was Rs.270. The mean daily income of 70 male workers was 300. Find the mean daily income of 30 Female workers.

32. The mean mark in the statistics of 100 student in a class is 60, of them the mean mark of 70 boys is 75. Find the mean marks of girls in the class.

Calculate Mean, median for following: $X=10,15,12,8,7,17,6,14,5$

33. State the relationship between mean median and mode. For a moderately skewed distribution, the difference between mean and mode is 6 and their sum is 50, find the value of median.

34. The mean of a group of 6 observations is 9. Two new observations 10 and 13 are added to the groups. Find the mean of 100 observations.

35. In a batch of 21 students 10 students failed. The marks of 11 students who passed were 65,66,70,50,40,62,85,90,90,70. Find the median and upper quartile of all students.

36. Mean of 100 items is found to be 30. If at the time of calculations two items are wrongly taken as 32 and 12 instead of 23 and 11. Find the correct mean.

37. Find the Mean, Mode, Median quartiles and 4th decile, 66th percentile of the given data.

Wages (in Rs.)	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of Workers	50	69	81	179	151	119	71	40

38. Following are the number of defects in 15 samples. Find mean, mode, median.

3,5,7,8,4,6,4,7,3,4,8,4,5,3,9.

39. Find Q_1 , Median, D_2 , P_{73} , Mode and mean.

X :	135	136	137	138	139	140	141
f :	4	10	15	18	25	13	9

40. Explain quartiles. Find value of quartiles, D_7 , P_{39} .

Profit	: 100-110	110-120	120-130	130-140	140-150
No. of workers	: 15	85	105	87	37

41. Describe stratified sampling with proportional and optimum allocation.
42. State merits and demerits of simple random sampling.
43. State merits and demerits of stratified sampling.
44. Define Karl Pearson's coefficient of correlation. State and explain mathematical properties of 'r'.
45. Explain: i) Stratification with proportional allocation ii) Stratification with optimum allocation.
46. A population of size 800 is divided into 3 groups. Their sizes and standard deviations are given as follows:

Stratum	I	II	III
Size	200	300	300
S.D.	6	8	2

stratified random sample of size 120 is to be drawn from the population. Determine the sizes of the Samples from the three groups to be selected by :

- i) Proportional allocation ii) optimum allocation

47. Explain Scatter diagram. Interpret i) $r=+1$ ii) $r=-1$ iii) $r=0$
48. Distinguish between positive correlation and negative correlation
49. What are dispersion? What are the main requirements of measures of dispersion? Discuss briefly the merits and demerits of standard deviations.
50. State and discuss various measures of dispersion.
51. What are the measures of dispersion? Distinguish between absolute and relative measures of dispersion.
52. Define: a) Range b) Q.D. c) Coefficient of Q.D.

Calculate Q.D. and its coefficient from the following data.

Sales (in Rs.)	Below 100	100-200	200-300	300-400	400-500	Above 500
No. of Shops	10	15	23	48	18	6

53. Find range, Q.D., coefficient of range, coefficient of Q.D. of the following data:

X :	50	51	52	53	54	55
F :	22	34	50	40	28	15

54. Calculate Q.D., Coefficient of Q.D., M.D. and its coefficient from following data

Sales : 0-100 100-200 200-300 300-400 400-500 500-600

No. of Shops : 10 15 23 48 18 6

55. Define M.D. and S.D. and state its merits and demerits.

56. Compute M.D. about median, S.D. and C.V. for the following data:

Size: 4 6 8 10 12 14 16

Freq: 2 1 3 6 4 3 1

57. Find standard deviation and coefficient of variation of the following marks of students: 8, 9, 15, 23, 5, 11, 19, 8, 10, 12.

58. Find mean, Q.D., variance and C.V. of: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

59. Calculate: i) Range ii) M.D. iii) S.D. iv) C.V. for the following data.

50, 55, 57, 49, 54, 61, 64, 69, 58, 56

60. Given Variance=5, $N=10$, $\sum X=160$. find the value of S.D. and C.V.

61. If the arithmetic mean of 10 observations is 50.2 and sum of square of observations ($\sum X^2 = 400$). Find its S.D. and C.V.

62. Using the coefficient of variation, find which of the following batsman is more consistent in scoring. Would you also accept him as a better run-getter?

Score of A : 42, 115, 6, 73, 7, 19, 119, 36, 84, 29

Score of B : 47, 12, 76, 42, 4, 51, 37, 48, 13, 0

63. Define range and coefficient of rang, mean deviation about median and coefficient of M.D. about median.

The score of two batsman are given below.

Virat	5	4	5	6
Rohit	0	10	5	10

Who is more consistent? Who is a better run getter?

64. Define M.D. about mean. Find M.D. about mean from the following data.

31, 35, 29, 63, 55, 72, 37

65. Define combined mean and combined S.D.

For the data given below,

	Factory A	Factory B
No. of employees	50	100
Average wages	Rs. 120	Rs. 85
Variance	Rs. 9	Rs. 16

Find: a) Combined mean b) Combined S.D.

c) Combined C.V. d) which factory shows more variation

66. The arithmetic mean of runs scored by three batsman A, B, C in the same series of 10 innings are 50, 48 and 2 respectively. Who is the most consistent of the three?

67. If the mean and standard deviation of series of 100 values are 50 and 5 respectively, find the sum of the values and the sum of squares of values of this series.

68. For the set of 15 observations means and variance are 15 and 9 respectively, find $\sum X$, $\sum X^2$.

69. Two groups of size 40 and 50 respectively have the same 50 but different standard deviations 18 and 19. Find the standard deviation of the combined group.

70. If the arithmetic mean of 10 observations is 5.2 and the sum of the squares of the observations is 400. Find its standard deviation and the coefficient of variation.

71. Mean and Standard deviation of a sample of size 10, were found to be 9.5 and 2.5 respectively. Later on an additional observation 15 was included in the original sample. Find the mean and standard deviation of 11 observations.

72. Mean and Standard deviation of a sample of size 100, were found to be 65 and 10 respectively. Another group of 50 items each with value equal to 72 was added to the group. Find the Standard deviation of the combined group of 150 items.

73. The mean and standard deviation of 101 items were found to be 60 and 12 respectively. Later on it was found that one observation 42 was wrongly taken and hence, it was decided to ignore it. Find the mean and standard deviation of remaining 100 items.
74. For a distribution C.V. and mean are 80% and 20 respectively. Find variance and standard deviation of the distribution.
75. Define combined mean and combined S.D. for two groups. The mean and S.D. of 100 items was found to be 65 and 10 respectively. Another group of 50 items with each value equal to 59. Find mean and variance of combined group of 150 observations.
76. If the quartile deviation of certain data is 1.3 and coefficient of quartile deviation is 0.4, find the first and third quartile.
77. Define standard deviation and C.V. The runs scored by two batsman in six innings of three test matched are given bellow:

Innings	:	1	2	3	4	5	6
Runs by Kohli	:	5	28	153	5	41	54
Runs by Rohit	:	65	35	20	80	5	6

Examine the consistency in scoring the runs by two batsman using C.V.

78. Find Karl Pearson's coefficient of correlation from the following data:
 Price(x) : 11, 12, 13, 14, 15
 Supply(y) : 30, 29, 29, 25, 22.
79. Write a note on Spearman's rank correlation coefficient.
80. Define Karl Pearson's coefficient of correlation and explain positive and negative correlation.
81. State any two properties of correlation coefficient. Compute Karl Pearson's coefficient of correlation from the following data.

X :	2	3	5	9	11
Y :	5	7	8	12	14

82. State merits and demerits of Rank correlation coefficient.
83. If the sum of squares of the difference between the rank of certain pairs of observations is 24 and the rank correlation coefficient is 0.80, find the number of observations.
84. State relation between correlation coefficient and regression coefficients and verify them by using following data:

X :	2	3	4	7	6
Y :	10	7	3	1	2

85. State the equation of regression lines. From 10 observations on price (X) and supply (Y) of a commodity, the following data were obtained.

$$\sum X = 130, \sum Y = 220, \sum X^2 = 2288, \sum XY = 3467$$

Compute the equation of line of regression of supply on price and estimate the supply when price is 16 units.

86. What is regression? State the regression equations of Y on X and X on Y.

Given : $N = 25$, $\sum X = 250$, $\sum Y = 375$, $\sum X^2 = 3125$, $\sum Y^2 = 7650$, $\sum XY = 2500$

Find: a) regression of Y on X b) estimate Y when X = 15

87. State the regression equations of y on x and regression coefficient of y on x.

If $b_{yx} = -0.9$, $b_{xy} = -0.4$, $\bar{x} = 50$, $\bar{y} = 40$

Find : i) correlation coefficient.

 ii) regression equations

 iii) Estimate y, if x = 10

 iv) Estimate x, if y = 20

88. State merits and demerits of Rank correlation.

89. Calculate correlation coefficient between price and demand

Price: 2, 3, 4, 7, 6

Demand: 10, 7, 3, 1, 2

90. Define:

i) Regression coefficient of Y on X

ii) Regression coefficient of X on Y

State the relation between correlation coefficient & regression coefficients. Obtain the equation of line of regression of Y on X and X on Y for the following data.

X: 8, 9, 5, 10, 12, 8, 11

Y: 4, 5, 2, 5, 7, 6, 6

91. Find the regression coefficient of X on Y

i) Correlation coefficient between X and Y is 0.4 &

ii) Regression coefficient of Y on X is 1.2

92. What are the equations of regression lines. Give any two examples of it.

Obtain equations of regression lines from the following;

$\bar{X} = 65$, $\bar{Y} = 67$, $\sigma_x = 2.5$, $\sigma_y = 3.5$ &

$r =$ correlation coefficient between X and Y = 0.8

Estimate the value of Y when X = 70.

93. What is the relation between coefficient of correlation and regression coefficients?

Use it to find regression coefficient of X on Y if

i) Correlation coefficient between X and Y is 0.4

ii) Regression coefficient of Y on X is 1.2

- 1) Define with suitable examples OR Explain the terms with suitable examples :
 - i) Experiment
 - ii) Outcome
 - iii) Exhaustive Cases
 - iv) Sample Space
 - v) Impossible Event
 - vi) Certain or Sure Event
 - vii) Simple Event
 - viii) Compound Event
 - ix) Favorable Cases
 - x) Probability
 - xi) Complementary Event
 - xii) Exhaustive Events
 - xiii) Mutually Exclusive Events
- 2) If an unbiased die is throw find the probability of getting:
 - i) An even number
 - ii) A perfect Square
 - iii) A prime number
 - iv) The no. divisible by 6
 - v) the no. divisible by 3
 - vi) The no. divisible by 2 & 3
 - viii) The no, divisible by 2 or 3
- 3) If two dices or dies are rolled at a time. Find the probability of getting:
 - i) same number on both the dies
 - ii) Number 4 on at least one die
 - iii) Sum of dots is 10
 - iv) sum of dots is multiple of 4
 - v) product of dots is multiple of 10
- 4) A three unbiased coins are tossed at a time. Find the chances of getting:
 - i) One head & two tail
 - ii) Two head & one tail
 - iii) No head
 - iv) At least two head
 - v) At most one head
 - v) Exactly two tail
- 5) A card is drawn from pack of 52 cards find the chance of getting:
 - i) Red ace card
 - ii) An Ace card
 - iii) Red King car
 - iv) Queen of spade
 - v) Non queen card
 - vi) either non spade card or picture card
- 6) In a box there are 4 white balls, 6 black balls. If 2 balls are selected randomly. Then find the probability that:
 - i) Selected halls are of same colour
 - ii) One hall from each colour is selected
 - iii) Both white coloured balls are selected
 - iv) Both black coloured balls are selected
 - v) One white and one red ball is selected
- 7) A card is drawn from a pack of cards. Find the probability that it will be:
 - i) a picture card, given that it is a spade
 - ii) a Spade card, given that it is a picture card

- 8) If $A = \{2,4,6,8,10\}$, $B = \{1,2,3,4,5,6,7\}$, $C = \{5,6,7,8\}$ then find $P(A|B)$, $P(B|A)$, $P(A|C)$, $P(C|B)$, $P(A \cap B)$, $P(A \cup C)$, $P(B \cup C)$
- 9) If $P(A) = 0.3$, $P(B) = 0.6$, $P(A \cap B) = 0.2$ then find :
- i) $P(A \cup B)$ ii) $P(A|B)$ iii) $P(B|A)$ iv) $P(\bar{B})$
- 10) If $P(A) = 0.4$, $P(\bar{B}) = 0.5$, $P(A \cap B) = 0.2$ then find :
- i) $P(\bar{A})$ ii) $P(B)$ iii) $P(A \cup B)$ iv) $P(A|B)$ v) $P(B|A)$
- 11) For any two events, define conditional probability of A given B and conditional probability of B given A.
- 12) State Addition and multiplication (product) laws of probability.
- 13) A box containing 3 red, 4 white & 3 black balls. Three balls are drawn one by one without replacement. Find the probability that they will be:
- i) red-white-black in this order ii) white red black in this order.
- 14) There are two groups of children. One group contains 2 boys & 2 girls, while other contains 1 & 3 girls. One child is selected from each group, find the probability of getting the children of same sex.
- 15) A single die is thrown & X is No. on die then find probability distribution of X.
- 16) Three coins are tossed simultaneously & X: No. of runs then find probability distribution of x.
- 17) Define Binomial Distribution & State its mean and variance and properties.
- 18) Explain Real Life examples where Binomial Distribution can be used.
- 19) If A and B any two events such that $P(A) = 1/2$ & $P(B) = 1/2$ find the $P(A \cup B)$ if
- i) A & B independent event ii) A & B Disjoint Event
- 20) Find all parameters of Binomial with usual notation:
- i) Mean=20 and S.D.=4 ii) Mean=3 and Variance =3/2
- 21) Find the probability of getting 4 heads in 10 throws of an unbiased coin.
- 22) Write definition of Binomial distribution. The mean and variance of Binomial distribution are 5 and 4 respectively, then find n, p and q.
- 23) The mean and variance of Binomial distribution are 6 and 4 respectively, then find n, p and q.
- 24) If X is binomial variate such that $n=8$ & $p=1/2$ find
- i) Mean & Variance of X ii) $P(x=0)$ iii) $P(x>7)$
- 25) If X is binomial variate with mean 5 and variance 4, find

- i) all parameters of the distribution ii) $P(x=0)$ iii) $P(x=2)$ iv) $P(x<2)$ v) $P(x\geq 2)$
- 26) Out of 1000 families of 4 children each, how many would you expect to have two boys and two girls?
- 27) If X is binomial variate with mean 5 and variance 2.5, find
 i) all parameters of the distribution ii) $P(x=0)$ iii) $P(x=2)$ iv) $P(x<2)$ v) $P(x\geq 8)$
- 28) Define Binomial distribution. If X is a binomial variate such that $n=4$ and $25P(X=3) = P(X=1)$. Find parameter p , mean and variance.
- 29) A can solve the problem 2 times in 5. B can solve it 3 times in 5. If both attempt, find the probability that:
 i) The problem will be solved ii) The problem will not be solved
- 30) State addition and multiplication laws of probability. A problem in Statistics is given to two students A and B. Probability that A solves it is $\frac{2}{3}$ and B solves it is $\frac{3}{4}$. Find the probability that the problem will not be solved.
- 31) Define Binomial distribution. If the probability of a bolt being defective is 0.1, find mean and variance for the distribution of defective bolts in a lot of 400.
- 32) Define Binomial distribution. Comment on the following:
 ‘The mean and variance of Binomial distribution are 3 and 4 respectively’.
- 33) Define Normal Distribution & State its properties & give standard areas under normal curve.
- 34) Draw a neat sketch normal curve & state its properties.
- 35) Define Normal Distribution & State its Mean, S.D, Q.D. and M.D.
- 36) Define S.N.V. ‘Z’ & give its Probability density function
- 37) Difference between Normal and Binomial Distributions.
- 38) If X is Normal variate with mean = 60 & S.D.= 3 Find:
 i) Two quartiles ii) Q.D. iii) M.D.
- 39) If X is a Normal variate such that mean = 75 and variance = 81. Then Find
 i) Lower and Upper quartiles ii) Q.D. iii) M.D. iv) $p(X<84)$ v) $p(X<66)$
- 40) If two quartiles of Normal variate X are 110 and 128 respectively. Find:
 i) Mean ii) median iii) S.D. iv) Q.D. v) M.D. vi) C.V.
- 41) The weights in kg of 1000 students are normally distributed with their mean 40 kg and S.D. is 4 kg. Find the number of students with weights:
 i) less than 36 kg ii) more than 45 kg iii) between 36 kg and 45 kg.

[Area under S.N.V. from $Z=0$ to $Z=1$ is 0.3413 and from $Z=0$ to $z=1.25$ is 0.3944]

42) Define standard normal probability distribution. State its mean and variance. The scores made by candidates in a certain test are normally distributed with mean 50 and S.D. 10. what percentage of the candidates receives scores:

- i) less than 40 ii) between 40 and 70

(Area under normal curve from $Z=0$ to $Z=1$ is 0.3413 and $Z=0$ to $Z=2$ is 0.4772)

43) The first and third quartiles of a normal distribution are 80 and 116 respectively. Find the mean and Standard Deviation (S.D.)

44) Define standard normal probability distribution. State its mean and variance. If X has normal distribution with mean 100 and Variance 25 find:

- i) $P(X > 108)$ ii) $P(X \leq 110)$ iii) $P(90 \leq X \leq 110)$

(Area for S.N.V. Z from $Z=0$ to $Z=1.6$ is 0.4452 and $Z=0$ to $Z=2$ is 0.4772)

45) The weight of 550 students from certain class are normally distributed with mean 40 kg and variance 25 kg. Find:

- i) Percentage of students having weight more than 30 kg.
ii) Number of students having weight between 45 kg and 50 kg.

[Given area under normal curve from $z=0$ to $z=2$ is 0.4772 and $z=0$ to $z=1$ is 0.3413]

46) Define normal distribution. State any four properties of normal distribution. If X is normally distributed with mean 12 and S.D. is 4 find:

- i) $P(X > 20)$ ii) $P(0 < X < 12)$ iii) $P(16 < X < 20)$

Given area under normal curve form: i) $Z=0$ to $Z=1$ is 0.3413

ii) $Z=0$ to $Z=2$ is 0.4772 iii) $Z=0$ to $Z=3$ is 0.4986

47) Define p.d.f. of S.N.V. State its mean and variance. The weights of 1000 students are found to be normally distributed with mean 50 kg and S.D. 5kg. Find the number of students with weights:

- i) less than 45 kg. ii) between 45 kg and 60 kg.

[For S.N.V. Z , area from $Z=0$ to $Z=1$ is 0.3413 and from $Z=0$ to $Z=2$ is 0.4772]

48) State the any four properties of normal curve. The weights of 2000 students are found to be normally distributed with mean weight 50 kg. and S.D. 5 kg. Find the number of students with weights:

- i) more than 45 kg. ii) between 45 and 60 kg.

[For S.N.V. the area under the normal curve from $z=-1$ to $z=1$ is 0.6826 and

from $z = 0$ to $z = 2$ is 0.4772]

49) Define normal distribution. Sketch the normal curve and state its properties if X is a normal variate with mean 80 and S.D. 5 Find :

- i) Limits of middle 50% data i.e. Q_1 and Q_3 ii) $P(X < 85)$ iii) $P(X > 70)$
 (Given-Area under standard normal from $Z = -$ to $Z = 1$ is 0.6827 and $Z=-2$ to $Z = +2$ is 0.9545)

50) State any four properties of Normal distribution. The average daily sales of 500 branches of a company was Rs. 1,500 and the standard deviation was Rs. 150. Assuming the distribution to be normal, indicate how many branches have sales:

- i) Below Rs. 1,200 ii) Between Rs. 1,350 and Rs. 1,650.

(Given for S.N.V. Z area between 0 and 1 is 0.3413, also area between 0 and 2 is 0.4772).

51) What is the Time Series? State its Components. Give an example of each component. Write uses of it.

- 52) Explain: i) Secular Trends ii) Seasonal Variations
 iii) Cyclical Variations iv) Irregular variations

53) Describe the method of i) Moving Average ii) Progressive Average iii) Least squares

54) Find three yearly moving average from the following data and plot them along with original values on the same graph.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sales (Lakhs)	8	9	10	11	12	15	14	18	20	15

55) Compute 5-yearly moving Average for following data. Plot trend values and actual values on same graph.

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Production	42	45	50	51	41	38	54	25	50	40

56) Compute 4-yearly moving Average for following data. Plot trend values and actual values on same graph.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Data	21	15	16	29	51	58	36	16	23	28

57) Calculate progressive averages for the following time series. Plot trend values on graph along with original values.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Data	17	24	31	44	53	60	71	88

58) Apply the method of progressive average to determine trend values

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Production	40	44	42	48	52	50	53	52	55

59) The figures of production of a sugar factory are given bellow.

Year	2007	2008	2009	2010	2011	2012	2013
Production	77	88	94	85	91	98	90

Fit a straight line by the method of least square and estimate the likely production for the year 2014.

60) Fit a straight line trend to the following data by the method of least square.

Year	2007	2009	2011	2013	2015
Production	15	22	25	28	19

Obtain the trend values.

61) Define Index Number and discuss its utility.

62) Define i) Simple aggregate index number ii) Average of relative price index number

63) Write note on 'Weighted index numbers'.

64) Explain the problems in the construction of index numbers.

65) Define: i) Laspeyre's price index number ii) Paasche's price index number
iii) Fisher's I.N.

66) Define: i) Laspeyre's quantity index number ii) Paasche's quantity I.N.
iii) Fisher's quantity I.N.

67) State relation between Laspeyre's, Paasche's and Fisher's price index numbers. Use it to find Paasche's price index numbers when Laspeyre's and Fisher's price index numbers are 125.61 and 124.8 respectively.

68) Obtain Paasche's quantity index number if $Q_{01}(F) = 87.50$, $Q_{01}(La) = 88.55$

69) Define value index number.

70) Compute price index number by simple aggregate and average of price relative method from the following data.

Commodity	A	B	C	D	E	F
Price(2005)	60	50	60	50	25	20
Price(2010)	80	60	72	75	37.5	30

71) Compute Laspeyre's, Paasche's and Fisher's ideal price index numbers from the following data.

Commodity	2009		2010	
	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

72) Compute Laspeyre's, Paasche's and Fisher's ideal price index numbers from the following data.

Commodity	1999		2000	
	Price	Expenditure	Price	Expenditure
A	8	80	10	80
B	20	100	25	250
C	5	75	8	96
D	10	70	12	120

73) Compute quantity indices by Laspeyre's, Paasche's and Fisher's method from the following data

Commodity	2010		2012	
	Price	Quantity	Price	Quantity
A	25	150	30	140
B	15	50	20	30
C	50	120	50	160
D	40	80	35	140
E	10	130	15	120

74) Define S.Q.C. And Explain: i) Chance cause and Assignable cause ii) Control Chart

75) State the advantages of Statistical Quality Control (S.Q.C.)

76) Explain construction of control chart for number of defect in a certain sampling inspection.

77) Explain construction of Range chart, Mean chart.

78) Explain construction of C-chart

79) What is control chart? What are types of control chart?

80) Define control limits for i) Mean chart ii) Range chart iii) C chart iv) np chart

81) Explain product control & process control.

82) What do you understand by S.Q.C.? Explain the use of SQC in industry and producers as well as consumers point of view.

83) Construct control chart for Mean and Range for the following data

Sample No.:	1	2	3	4	5	6	7	8	9	10
Mean(X) :	43	49	37	44	45	37	51	46	47	47
Range(R) :	5	6	5	7	7	4	8	6	4	6

(Given: $n=5$, $D_3=0$, $D_4=2.11$, $A_2=0.58$)

84) Draw Range chart for the following data

Sample	1	2	3	4	5	6	7	8	9	10
Range	2.1	3.1	3.9	2.1	0.9	3.0	2.5	2.8	2.5	2.0

(Given for $n=5$, $D_3=0$, $d_4=2.11$)

85) Draw suitable control chart and comment.(Given sample size=100)

Sample No. :	1	2	3	4	5	6	7	8
No. of defects :	12	14	20	12	15	10	10	4

86) What is S.Q.C.? An inspection of 10 samples of size 400 each from 10 lots revealed the following number of defective units. 17, 15, 14, 26, 9, 4, 19, 12, 9, 15. Draw an appropriate control chart and comment on it

87) Write note on np-chart. An examination of 10 new model computers revealed the following number of defects per computer. 8, 5, 6, 4, 3, 8, 8, 10, 9, 9. Draw an appropriate control chart and state your conclusion

88) Draw suitable control chart and comment.

Sample No. :	1	2	3	4	5	6	7	8	9	10
No. of defects :	4	3	5	7	1	6	8	2	4	6