QUESTION BANK

LESSON: 1] Population, Sample and Data Condensation

Q1] Define Statistics. Explain the scope of statistics in the following fields:
i) Information Technology ii) Management and iii) Economics.

Q2] Explain the terms i) Population ii) Sample and iii) Sampling unit. What are the requirements of a good sample? Also state the limitations of sampling.

Q3] Distinguish between census and sample.
State the advantages of sampling over census.

Q4] State the different methods of sampling. Explain Simple Random Sampling (SRS) and the procedure of drawing i) SRSWR and ii) SRSWOR.

Q5] Define the following terms.
a) Raw data b) Attributes c) Variable d) Frequency distribution
e) Relative frequency f) Frequency density g) Class mark
h) Open end class i) discrete variables j) continuous variables
k) Class boundaries and l)Inclusive method and Exclusive method.

Q6] Explain Less than and more than cumulative frequencies.

Q7] Explain the construction of i) ogive curves and ii) Histogram.

Q8] Draw i) Histogram ii) less than ogive curve and iii) more than ogive curve for the following frequency distribution.

Marks:	0-10	10-20	20-30	30-40	40-50
No. of students:	5	12	43	32	8

Q9] Draw a Histogram and less than cumulative frequency curve to represent the following data of the earnings (in Rs.) of workers.

Monthly Earnings: 80-120 120-160   160-200   200-240 240-280 280-320

No. of workers: 4   7   13   8   5   2

Q10] Marks Scored by 50 students in a test paper are given below.

30, 45, 48, 55, 39, 25, 31, 12, 18, 21, 54, 59, 51, 33, 43, 44, 10, 38, 19, 26, 41, 35, 37, 41, 46, 33, 51, 37, 58, 58, 17, 19, 23, 26, 29, 38, 57, 36, 35, 44, 43, 27, 19, 43, 22, 31, 47, 34, 31, 15.

Classify the above data by using 'inclusive method' of classification. Start with 10-14, 15-19,……..

LESSON 2: MEASURES O CENTRAL TENDENCY

Q.1 what do you mean by Average? What are the objectives & requisites of good measures of central tendency?

Q.2 State merits and demerits of Arithmatic mean. Explain in which situations mode is preferable to Arithmatic mean. Also write a note on weighted arithmetic mean.

Q.3 Define median? Explain how it is calculated?

Q.4 Define mode? Explain mode as a statistical average.
    Explain how mode is calculated by using graphical Method?

Q.5 Compare mean & median in the light of requisites and usefulness.

Q.6 Explain briefly, the relative merits and demerits of mean, median & mode.

Q.7 Define Quartiles. How are they calculated?

Q.8 Calculate Arithmetic mean, Median and Mode for the following weights o 10 boys: 55, 52, 62, 50, 65, 52, 53, 59, 60, 54.

Q.9 Find the mean, median and mode of the following data:

X	1	2	3	4	5
Freq	25	15	20	15	10

Q.10 Find the modal wages of the following frequency distribution:

Hourly Wages: Below 20   20-40   40-60 60-80 80-100
No. of persons: 1   9   32   16   7

Q.11 A student scored 50,54,55,60 marks in four subjects Maths, Economics, Geography and English. Assigning weights 3,3,2,1 respectively, find the weighted A.M. of the scores of the student.

Q.12 Calculate arithmetic mean, median and mode for the following data.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Freq	4	6	9	6	5	4	4	2

Q.13 Calculate the arithmetic mean for the following data using step deviation method.

Class	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Freq	50	70	100	180	150	120	70	60

Q.14 The mean salary of 50 employees was calculated to be Rs. 680/- per month. Later it was found that salary of Mr. A was wrongly taken as Rs. 270/- instead of Rs.720/- What will be the correct mean salary.

Q.15 Find the combined mean for the following data:

Mean(X_1) = 210, Mean of (X_2) = 150, n_1 = 150, n_2 = 100

Q.16 The mean weight of 150 students in a class is 60 kg. The mean weight of boys is 70 kg. and the mean weight of girls is 55 kg. Find the number of boys and girls in the class.

Q.17 Mean weight of 98 students as calculate from a frequency distribution is found to be 50 kg. It is later discovered that the frequency of the class

interval 30-40 was wrongly taken as 8 instead of 10. Calculate the correct A.M.

Q.18 Find the missing frequency from the following data given that average number of tablets required to cure a person is 20.

No. of tablets	4-8	8-12	12-16	16-20	20-24	24-28	28-32	32-36	36-38
No. of persons cured	11	13	16	14	---	9	17	6	4

Q.19 Find the missing frequency from the following data whose median is 126.

Class	100-110	110-120	120-130	130-140	140-150
Freq	5	---	20	10	7

Q.20 Calculate median, mode, lower quartile and upper quartile for the following data. Also locate them graphically.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	10	17	26	30	33	25	12	9

Q.21 The arithmetic mean, mode and median of a group of 100 observations were calculated to be 30,37 & 32 respectively. It was later discovered that one observation was wrongly noted as 56 instead of 65. Find the correct values of A.M.,mode & median.

Q.22 Compute the quartiles for the following series of observations.
26, 30, 35, 5, 6, 7, 9, 20, 40, 45, 11, 18, 15, 49, 60.

Q.23 Find the quartiles from the following frequency distribution using formula.

Monthly	1400-	1600-	1800-	2000-	2200-	2400-

salary	1600	1800	2000	2200	2400	2600
Frequency	12	30	55	40	35	28

Lesson: 3] <u>Measures of Dispersion</u>

Q.1 Explain the concept of dispersion. List the various measures of dispersion. What are requisites of a good measures of dispersion?

Q.2 What are the absolute and relative measures of dispersion?

Q.3 Define Standard Deviation for ungrouped & grouped data. State its merit and demerits. Also define Coefficient of variation and state its utility.

Q.4 Define Quartile deviation and coefficient of quartile deviation. State its merits and demerits.

Q.5 Define mean deviation and coefficient of mean deviation. State its merits and demerits.

Q.6 Define combined variance and combined standard deviation.

Q.7 Define Variance and discuss the effect of change of origin and scale on variance.

Q.8 Find the range & coefficient of range of the following series which gives the monthly expenditure of students in rupees.

22   35   32   45   42   48   39

Q.9 For a distribution Q_1=23.41, Q_2=25.3, Q_3=27.63. Find quartile deviation and coefficient of quartile deviation.

Q.10 Calculate mean deviation about median and mean deviation about mean from the following data. Also calculate Coefficient of mean deviation.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Freq	18	16	15	12	10	5	2	2

Q. 11 The mean weight of 150 students is 60 kg. The mean weight o boys are 70 kg, with S.D. of 10 kg. For girls the mean weight is 55 kg with S.D. of 15 kg. Find the number of boys and combined S.D.

Q.12 Calculate the standard deviation and coefficient of variation of the following observations on a certain variable.

240.12   240.13   240.15   240.12   240.17

240.15   240.17   240.16   240.22   240.21

Q.13 The mean of two samples of sizes 50 & 100 respectively are 54.1 & 50.3 and the standard deviations are 8 & 7. Obtain the standard deviation of sample of size 150 obtained by combining the two samples.

Q.14 Find the missing information from the following:

	Group I	Group II	Group III	Combined
Number	50	?	90	200
Standard deviation	6	7	?	7.746
Mean	113	?	115	116

Q.15 A shareholder research centre of India has given the following results.

Share	Average price	Standard deviation
A	18.2	5.4
B	22.5	4.5
C	24.0	6.0

Above figures are in Rupees. Which share in your opinion appears to be more consistent?

Q.16 A sample of 50 cars each of 2 makes X and Y is taken and average running life in years is recorded.

Life (No. of years)	No. of Cars	
	Make X	Make Y
0-5	8	6
5-10	12	10
10-15	17	20
15-20	10	12
20-25	3	2

i)   Which of these two makes gives higher average life?
ii)   Which of these two makes shows greater consistency in performance?

Q.17 Scores of two golfers for 12 rounds were as follows.

Golfer A: 74, 75, 78, 78, 72, 77, 79, 78, 81, 76, 72, 72.
Golfer B: 86, 84, 80, 88, 89, 85, 86, 82, 82, 79, 86, 80.

Find which golfer may be considered to be a more consistent player.

Q.18 For the two groups, following results were obtained.

GroupI: $\sum(x_1-5) = 8$, $\sum(x_1-5)^2 = 40$, $N_1=20$

GroupII: $\sum(x_2-8) = -10$, $\sum(x_2-8)^2 = 70$, $N_2=25$.

Find the mean and standard deviation of the 45 observations obtained by combining the two groups.

Q.19 The mean & standard deviation of 20 observations are 10 & 2 respectively. Later it was discovered that item 8 taken was incorrect. Calculate Arithmetic mean and standard deviation if:

i) The wrong item is omitted.

ii) The wrong item is replaced by 12.

Q.20 Calculate standard deviation from the following data:

Size of Item: 4-8 8-12 12-16 16-20 20-24

No. of Items: 5   10   12   10   8

Q.21 Number of runs scored by cricketers A and B in 5 test matches is shown below:

A : 5   20   40   90   60

B : 10   30   50   70   50

Which cricketer is more stable? Justify.

Chapter: 4] Permutations and Combinations

Q1) State the fundamental principals of counting with one illustrations each.

Q2) Define permutation in case of the following, with one illustration each:

a) Permutation of distinct objects

b) Permutation of objects not all distinct and

c) permutation with repetition.

Q3) Define combination with one illustration.

Distinguish between permutation and combination.

Q4) How many 3 letter words can be formed using the letters of the word 'COMPUTER'.

Q5) How many three digit numbers divisible by 5 can be formed out of 5,6,7,8,9, if i) no digit is to be repeated?, ii) a digit may be repeated any number of times?

Q6) A committee of 4 persons is to be formed from 10 persons. Find the number of possible ways?

Q7) A cricket team of 11 players is to be formed from 18 players consisting of

7 bowlers, 3 wicket-keepers and 8 batsmen. In how many ways the team can be formed so that it contains exactly 5 bowlers and 2 wicket-keepers?

Q8) In a basket there are 5 mangoes and 6 oranges. If any 3 fruits are to be selected from these, find the number of ways in which: i) exactly 2 mangoes are selected ii) atleast 2 mangoes are selected and iii) no mango is selected

Chapter: 5] <u>Sample Space , Events and Probability</u>

Q1) Distinguish between deterministic and non-deterministic experiment with two examples each.

Q2) Explain the following with suitable examples: i) Sample Space ii) Event iii) Mutually exclusive events iv) Exhaustive events and v) Certain event.

Q3) Three coins are tossed and outcome on the uppermost face is recorded. Let A: Exactly two coins show tails and B: Atleast two coins show tails. Determine whether the events A and B are mutually exclusive? Are they exhaustive?

Q4) State the classical definition of probability with one illustration. Also state its limitations.

Q5) State the axioms of probability.

Q6) State and prove the addition theorem of probability.

Q7) Define the independence of two events? Does independence of two events imply that the events are mutually exclusive? Justify your answer.

Q8) Explain the concept of conditional probability. State and prove the multiplication theorem for two events defined on sample space.

Q9) Define the partition of a sample space? State the Bayes' theorem.

Q10) If a pair of unbiased coins is tossed, obtain the probability of getting: i) both heads ii) One head and iii) Atleast one head iv) Atmost two heads .

Q11) From a well shuffled pack of 52 cards, four cards are drawn at random. Find the probability of getting i) two red and two black cards ii) all different cards iii) all cards same and iv) one is king.

Q12) Find the probability of getting 53 Sundays:
i) in a Leap year and   ii) in a non-leap year.

Q13) i) The letters of the word 'SEMINAR' are arranged at random. Find the probability that the vowels are occupied in the even places.
ii) If a three digit number is to be formed out of 1,2,3,4 and 5: a) with repetition and b) without repetition, find the probability that it is divisible by 5

Q14) If P(A)=0.6, P(B)= 0.5, P(A⌒B)=0.3. Calculate P(A'), P(AUB), P(A'⌒B), P(A'⌒B') and P(A'UB').

Q15) The probability that a contractor will get a plumbing contract is 0.4 and that he will get an electrical contract is 0.7. If the probability of getting atleast one contract is 0.6, what is the probability that he will get i) both the contracts and ii) exactly one contract?

Q16) Four cards are drawn at random from a well shuffled pack of 52 cards. Find the probability that i) two cards are red and two are black, ii) all cards are of different suits, iii) all are of same suit, iv) one of the card is king.

Q17) Two symmetric dice are rolled simultaneously. Find the probability of getting, sum of the numbers on the dice to be : i) eight ii) even iii) perfect square iv) either even or perfect square and v) numbers on the dice are same.

Q18) In a group of 10 men, 6 are graduates. If 3 men are selected at random, what is the probability that i) all are graduate ii) atleast one will be graduate, iii) at most two will be graduate, iv) none will be graduate?

Q19) A problem in statistics is given to three students A, B, C whose chances of solving the same are 1/2, 1/3, ¼ respectively. If they solve problem independently, what is the probability that the problem will be solved?

Q20) In a community 5% of people suffer from cancer. The probability that a doctor is able to correctly diagnose a person suffering from cancer is 0.9. The doctor wrongly diagnoses a person without cancer as having cancer with probability 0.1. What is the probability that a randomly selected person diagnosed as having cancer as really suffering from cancer?

10. Statistical Quality Control

Q.1 What do you understand by statistical quality control? Discuss briefly its need & utility in industry.

Q.2 What is control chart? Explain the basic principles underlying the control charts.

Q.3 Explain the construction of control charts for mean & range.

Q.4 Explain in detail X-bar & R-chart.

Q.5 Construct a control chart for mean and the range for the following data on the basis of fuses, samples of 5 being taken every hour (each set of 5 has been arranged in ascending order of magnitude.) Comment on whether the production seems to be under control, assuming that these are the first data:

42	42	19	36	42	51	60	18	15	69	64	61
65	45	24	54	51	74	60	20	30	109	90	78
75	68	80	69	57	75	72	27	39	113	93	94
78	72	81	77	59	78	95	42	62	118	109	109
87	90	81	84	78	132	138	60	84	153	112	136

Q.6) Given below are the means and ranges of samples of size 4 each taken every hour:

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
Mean (X bar)	69.4	63.4	57.0	64.0	57.4	82.0	85.0	33.4	46.0	112.4	93.6	95.6
Range (R)	45	48	62	48	36	81	78	42	69	84	84	75

Construct control chart of means and ranges. Also comment on state of control

(n = 4, A_2 = 0.729, D_3 = 0, D_4 = 2.282)