

**ITM(SLS) BARODA UNIVERSITY, VADODARA**

**School of Computer Science  
Engineering & Technology**

**(B.Tech. SEM-VII)**

**Probability and Statistical Modelling for Computer Science**

**ASSIGNMENT-1**

**PART-A -THEORY QUESTIONS**

Q1. Define Statistics. Write applications of statistics in Computer Science

Q2. What are measures of central tendency? Explain each of them with a comparison.

Q3. Write a short note on:

(i) Types of statistics.

(ii) Data measurement level

(iii) Measures of dispersion

(iv) Graphical representation of data with drawbacks and benefits.

(v) Skewness

(vi) Kurtosis

(vii) Coefficient of variation.

**PART-B-MULTIPLE CHOICE QUESTIONS**

Answer all the following multiple-choice questions.

1) Value of  $\Sigma fd$  is 12,  $A = 22.5$ , and width of class interval is 5, arithmetic mean is 23.1 then number of observations are-

A.100

B.103

C.105

D.102

2) If mean is 25 and standard deviation is 5 then C.V (Coefficient of variation) is

A. 100%

B. 25%

C. 20%

D. None of these

3) The Coefficient of Skewness is always zero for ———— distribution

A. Symmetrical

B. Skewed

C. None of these

4) If right tail is longer than left tail then distribution is called

A. Negatively Skewed

B. Positively Skewed

C. None of these

5) Median of 7, 6, 4, 8, 2, 5, and 11 is

A. 6

B. 12

C. 11

D. 4

## PART-B-NUMERICAL QUESTIONS

**Q1.** Construct a frequency distribution for following distribution:

(i) Marks obtained by 20 students in the test are as follows. 5, 10, 20, 15, 5, 20, 20, 15, 15, 15, 10, 10, 10, 20, 15, 5, 18, 18, 18, 18.

(ii) 95, 67, 28, 32, 65, 65, 69, 33, 98, 96, 76, 42, 32, 38, 42, 40, 40, 69, 95, 92, 75, 83, 76, 83, 85, 62, 37, 65, 63, 42, 89, 65, 73, 81, 49, 52, 64, 76, 83, 92, 93, 68, 52, 79, 81, 83, 59, 82, 75, 82, 86, 90, 44, 62, 31, 36, 38, 42, 39, 83, 87, 56, 58, 23, 35, 76, 83, 85, 30, 68, 69, 83, 86, 43, 45, 39, 83, 75, 66, 83, 92, 75, 89, 66, 91, 27, 88, 89, 93, 42, 53, 69, 90, 55, 66, 49, 52, 83, 34, 36

**Q2.** Represent the following information using the appropriate graphical method:

(i) The following table shows the mode of transport used by 400 students of a college. Represent the following information on the pie chart. Show the steps of construction of pie graph for the given data along with the calculation.

Mode of Transport	Bus	Bicycle	On foot	By car
No. of Students	200	100	80	20

(ii) The number of bed-sheets manufactured by a factory during five consecutive weeks is given below.

Week	First	Second	Third	Fourth	Fifth
Number of Bed-sheets	600	850	700	300	900

Draw the bar graph representing the above data.

(iii) Draw the frequency polygon for the following data

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	4	6	8	10	12	14	7	5

**Q3.** The following data give the savings bank account balances of nine samples

Households selected in a survey. The figures are in rupees.

745    2,000    1,500    68,000    461    549    3750    1800    4795

(a) Find the mean and the median for these data; (b) Do these data contain an outlier? If so, Exclude this value and recalculate the mean and median. Which of these summary measures has a greater change when an outlier is dropped? (c) Which of these two summary measures is more appropriate for this series?

**Q4.** Find mean, mode, standard deviation, and coefficient of skewness for the following-

Years under:      10      20    30    40    50    60

No. of Persons:    15    32    51    78    97    109

**Q5.** Find median of following data

2000,    1180, 1785, 1500, 560,    782,    1200, 385,    1123, 222.

**Q6.** The data profit (in Rs.lakh) earned by 60 companies is as follows:

Profits:              Below 10    10-20    20-30    30-40    40-50    50 and above

No of companies:    5              12            20            16            5            2

(a) Obtain the limits of profits of central 50% companies.

(b) Calculate the coefficient of Skewness.

**Q7.** The median and mode of the following wage distribution are known to be Rs.335 and Rs.340 respectively. Three frequencies from the data are missing. The total frequency is 230. Find the missing frequencies.

Wages	0-100	100-200	200-300	300-400	400-500	500-600	600-700
Freq.	4	16	60	-	-	-	4

**Ans:**  $f_4 = 100$ ,  $f_5 = 40$ ,  $f_6 = 6$  .

**Q8.** The median and mode of the following wage distribution are known to be Rs.335 and Rs.340 respectively. Three frequencies from the data are missing. The total frequency is 230. Find the missing frequencies.

Wages	0-100	100-200	200-300	300-400	400-500	500-600	600-700
Freq.	4	16	60	-	-	-	4

**Ans:**  $f_4 = 100$ ,  $f_5 = 40$ ,  $f_6 = 6$  .

- Q9.** For the following distribution, compute Quartiles and hence find the Coefficient of Skewness .

Income(Rs)	Below 200	200-400	400-600	600-800	800-1000	1000 & above
No.of persons	25	40	85	75	16	16

**Ans:**  $Q_1 = 396.25$ ,  $Q_2 = 549.41$ ,  $Q_3 = 714$ , C.S = 0.036

- Q10** Find  $D_4$ ,  $P_{77}$  for the following distribution

Class	10-19	20-29	30-39	40-49	50-59
Frequency	2	9	15	14	10

**Ans:**  $D_4 = 35.5$ ,  $P_{77} = 48.43$

- Q11** The number of runs scored by a team in 10 matches were recorded as 312, 309, 310, 307, 309, 306, 300, 311, 308, 305. Find mean, median, mode and standard deviation.

**Ans:**  $\bar{x} = 307.7$  ,  $M = 308.5$  ,  $Z = 309$  , S.D. = 3.29

- Q12** If  $n = 10$ ,  $\bar{x} = 12$  and  $\Sigma x^2 = 1530$ , then calculate the coefficient of variation.

- Q13** A group of 100 candidates have their average height 163.8 cm with coefficient of variation 3.2. What is the standard deviation of their heights?

- Q14** If the coefficient of variation is given as 20.75 and the mean is 22.6 then find the standard deviation.

- Q15** Two plants C and D of a factory show the following results about the number of workers and the wages paid to them.

No. of workers	5000	6000
Average monthly wages	Rs.2500	Rs.2500
Standard deviation	9	10

Using coefficient of variation formulas, find in which plant, C or D is there greater variability in individual wages.

- Q16** If the coefficient of variation is given as 20.75 and the mean is 22.6 then find the standard deviation

- Q17 CASE-STUDY**-Hindustan transport corporation” a transport service provider company owned about 15,000 trucks. HTC Is known for safe and fast delivery of goods. The maintenance manager observed that several thousand rupees were being spent on maintenance of trucks of which majority expenditure was on tyre servicing. The tyres were being reliable. Sometimes the tyres had to be changed much before their life as claimed by the supplier, as the journey was long and the load to be born was high. The bumpy, zigzag and mountainous roads increase the threat to the tyre. However the maintenance manager felt that the quality of the tyres could be better when the purchasing manager conveyed this matter to the supplier company, “J.K.Traders Pvt Ltd” Ahmedabad. He bluntly turned it down. The marketing managers of J.K.Traders told that they were supplying the tyres of the best quality in the industry to HTC. The improvement in the quality can not be thought in the near future. With this negative response from J.K.Traders, HTC felt its supplier was becoming dominant and dictating the terms. Quality is a very crucial parameter which HTC never compromised with so, the managing director, Mr Karan directed Mr Yatharth to look out for alternative suppliers “Road star pvt ltd” and “King tyre pvt ltd”. When the two suppliers of tyres tested in simulated environment, the results were as follows:

Life of Tyres (Thousand of KM)	Numbers of Tyres.	
	Road Star Pvt. Ltd	King Tyre Pvt Ltd
5-10	2	4
10-15	3	7
15-20	10	11
20-25	15	25
25-30	14	10
30-35	17	2
35-40	9	1

Find the following:

1. Construct histogram and frequency curve for both tyre suppliers, compare the symmetries.
2. Compute and compare mean, median and mode life of the tyres supplied by the two suppliers and interpret the values.
3. Derive the standard deviation and variance of life of tyres supplied by the two suppliers.
4. Which supplier would you choose if you were the GM of HTC? Why? Justify your decision with appropriate quantitative tools.