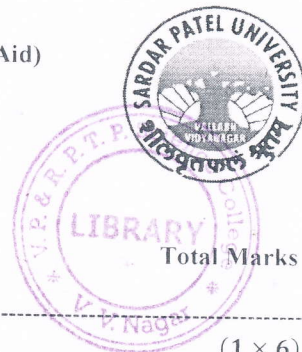


A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE (AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120

Bachelor of Science (Semester 1) Internal Examination - 2024
US01MISTA01 – Descriptive Statistics for Univariate Data



Date : 4th September, 2024, Friday

Time : 11 am to 12 pm

Note : Q.2 and 3 carry 7 marks each.

Total Marks : 20

Q.1 Multiple Choice Questions

(1 × 6)

- (1) At a health club, 60% of the members are men and remaining are women. If the average age of the men is 30 and the average age of all members is 34 years then the average age of the women is _____ years
(a) 32 (b) 48 (c) 40 (d) 50
- (2) In a survey, when respondents are asked to rate their satisfaction on a scale from "Very Dissatisfied" to "Very Satisfied", the data collected is typically
(a) nominal (b) discrete (c) ordinal (d) continuous
- (3) If each observations of a given set is multiplied by 10, the mean of the new set of observations
(a) remains the same (b) is 10 times the original mean
(c) is one tenth of original mean (d) increased by 10
- (4) Given that $n = 15, \sum Xi = 170, \sum Xi^2 = 2830$. One of the observations, 20 was found to be wrong and removed. The correct value of the standard deviation is
(a) 60.30 (b) 58.87 (c) 7.77 (d) 7.67
- (5) Juhi wants to calculate his grade in the subject of statistics. The teacher's policy is that the internal test weight 30%, quizzes 20%, homework 20%, projects 5% and the final examination is 25%. The marks obtained by Juhi is given below:

Internal test	Quizzes	Homework	Projects	Final Examination
92	95	100	90	85

What will be his final grade in the class be?

- (a) 92.40 (b) 92.13 (c) 92.26 (d) 92.35
- (6) The standard deviation of observations 31, 32, ..., 47 is _____
(a) $4\sqrt{3}$ (b) $\sqrt{\frac{17}{12}}$ (c) $2\sqrt{6}$ (d) $\sqrt{\frac{47^2 - 1}{12}}$

Q.2(a) In a group of n people, the mean age of men and women is 30 years. If the mean age of x men is 32 and $(n - x)$ women is 27, find the percentage of men and women in the group.

(b) Find the geometric mean of n numbers $a, ar, ar^2, ar^3, \dots, ar^{n-1}$

OR

Q.2(a) Find the harmonic mean of ratio of first n natural numbers.

(b) The following table gives the distribution of daily income of 500 workers in a factory.

Daily income(Rs.)	50 – 100	100 – 150	150 – 200	200 – 250	250 – 300	300 – 350
No. of workers	10	25	145	220	70	30

Determine (i) the limits for the middle 70% of the workers (ii) no. of workers who earned (a) less than 145

(b) between 122 to 280 (iii) percentage of workers having daily income more than mode income.

Q.3(a) Two groups with n_1 and n_2 observations having mean $\bar{X}_1$ and $\bar{X}_2$, standard deviations S_1 and S_2 respectively. Derive the formula for combined variance in each of the following cases:

- (i) $\bar{X}_1 = \bar{X}_2$ (ii) $n_1 = n_2$ (iii) $n_1 = n_2$ and $\bar{X}_1 = \bar{X}_2$ (iv) $n_1 = n_2$ and $\bar{X}_1 = \bar{X}_2$ and $S_1 = S_2$

(b) The daily expenditure of 100 families are given below:

Daily Expenditure(Rs.)	0 – 200	200 – 400	400 – 600	600 – 800	≥ 800
No. of families	13	?	27	?	16

If the median of the distribution is 420. Find the missing frequencies. Is the distribution symmetrical? Justify your answer by calculating most suitable statistical measure.

OR

Q.3(a) The mean and variance of seven observations are 12 and 27 respectively. If five of the observations are 2, 7, 10, 12, 17, find the remaining two observations. Draw Box – and – whisker plot based on all observations and find outlier, if any.

(b) Define raw and central moments. Express central moments in terms of raw moments. How will you calculate coefficient of skewness and kurtosis based on it?