Sardar Patel University

B.Sc. Semester-III Examination

Saturday, 24th November, 2018

Time:- (02:00 A.M. to 5:00 P.M.)　　　US03CSTA01　　　　　M.Marks:70

(Descriptive Statistics)

Note:- (i) Simple/ Scientific calculator is allowed. (ii) Graph paper will be provided on request.

Q.1.　　　Multiple Choice Questions:-　　　　　　　　　　　　　　　　[10]

(1)　For the distribution of 5 observations : 18, 18 , 18 , 18, 18. Mode is.

　　a) 18　　　　b) 90　　　　c) 324　　　　d) 0

(2)　A characteristic of the mean is that

　　a) it is not affected by extreme scores.
　　b) it is best used with ordinal data.
　　c) the sum of the deviations about the mean is zero.
　　d) None of these.

(3)　If any one of the observation is zero then . . . mean is zero.

　　a) Harmonic　　b) Geometric　　c) Arithmetic　　d) None of these.

(4)　The data in the graph is .
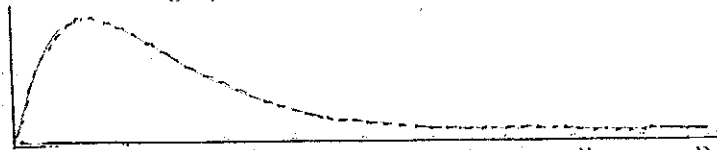
　　a) Negatively skewed
　　b) Positively skewed
　　c) Normally distributed
　　d) None of these

(5)　If $\beta_2 > 3$ then the given curve is

　　a) a platypus　　b) leptokurtic.　　c) a mesokurtic　　d) none of these

(6)　In case of open end classes, an appropriate measure of dispersion to be used is.

　　a) Median　　b) Mode　　c) Quartile deviations　　d) Standard deviation.

(7)　Base period for an index number should be

　　a) a year only
　　b) a normal period
　　c) a period at distant past
　　d) none of these

(8)　Laspeyre's index method the . . . year quantities are as weights.

　　a) base　　b) current　　c) both (a) & (b).　　d) none of these

(9)　Vital Statistics are broadly classified as.

　　a) Mortality　　b) Fertility　　c) both (a) & (b).　　d) none of these

(10)　Death rate calculated for a particular specified section of the population is known as.

　　a) Crude death rate
　　b) Specific death rate
　　c) Standardized death rate.
　　d) none of these

Q.2.　　　Short Type Questions:- (Attempt Any Ten)　　　　　　　　　[20]

(1)　What do you mean by measures of central tendency? Write down the

characteristics of the ideal measures of central tendency.

(2) What is the weighted mean of first 10 natural numbers whose weights are equal to the corresponding number?

(3) A man have to drive 100 kmph wishes to achieve an average speed of 15 kmph. For the first half of the journey his average speed is only 10 kmph. What must be his average speed for the second half of the journey if his overall average speed is 15 kmph?

(4) Express central moments in terms of raw moments.

(5) Which measure of dispersion do you consider to be best and why?

(6) Explain the meaning of skewness using suitable diagram. State the various methods to determine skewness and its coefficient.

(7) What is Index numbers?

(8) What are the Factor reversal Test and the Time reversal test?

(9) What is Base Year? What is current Year?

(10) What is Vital statistics? What events are covered under vital Statistics?

(11) What are the measures of mortality to express death rates? What is the standardized death rate

(12) State the uses of Vital Statistics.

Q.3. (a) Following is the distribution of marks in Statistics obtained by 50 [05] students.

Marks (More than)	0	5	10	15	20	25
No .of students	50	46	40	20	10	3

Calculate the median marks. If 60% of the students pass this test, find the minimum marks obtained by pass candidates.

(b) The following table gives the frequency distribution of the marks of 80 [05] candidates in an examination.

Marks	0-15	15-30	30-45	45-60	60-75
No. of students	5	22	30	17	6

Determine (i) the no. of students having marks (a) less than 35 (b) between 13 to 27 (c) more than 50. (ii) If passing standard is 40%, find % of results .

OR

Q.3. (a) (i)Prove that Arithmetic mean of series in A.P. (Arithmetic Progression) [05] is equal to the arithmetic mean of its first and last term.

(ii) A cyclist covers his first three kms at a speed of 8 kmph, another 2 kms at 9 kmph and the last 2 kms at 4 kmph. Find the average speed for the entire journey.

(b) State the properties of Mean. Prove any one of them. [05]

Q.4. (a) For a distribution, the mean is 10, variance is 16, β_1 is +1 and β_2 is 4. [04] Obtain the first four central moments. Also obtain second, third and fourth raw moment.

(b) Interpret the nature of skewness by calculating a suitable statistical [06] measure.

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	1	6	14	43	21	13	1

Q.4. (a) In usual notation, Prove that [05]

$$S^2 = \frac{\sum_{i=1}^{k} ni(Si^2 + di^2)}{\sum_{i=1}^{k} ni} \quad , \text{where} \quad di = Xi - \overline{X} \ , \ i = 1,2,...,k \quad \overline{X} = \frac{\sum_{i=1}^{k} ni \, Xi}{\sum_{i=1}^{k} ni}$$

Hence, state the results for two populations.

(b) Define the raw moment and the central moment. [05]
Prove that Moments are independent of change of origin but not scale.

Q.5. (a) If L(p) , L(q), P(p) and P(q) represent Laspeyre's and Paasche's index [04] numbers for prices and quantities respectively show that
$$\frac{L(p)}{L(q)} = \frac{P(p)}{P(q)}.$$

(b) Test whether given formula satisfies Factor reversal test and Time [06] reversal test.

$$I = \sqrt{\frac{\sum p_0 q_0}{\sum p_1 q_1}} \times 100.$$

Q.5. (a) Calculate Laspeyre's, Paasche's and Fisher's indices for the following [06] data.

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	8	600	11	460
B	3	125	3	149
C	5	70	8	80
D	11	39	13	25
E	9	50	11	26

(b) Apply Time reversal test and Factor reversal test for the data given in [04] Q.5.(a) .using Laspeyre's formula.

Q.6. (a) Explain methods of obtaining the Vital statistics. [05]
(b) Explain about crude death rate with its limitations. [05]

Q.6. Define the term (i) Crude Death Rate (ii) Standard Death Rate. [10]
Calculate (i) Crude Death Rate for Town A and Town B.
(ii) Age specific Death Rate for Town A and Town B.
(iii) Standard Death Rate taking the population of Town A as standard population and compare the health conditions by Direct method and Indirect method.

Age groups	Town A		Town B	
(in years)	Population	No. of Deaths	Population	No. of Deaths
0-5	7040	315	8300	491
5-15	13645	341	15510	348
15-35	14300	394	19620	431
35-50	5625	462	9190	889
>50	7710	563	563	7480