



Q.1. Answer the following short questions. (15x2=30)

- (i) Define Descriptive and Inferential statistics
- (ii) Define a variable. Differentiate between discrete and a continuous variable.
- (iii) What is meant by frequency distribution and cumulative frequency distribution.
- (iv) Define the statistical term histogram and frequency polygon.
- (v) What is a measure of central tendency? What are its desirable qualities?
- (vi) Show that $\sum(x_i - \bar{x}) = 0$
- (vii) What is coefficient of variation? What purpose does it serve?
- (viii) The first four moments of a distribution about $x = 2$ are 1, 2.5, 5.5 and 16 calculate the first four moments about mean and calculate β_1 and β_2 .
- (ix) Compare the simple aggregative and weighted aggregative index numbers.
- (x) Prove that fisher's ideal index satisfies the factor reversal test.
- (xi) Show that standard deviation of regression $sy.x = \sqrt{\frac{\sum y^2 - a \sum y - b \sum xy}{n-2}}$
- (xii) Define rank correlation, which quantity is added to $\sum d^2$ for tied ranks.
- (xiii) What is meant by coefficient of determination?
- (xiv) Distinguish between the secular and seasonal variation in time series analysis.
- (xv) Define detrending and deseasonalization.

Solve the following questions.

Q:2 (a) The following data relate to size of shoes sold at a store during a given week. Find the median and the modal size of shoes also find D_9 and P_{70} . (6+4=10)

Size of Shoes	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	$9\frac{1}{2}$
No of Pairs	3	7	20	30	60	50	25	17	8	2

(b) Show that $\text{var}(x + a) = \text{var}(x)$ where 'a' is some constant.

Q:3 (a) Show that correlation coefficient is independent of change of origin and scale i.e. $r_{xy} = r_{uv}$ if

$u = \frac{x-a}{h}, v = \frac{y-b}{k}$ (4+6=10)

(b) Construct fisher's ideal index number for 2011, taking 2010 as base

Items	Quantity		Value	
	2010	2011	2010	2011
A	110	175	600	1000
B	90	120	400	800
C	70	85	200	350

Q:4 (a) Compute the seasonal indices by ratio to trend method using least square line $y = 119.56 + 2.76x$ by taking origin in the centre and unit of x being half quarter.

(b) Deseasonalize the values of years 1999 and 2000 (7+3=10)

Year	QUARTERS			
	I	II	III	IV
1997	72	98	79	106
1998	79	122	101	143
1999	94	141	128	160
2000	125	143	135	187