UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / First Semester – Spring 2022

Roll No. .....

Paper: Statistics-I **Course Code: STAT-101** **Time: 3 Hrs.** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

(i) Differentiate between Parameter and Statistic
(ii) Define qualitative variable and quantitative variable, give any one example of each type.
(iii) Describe briefly the main steps in the preparation of Frequency table from raw data.
(iv) What is a cumulative frequency curve? How does it differ from the ordinary curve?
(v) Show that $\sum(x_i-a)^2=\sum(x_i-\bar{x})^2+n(\bar{x}-a)^2$ where 'a' is any arbitrary number.
(vi) Differentiate between simple Arithmetic Mean and weighted Arithmetic Mean.
(vii) What is meant by skewness? What are the measures of skewness, name them and also give formulae.
(viii) The following values have been obtained from a frequency distribution of weights (lb) having 125 observation after making the substitution. $x = 16 + 5\,U$, $\Sigma fu = -46$, $\Sigma fu^2 = 306$, $\Sigma fu^3 = -242$, and $\Sigma fu^4 = 1962$ check that either the distribution is Meso Kurtic or not.
(ix) Compare the simple Index and composite Index.
(x) Show that Fisher's ideal Index satisfies the time reversal test.
(xi) Show that coefficient of determination r^2 is $r^2=\frac{a\sum y+b\sum xy-(\sum y)^2/n}{\sum y^2-(\sum y)^2/n}$
(xii) Describe the properties of regression line.
(xiii) What is analysis of time series.
(xiv) Write brief note on semi average method.
(xv) Define standard deviation of regression.

Solve the following questions.

Q:2 (a) Find (i) Arithmetic Mean and (ii) Geometric Mean of the series. 1, 3,9, 27, 81.....3^n

(b) The mean and Variance of variable "x" are 60 and 64 respectively. Find Mean and Variance of new variable if

(i) All the Values of x are increased by 20 points.

(ii) All the values of x are increased by 10%. **(5+5=10)**

Q:3 (a) Obtain (i) Simple aggregative value index.
(ii) An index of average value, for each year from the following data.

Years	Declared values	Values on the basis of 2010 values
2010	900	900
2011	1050	988
2012	1500	1000
2013	1700	832

(b) For n pairs of value of two variables when each variable is ranked in order (1 to n) show that coefficient of rank correlation is $r_s=1-\frac{6\sum d^2}{n(n^2-1)}$. **(5+5=10)**

Q:4 (a) Compute Seasonal Indices by link Relative Method for the following data.

Year	Jan-March	April-June	July-Sep	Oct-Dec.
2001	80	101	126	92
2002	85	110	123	90
2003	83	99	125	94
2004	86	102	129	92

(b) Fit a Straight line $y = a + bx$ from the following results for the year 1948-58 (Both inclusive)

$$\sum x=0,\sum y=438.9,\sum x^2=110$$
$$\sum xy=-84.4$$

(6+4=10)

Find out the estimated trend values for 1960 and 1961.