COMSATS UNIVERSITY ISLAMABAD
Department of Statistics
Assignment # 1

Course Title:	Statistics and Probability Theory		Course Code:	MTH262	
Course	Dr. Tajammal Hussain				
Semester:	SP23	Batch:	BCS	Section:	A,B& C	Assigned date	03-03-23
Due Date	March 13,2023			Maximum Marks:	100
Instruction:	Use A4 page, the title page should be typed.				

Note: Upload a scanned copy on CUI Portal, strictly, within duedate.

Problem 1. (20)
   a) Define and explain "Statistics" as a subject.
   b) What are the two types of Statistics? Explain, functions of each of the type with examples.
   c) What are the key connections between Statistics and:
       i.   Machine Learning
       ii.   Artificial Intelligence
       iii. Big Data
   d) Write a note on emerging field of Data Science in the context of Statistics learning.
   e) What are the types of variable (data)? Enlist any 10 examples for each of type from your core area of study.

Problem 2. (20) All questions are referred to "Introduction to Statistics" by Prem S. Maan.
Chapter No.1: 15, 20,21,33,
Chapter No. 2: 14,62,67,70,73
Chapter No. 3: 70, 97,124, ,138

Problem:3. (20)
A large business firm was supposed to document its salary record. Salaries in Rs. (000) of all of its employees are reported and recorded as below:
67,88,23,60,31,79,45,68,120,34,56,75,89,95,38,50,64,39,34,78,105,109,90,70,60,45,67,90,28,40,
53,85,56,56,60,40,50,45,65,56,76,73,80,45,50,115,100,35,70,50,75,90,40,60,39,90,38,60,56,78,5
8,90,40,30,56,88,77,66,92,40,70,80,67,90,40,66,30,60,70,66,38,90,30,70,65,55,77,50,55,66,78,1
00, 110,99,59,96.
   a) Arrange the data into an appropriate number of classes:
       i)   By tally method
       ii) By stem-and-leaf method
   b) Arrange the data into an ascending order.
   c) Find median, 1st Quartile, 3rd Quartile, and 10th decile and mode of data for raw data.
   d) Find range and quartile range for raw data.

Problem:4. (20)

Distribution of examination marks of collage students' is given below:

Marks	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Number of students	8	87	190	304	211	85	20

a) Find and interpret following measures of central tendency:
   i) Arithmetic mean
   ii) Mode
   iii) Median
   iv) Geometric mean
   v) Harmonic Mean
b) Find and interpret the following measures of Dispersion:
   i. Range
   ii. 1st Quartile
   iii. 10th Decile
   iv. Variance and standard deviation
   v. Coefficient of range
c) Develop:
   i. a bar chart by taking class-limits on X-axis.
   ii. a Histogram by taking class-boundaries of X -axis. Also, discuss about the shape of histogram.
   iii. an Ogive curves.

Problem:5. (20)

Two new production systems are being evaluated for consistency of their performance. It is found that System 'xyz' has an average production rate of 2500 units /hour with a standard deviation of 15 units/hour, minimum production rate 1800 units/hour, maximum production rate of 2900 units/ hour, first quartile production rate of 2200 units/ hour and the third quartile production rate of 2700 units/hour.

Another system 'ABC' has an average production rate of 2300 units/hour with a standard deviation of 10 units/hour, minimum production rate of 1900 units/hour, maximum production rate of 2700 units/ hour, first quartile production rate of 2000 units/ hour and the third quartile production rate of 2500 units/hour. Decide which production system is more consistent by using;

a) Coefficient of Range method
b) Inter-quartile Method
c) Coefficient of Variation method