University of Central Punjab
Faculty of Information Technology
Final Term Exam-F22

Program	BSCS, BSSE	Semester	Fall 22
Course Title	Probability and Statistics	Course Code	CSSS2743, SESS-2733
Course Instructor	Ms. Aurooj Butt Ms Sana Amjad Ms Rubina Naz Ms Zainab Mansoor Ms Umama Tahir Ms Maham Yaqoob	Section	D1,D2,D3,D4,D5, P1,P2,P3
Date	13-02-23	Time Slot	9:00 to 11:30
Time Allowed	2.5 h	Total Marks	50
Student Name		Registration No.	0897

Note: Attempt all Questions (follow the sequence of Question numbers on your answer sheets). Do your rough work on your provided Answer Sheets. Understanding of the Questions is the part of evaluation.

Short Questions

[10*2=20 marks]

Solve All the Questions in the same sequence:

1. Suppose average pizza delivery times are normally distributed with an unknown population mean and population standard deviation of six minutes. A random sample of 28 pizza delivery restaurants is taken and has a sample mean delivery time of 36 minutes. Find a 90% confidence interval estimate for the population mean delivery time. **(2)**
2. Suppose the null hypothesis, is that a patient is not sick. Which type of error has the greater consequence, Type I or Type II? **(2)**
3. Suppose we know the confidence interval is (42.12, 47.88). Find the error bound and sample mean. **(2)**

4. In the United States the ages of smartphone users, approximately follow a normal distribution with approximate mean and standard deviation of 36.9 years and 13.9 years, respectively. Find the 80th percentile of this distribution, and interpret it in a complete sentence. **(2)**

5. A normal distribution has a standard deviation of 1.We want to verify a claim that the mean is greater than 12. A sample of 36 is taken with a sample mean of 12.5. By assuming p value 0.013 state the hypothesis and interpret the results. **(2)**

6. Suppose X has a normal distribution with mean 25 and standard deviation five. Between what two values of X do 95% of the data values lie? **(2)**

7. Data are collected on the relationship between the number of hours per week practicing a musical instrument (X) and scores on a math test (Y). The line of best fit is as follows:

$$\hat{y} = 72.5 + 2.8x.$$

Are both variables in Inverse proportion and what is the Value of Regression Coefficient? **(2)**

8. An unknown distribution has a mean of 45 and a standard deviation of eight. Samples of size $n = 30$ are drawn randomly from the population. Find the probability that the sample mean is between 42 and 50. **(2)**

9. Use the following information to answer the following parts: One hundred eight Americans were surveyed to determine the number of hours they spend watching television each month. It was revealed that they watched an average of 151 hours each month with a standard deviation of 32 hours. Assume that the underlying population distribution is normal. Identify the following: **(2)**

a. $\bar{x}$ = _____

b. s_x = _____

c. n = _____

d. $n - 1$ = _____

10. The golf scores for a school team were normally distributed with a mean of 68 and a standard deviation of 3. Find the probability that a randomly selected golfer scored less than 65. **(2)**

Long Questions [10*3=30]

Question no 11 (10)

A particular brand of tires claims that its deluxe tire averages at least 50,000 miles before it needs to be replaced. From past studies of this tire, the standard deviation is known to be 8,000 miles. A survey of owners of that tire design is conducted. From the 28 tires surveyed, the mean lifespan was 46,500 miles with a sample standard deviation of 9,800 miles. Using alpha = 0.05, is the company's claim justified?

Question no 12 (10)

The Human Toxome Project (HTP) is working to understand the scope of industrial pollution in the human body. Industrial chemicals may enter the body through pollution or as ingredients in consumer products. In October 2008, the scientists at HTP tested cord blood samples for 20 newborn infants in the United States. The cord blood of the "In utero/newborn" group was tested for 430 industrial compounds, pollutants, and other chemicals, including chemicals linked to brain and nervous system toxicity, immune system toxicity, and reproductive toxicity, and fertility problems. There are health concerns about the effects of some chemicals on the brain and nervous system. Following data shows how many of the targeted chemicals were found in each infant's cord blood.

79, 145, 147, 160, 116, 100, 159, 151, 156, 126, 137, 83, 156, 94, 121, 144, 123, 114, 139, 99

Use this sample data to construct a 90% confidence interval for the mean number of targeted industrial chemicals to be found in an in infant's blood.

Question no 13: (10)

Use the following information to answer the next two parts. A random sample of ten professional athletes produced the following data where x is the number of endorsements the player has and y is the amount of money made (in millions of dollars).

x	0	3	2	1	5	5	4
y	2	8	7	3	13	12	9

a) Estimate the least square regression equation taking the number of endorsements as an independent variable.
b) Calculate correlation coefficient and interpret your findings.