

JAMIA HAMDARD

Department of Medical Elementology & Toxicology

School of Chemical and Life Sciences

BSc (Hons.) Toxicology, (2023-24)

Semester-IV End term Examination

Paper Name: Applied Biostatistics

Paper Code: BTX-MIC401

Time: 2:30 hours

Maximum Marks: 60

Note: This paper has 3 sections A, B and C. Attempt all the three sections. Read instructions given before each section and answer the questions accordingly.

SECTION-A

Instructions: Attempt all the questions.

(1x20=20)

- Q.1. What are the basic assumptions of linear regression?
- Q.2. Define secondary data with example.
- Q.3. What do you know about kurtosis?
- Q.4. How many types of errors in statistical hypothesis? Define it.
- Q.5. Define critical region.
- Q.6. Write the axiomatic definition of probability.
- Q.7. If $NPR=1$, then what we conclude about the future population.
- Q.8. Write down the mean and variance of binomial distribution.
- Q.9. Define sample space. Write the sample space if two coins are tossed simultaneously.
- Q.10. Define crude birth rate.
- Q.11. Distinguish between census and sampling.
- Q.12. What do you understand by positive correlation and negative correlation?
- Q.13. Define mean and variance of the Poisson distribution.
- Q.14. If two events, A and B, are mutually exclusive events, then the $P(A \cup B)$?
- Q.15. Define power of test.
- Q.16. If A and B are independent events and $P(A)=0.3$ and $P(B)=0.6$, find $P(A \cup B)$.
- Q.17. What do you mean by level of significance?
- Q.18. Write the assumptions of t-test.
- Q.19. Define analysis of variance.
- Q.20. What do you understand by one way ANOVA.

SECTION B

Instructions: Attempt any 4 questions.

(4x5=20)

- Q.1. What do you understand by regression analysis? Also write the model for multiple regression analysis.
- Q.2. What is meant by hypothesis testing? Define the null and alternative hypothesis. Write the step-wise procedure for the testing of hypothesis.
- Q.3. Define Binomial distribution. Describe the main features of Binomial distribution.
- Q.4. From the following data, find the missing value.

	X	Y
No. of items	9	9
Mean	10	9
Variance	28	?

Covariance between X & Y = 46 and the correlation between X & Y is 0.948.

- Q.5. Define CDR, ASDR and IMR. In a year, in a community there were 6500 live births. The no. of infant died in the year was 350, of the infant deaths in 18 cases the new born babies died within one month. Find the infant and Neo-natal mortality rate.

SECTION C

Instructions: Attempt any 2 questions.

(2x10=20)

- Q.1. Define the Bayes' theorem. In screening for a certain disease, the probability that a healthy person wrongly gets a positive result is 0.05. The probability that a diseased person wrongly gets a negative result is 0.002. The overall rate of the disease in the population screened is 1%. If my test gives a positive result, what is the probability that I actually have the disease?
- Q.2. Define Poisson distribution and the main features of it. If on an average 2 calls arrive at a telephone switchboard per minute, what is the probability that exactly 5 calls will arrive during a randomly selected 3 minute interval?
- Q.3. Define Spearman's rank correlation. Calculate the rank correlation from the following data:

X	20	11	24	18	20	22
Y	24	9	20	22	9	11

- Q.4. Explain the life table and its applications. A life table with two years age returns with certain missing values is given below:

Age (years)	I_x	d_x	q_x	p_x	L_x	T_x	e_x
9	75824	-	-	-	-	50,28,788	-
10	75362	418	-	-	-	-	-

Find the missing values.