# JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
## TEST-1 EXAMINATION- 2024
### B.Tech.-IV Semester (BI)

COURSE CODE(CREDITS): 18B11MA411/3
COURSE NAME: BIOSTATISTICS
COURSE INSTRUCTOR: SST

MAX. MARKS: 15

MAX. TIME: 1 Hour

Note:(a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

(d) Use of scientific calculator is allowed.

1. Suppose birthweight (oz), and age (days) are measured for 8 infants and the data are as shown in the following table:

| Birthweight (oz), X | 135 | 120 | 100 | 105 | 130 | 125 | 125 | 105 |
|---|---|---|---|---|---|---|---|---|
| Age (days), Y | 3 | 4 | 3 | 2 | 4 | 5 | 2 | 3 |

(a) Find the Karl Pearson's coefficient of correlation between birthweight and age.

(b) Interpret your result.  [3 Marks+1 Mark] (CO-1)

2. (a) Prove that geometric mean of the regression coefficients is the coefficient of correlation.

(b) Prove that arithmetic mean of the regression coefficients is greater than the coefficient of correlation.

(c) Write the formula for calculating the coefficient of correlation for repetitive ordinal data.  [0.5 Mark +1 Mark+0.5 Mark] (CO-1)

3. The article "Objective Measurement of the Stretchability of Mozzarella Cheese", reported on an experiment to investigate how the behavior of mozzarella cheese varied with temperature. Consider the accompanying data on Temperature, X and elongation (%), Y at failure of the cheese and fit a polynomial of second degree using the method of least squares.

| Temperature, X | 59 | 63 | 68 | 72 |
|---|---|---|---|---|
| elongation (%) Y | 118 | 182 | 247 | 208 |

[3 Marks] (CO-1)

4. (a) Write the logistic function, explaining the meaning of each of its component.

(b) Mention two major disadvantages of logistic regression.

[1 Mark +1 Mark] (CO-1)

5. Consider the credit card scenario with $A = \{Visa\}, B = \{MasterCard\}, P(A) = 0.5, P(B) = 0.4, P(A \cap B) = 0.25$. Calculate and interpret each of the following probabilities:

(a) $P(B|A)$

(b) $P(A|B)$

(c) $P(\overline{B}|A)$  [1Mark+1 Mark+2 Marks] (CO-2)