

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2024

B.Tech.-IV Semester (BI)

COURSE CODE(CREDITS):18B11MA411(3)

MAX. MARKS: 25

COURSE NAME: BIOSTATISTICS

COURSE INSTRUCTORS: SST

MAX. TIME: 1 Hour 30 Minutes

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 a scientific calculator is allowed.

1. It is of interest to study the effect of population size in various cities in the United States on ozone concentrations. The data consists of the 1999 population in millions and the amount of ozone present per hour in ppb (parts per billion). The data are as follows:

Ozone (ppb/hour), y	120	123	127	126	129
Population, x	0.6	0.5	0.2	0.5	0.7

- Fit the linear regression model relating ozone concentration to population. [5 M] (CO-1)
2. An individual has 3 different email accounts. Most of her messages, in fact 70%, come into account α , whereas 20% come into account β and the remaining 10% into account γ . Of the messages into account α , only 1% are spam, whereas the corresponding percentages for accounts β and γ are 2% and 5%, respectively. What is the probability that a randomly selected message is spam? [4 M] (CO-2)
3. Find the value of A , if X is a continuous random variable with the following probability density function: $f_X(x) = \begin{cases} A(2x - x^2), & 0 < x < 2 \\ 0, & \text{otherwise} \end{cases}$. [3 M] (CO-2)
4. If 20% of all copies of a particular textbook fail a certain binding strength test. What is the probability that at most 2 copies among 15 randomly selected copies fail the binding strength test? [3 M] (CO-2)
5. The number of creatures of a particular type captured in a trap during a given period follows Poisson distribution with an average traps 4.5 creatures. Find the probability that a trap has at most three creatures. [3 M] (CO-2)
6. The average height of professional baseball players is around 6 feet 7 inches, and the standard deviation is 4 inches. Assuming Normal distribution of heights within this group, how many baseball players are taller than 7 feet in a team of 9 players? [4 M] (CO-3)

7. The moment generating function of a random variable X is given by $M_X(t) = e^{5(e^t-1)}$, find the following:

- a) Mean of X .
- b) Variance of X .
- c) $P[X = 0]$

[3 M] (CO-3)

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
0.1	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
0.2	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
0.3	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
0.4	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
0.5	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
0.6	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
0.7	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
0.8	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
0.9	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
1.0	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
1.1	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
1.2	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
1.3	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
1.4	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189

JUT TEST-2 EXAMINATION