

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 EXAMINATION- APRIL-2019

B.Tech. IV Semester

COURSE CODE: 10B12MA421

MAX. MARKS: 25

COURSE NAME: BIOSTATISTICS

COURSE CREDITS: 04

MAX. TIME: 1:30 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Scientific calculator is allowed.

1. The following data are given;

X	0	1	2	3	4	5	6
Y	1	4	5	3	2	3	4

(i) Fit a quadratic regression curve of the form $\mu_{Y/x} = \beta_0 + \beta_1x + \beta_2x^2$ (ii) Predict Y when $x=2.5$

[2.5+0.5] [CO1]

2. The win -lose record of a certain basketball team for its last 17 consecutive games were as follows:-

W W W W L L W W L L L W W L L W W

Apply run test for randomness to test the sequence of wins and losses is random or not.

[Given that $P(v \leq 7) = 0.182$]

[1.5] [CO3]

3. From a Biostatistics class of 12 equally capable students using programmed materials, 5 students are selected at random and given additional instructions by the teacher. The results on the final examination are as follows;

	Grade						
Additional Instructions	87	69	78	91	80		
No Additional Instructions	75	88	64	82	93	79	67

Use the Mann-Whitney test with $\alpha = 0.05$ to determine if the additional instruction affects the average grade. [Given that, $u_{0.05}(5, 7) = 5$]

[3] [CO 3]

4. The accompanying data refer to concentration of the radioactive isotope Strontium-90 in milk samples obtained from five randomly selected dairies in each of the four different regions.

	1	6.4	5.8	6.5	7.7	6.1
Region	2	7.1	9.9	11.2	10.5	8.8
	3	5.7	5.9	8.2	6.6	5.1
	4	9.5	12.1	10.3	12.4	11.7

Test at level 0.05 to see whether true average Strontium-90 concentration differs or not using Kruskal - Walli's test. [Given that $\chi^2_{0.05,3} = 7.815$]

[5] [CO 3]

[P.T.O.]

5. A random process $\{X(t)\}$ is defined as $X(t) = p \cos t + q \sin t, -\infty < t < \infty$, where p and q are independent random variables each of which has a value -3 with probability $\frac{4}{7}$, value 4 with probability $\frac{3}{7}$ and probability 0 otherwise. Show that $\{X(t)\}$ is a wide sense stationary process.

[5] [CO 4]

6. For the following transition probability matrix of a Markov chain, $\begin{bmatrix} 0.4 & 0.5 & 0.1 \\ 0.3 & 0.3 & 0.4 \\ 0.3 & 0.2 & 0.5 \end{bmatrix}$,

- (i) Draw the state transition diagram.
- (ii) Calculate the limiting state probabilities.

[5] [CO 5]

7. Telephone calls arrive at a switching centre in a Poisson's manner at an average rate of 75 calls per minute. What is the probability that exactly three calls arrive within a 5-second period.

[2.5] [CO 5]

