

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- MAY-2019

B.Tech. IV Semester

COURSE CODE: 10B12MA421

MAX. MARKS: 35

COURSE NAME: BIOSTATISTICS

COURSE CREDITS: 04

MAX. TIME: 2 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. A study was made on the amount of converted glucose in a certain process at various temperatures. The data were coded and recorded as follows;

Temperature, x	1.0	1.1	1.2	1.3	1.4	1.5
Converted Glucose, y	8.1	7.8	8.5	9.8	9.5	8.9

Estimate the linear regression line.

[3] [CO 1]

2. Find a 95% confidence interval for slope β_1 in the regression line $\mu_{y/x} = \beta_0 + \beta_1 x$ for the data;

$$S_{xx} = 4152.18, S_{xy} = 3752.09, S_{yy} = 3713.88, b_1 = 0.903643, t_{0.025, 31df} = 2.045$$

[3] [CO 2]

3. In an experiment to study the way in which different anesthetic affect plasma epinephrine concentration, 5 dogs were selected and concentration was measured while they were under the influence of the anesthetics isoflurane, halothane and cyclopropane. Test at 0.5 level to see whether there is an anesthetic effect on concentration using Friedman's test.

Dogs	1	2	3	4	5
Isoflurane	0.28	0.51	1.00	0.39	0.29
Halothane	0.30	0.39	0.63	0.38	0.21
Cyclopropane	1.07	1.35	0.69	0.28	1.24

[Given that, $\chi_{0.05, 2df}^2 = 5.991$]

[3] [CO 3]

4. A random process is defined by $X(t) = K \cos wt, t \geq 0$ where w is a constant and K is uniformly distributed between 0 and 2. Determine the following;

(a) $E[X(t)]$

(b) the auto correlation function of $X(t)$

(c) the auto covariance function of $X(t)$

[3] [CO 4]

[P.T.O.]

5. Studies indicate that the probability that three cars will arrive at a parking lot in a 5-minute interval according to a Poisson's process; determine the following;

(a) The average arrival rate of cars.

(b) The probability that no more than 2 cars arrive in a 10 minute interval.

[3] [CO 5]

6. Consider the following transition probability matrix:

$$\begin{bmatrix} 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \\ 0.0 & 0.3 & 0.7 \end{bmatrix}$$

(a) Give the state transition diagram

(b) Given that the process is currently in state 1, what is the probability that it will be in state 2 at the end of third transition?

[4] [CO5]

7. Write a short note on Weiner (Brownian motion) process.

[4] [CO 5]

8. Describe any two distance measures used in clustering analysis. Define outliers.

[4] [CO 5]

9. Use agglomerative hierarchical clustering algorithm for the following distance matrix. Also draw the dendrogram and find its height.

Items	α	β	γ	δ	ϵ
α	0	2	1	4	3
β	2	0	3	1	5
γ	1	3	0	2	6
δ	4	1	2	0	3
ϵ	3	5	6	3	0

[4] [CO 6]

10. Describe two algorithms used for clustering large database and compare them.

[4] [CO 6]

