Printed Page:- 05 **Subject Code**:- B**CSBS0201**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION - (2023 - 2024)

Subject: Statistical Methods

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. One of the members of the population is known as the (CO1) 1

(a) Data
(b) Family
(c) Element
(d) Group

1-b. When the available population is _____, we use a stratified sample.(CO1) 1

(a) too small
(b) very large
(c) homogeneous
(d) heterogeneous

1-c. Range of correlation coefficient lies between (CO2) 1

(a) r=0
(b) r=1
(c) $-1 \leq r \leq +1$
(d) r=0.240

1-d. The slope of the regression line of Y on X is also referred to as the:(CO2) 1

(a) Regression coefficient of X on Y
(b) The correlation coefficient of X on Y
(c) Regression coefficient of Y on X

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(d) Correlation coefficient of Y on X.

1-e. Properties of a good point estimator includes which of the following? (CO3) 1

A. Stationarity B. Efficiency C. Consistency D. Neutrality E. Unbiasedness

Choose the correct answer from the options given below:

(a) A, B and C only

(b) C, D and E only

(c) A, D and E only

(d) B, C and E only

1-f. A quantity obtained by applying a certain rule or formula is known as (CO3) 1

(a) sample

(b) Test statistics

(c) Estimate

(d) Estimator

1-g. Which of the following statements is true about the null hypothesis? (CO4) 1

(a) Any wrong decision related to the null hypothesis results in two types of errors

(b) Any wrong decision related to the null hypothesis results in one type of an error

(c) Any wrong decision related to the null hypothesis results in four types of errors

(d) Any wrong decision related to the null hypothesis results in three types of errors

1-h. Which of the following are considered non-parametric tests? (CO4) 1

a) Mann-Whitney U test

b) Kruskal-Wallis test

c) F-test

d) T-test

e) Chi-square test

Choose the correct answer from the options given below:

(a) a, b, and e

(b) a, b and c

(c) a, b, c and d

(d) a, b, c, d and e

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1-i. Which of the following is a typical characteristic of financial asset return time-series? (CO5) 1

(a) Their distributions are thin-tailed

(b) They are not weakly stationary

(c) They are highly autocorrelated

(d) They have no trend

1-j. Which of the following conditions are necessary for a series to be classifiable as a weakly stationary process? (CO5) 1

(i) It must have a constant mean

(ii) It must have a constant variance

(iii) It must have constant autocovariances for given lags
(iv) It must have a constant probability distribution

(a) (ii) and (iv) only
(b) (i) and (iii) only
(c) (i), (ii) and (iii) only
(d) (i), (ii), (iii) and (iv)

2. Attempt all parts:-

2.a. How population is different from sample? (CO1) 2

2.b. Define positive and negative correlation.(CO2) 2

2.c. Define Hypothetical population and real population. (CO3) 2

2.d. Define critical value. (CO4) 2

2.e. What do you mean by time series? (CO5) 2

SECTION-B 30

3. Answer any five of the following:-

3-a. Calculate the standard error of the given data- 14, 36, 45, 70, 105.(CO1) 6

3-b. Explain any one method of selection of simple random sampling.(CO1) 6

3-c. Calculate coefficient of correlation from the data given below by the direct method, i.e. without taking the deviations of items from actual or assumed mean.(CO2) 6

X:	9	8	7	6	5	4	3	2	1
Y:	15	16	14	13	11	12	10	8	9

3-d. Calculate the rank correlation coefficient for the rank of 10 students assigned by two teachers.(CO2) 6

Students:	1	2	3	4	5	6	7	8	9	10
Rank(T_1):	8	7	6	3	2	1	4	9	10	5
Rank (T_2):	10	8	5	2	1	3	6	9	7	4

3.e. A person throws 10 dice 500 times and obtains 2560 times 4, 5 or 6. Can this be attributed to fluctuations of sampling? (CO3) 6

3.f. An examination was given to two classes consisting of 40 and 50 students respectively. In the first class the mean marks was 74 with a standard deviation of 8, while in the second class, the mean marks was 78 with a standard deviation of 7. Is there a significant difference between the performance of the two classes at a level of significance of 0.05? (CO4) 6

3.g. What are the methods used in forecasting? (CO5) 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Explain the following terms: (CO1) 10
i) Population
ii) Sample

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iii) Parameter
iv) Sampling Units
v) Sampling distribution

4-b. Explain Stratified random sampling with example. Write merits and demerits of stratified random sampling.(CO1) 10

5. Answer any <u>one</u> of the following:-

5-a. The following data relate to the scores obtained by 9 salesmen of a company in an intelligence test and their weekly sales in thousand rupees: 10

Salesman:	A	B	C	D	E	F	G	H	I
Test Scores:	50	60	50	60	80	50	80	40	70
Weekly sales:	30	60	40	50	60	30	70	50	60

a. Obtain the regression equation of sales on intelligence test scores of the salesman.
b. If the intelligence test score of a salesman is Rs. 65,000 what would be his expected weekly sales? (CO2)

5-b. A research company summarized advertising expenditure and sales results as follows: 10

	Adv. Exp.	Sales (in crores)
Mean	20	200
S.D.	18	170
Karl Pearson's Correlation Coeff. (r)	0.6	

Derive the two regression equations. (CO2)

6. Answer any <u>one</u> of the following:-

6-a. Define estimator. What are the properties of a good estimator? (CO3) 10

6-b. Estimate the parameter θ in sampling from a Poisson distribution by the method of moments. Suppose the five observations are taken 10, 18, 21, 26 and 28. Show that moment estimate of θ is 20.6. (CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. Intelligence test on two groups of boys and girls gave the following results: 10

	Mean	S.D.	N
Girls	75	15	150
Boys	70	20	250

Is there a significant difference in the mean scores obtained by boys and girls? (CO4)

7-b. Explain the concept of null and alternative hypothesis. Elaborate with the help of suitable example. (CO4) 10

8. Answer any <u>one</u> of the following:-

8-a. What are the mathematical models of time series? Explain. (CO5) 10

8-b. Explain ARIMA modelling in the terms of p, d and q. (CO5) 10

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