Printed Page:- 05 **Subject Code**:- **ACSBS0201**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (2022-2023)

Subject: Statistical Meth

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.*

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SECTION A **20**

1. Attempt all parts:-

1-a. The size of the population can be__. (CO1) 1

(a) finite

(b) Infinite

(c) Sampled population

(d) Finite and Infinite both

1-b. Simple random samples can be drawn with of help of___. (CO1) 1

(a) Random numbers table

(b) Chit Method

(c) Lottery Method

(d) All the above

1-c. (ANOVA) Analysis of variance is a statistical method of comparing the_____ of several populations. (CO2) 1

(a) Means

(b) Variances

(c) Standard Deviations

(d) None of the above

1-d. Regression coefficients are independent of the__. (CO2) 1

(a) Origin and scale

(b) Scale but not of origin

(c) Origin and but not of scale

(d) None of these

1-e. Estimation is possible only in case of a __. (CO3) 1

(a) Parameter

(b) Sample

(c) Random sample

(d) Population

1-f. Bias of an estimator can be __. (CO3) 1

(a) Negative

(b) Positive

(c) Zero

(d) Both (a) or (b)

1-g. A statement whose validity is tested on the basis of a sample is called__. (CO4) 1

(a) Null Hypothesis

(b) Simple Hypothesis

(c) Composite Hypothesis

(d) Statistical Hypothesis

1-h. Type 1 error occurs when__. (CO4) 1

(a) We reject H_0 if it is True

(b) We reject H_0 if it is False

(c) We accept H_0 if it is True

(d) We accept H_0 if it is False

1-i. The components of a time series which is attached to short term fluctuation is __. (CO5) 1

(a) Secular trend

(b) Seasonal variations

(c) Cyclic variation

(d) Irregular variation

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1-j. The quantities which are numerically measured can be plotted on a___. (CO5) 1

(a) p - chart

(b) c – chart

(c) x bar chart

(d) np – chart

2. Attempt all parts:-

2.a. What is non-restricted sampling? (CO1) 2

2.b. What are the uses of scatter diagram? (CO2) 2

2.c. How do you find Poisson's maximum likelihood estimation? (CO3) 2

2.d. If the level of significance is 1%, then what is the confidence limit? (CO4) 2

2.e. What is the need for studying time series? (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. What are the advantages and disadvantages of simple random sampling? (CO1) 6

3-b. In a shop there are 550 packets with Nos. from 1 to 550. It is desired to take sample of 10 students. Use the systematic sampling method to determine the sample size. (CO1) 6

3-c. The following information given below about advertising and sales: 6

	Advertisement Expenditure (X) (Rs. Crore)	Sales(Y) (Rs. Crore)
Mean	10	90
S. D	3	12

Correlation coefficient is 0.8

a. Calculate the two regression lines.
b. Find the likely sales when advertisement expenditure is Rs. 50 crore.
c. What should be advertisement expenditure if the company wants to attain sales target of Rs. 150 crore? (CO2)

3-d. A driver keeps a record of the distance travelled and the amount of fuel in his tank on a long journey. Draw the scatter graph for this data. (CO2) 6

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Distance Travelled (km)	0	50	100	150	200	250	300
Fuel in Tank (litres)	80	73	67	61	52	46	37

3.e. A random sample of 35 airfare price (in dollars) for a one-way ticket from Atlanta to Chicago. Find a point estimate for the population mean :99, 102, 105, 105, 104, 95, 100, 114, 108, 103, 94, 105, 101, 109, 103, 98, 96, 98, 104, 87, 101, 106, 103, 90, 107, 98, 101, 107, 105, 94, 111, 104, 87, 117, 101. (CO3) 6

3.f. Explain Neyman Pearson's lemma in detail. (CO4) 6

3.g. What are the steps involved in forecasting techniques? (CO5) 6

SECTION C **50**

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

4-a. Define Stratified random sampling. With the help of an example write the steps of stratified random sampling. Write Merits and Demerits of Stratified random sampling. (CO1) 10

4-b. From the following data, find standard error of estimate (S_{yx}). (CO1) 10

X	6	2	10	4	8
y	9	11	5	8	7

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

5-a. Find the coefficient of correlation and regression lines to the following data: (CO2) 10

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

5-b. Two random variables have the least square regression lines with equations 3x +2 y = 26 and 6x + y=31. Find mean values and correlation coefficient between x and y. (CO2) 10

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

6-a. Let x1, x2, ...xn be a random sample from an exponential distribution with parameter θ. Find a sufficient statistic for the parameter θ. (CO3) 10

6-b. A random sample of n = 6 has the element 7, 11, 12, 13, 18 and 20. Compute a point estimate of 10

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i. Population mean
ii. The population standard deviation
iii. The standard error of the mean (CO3)

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

7-a. 10

Explain parametric test and non-parametric test. Differentiate between parametric test and non-parametric test. (CO4)

7-b. The height of 8 males participating in an athletic championship are found to be 175,168,165,170,167,160,173 and 168 cm. Can we conclude that the average height is greater than 165 cm.(Test at 5% level of significance) (CO4) 10

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

8-a. Explain the type of time series additive and multiplicative models with their components? (CO5) 10

8-b. Discuss the important characteristics of a time series forecasting model? 10

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