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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2022 ONLY)

SUB CODE : 22UDA2A1

REG.NO :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY 2023

B. Sc Computer Science with Data Analytics **MAXIMUM MARKS: 50**

SEMESTER: II **TIME : 3 HOURS**

PART - III
STATISTICS & PROBABILITY

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.
(Objective Questions with four Multiple Choices) (K1)
(Qn. No. 1 - 5)

1. Binomial distribution is applied for _____.

   a. continuous random variable b. discrete random variable

   c. irregular random variable d. uncertain random variable

2. If $\gamma = 0$ the variable are_____

   (a) Perfect (b) positive (c) negative (d) uncorrelated

3. 99% confidence limits for μ are _____

   (a) $\bar{x} \pm t_{0.05} \frac{S}{\sqrt{n}}$ (b) $\bar{x} \pm t_{0.1} \frac{S}{\sqrt{n}}$ (c) $\bar{x} \pm t_{0.01} \frac{S}{\sqrt{n}}$ (d) $\bar{\mu} \pm t_{0.01} \frac{S}{\sqrt{n}}$

4. Eliminating fertility variations consists in an experimental layout which will control variation in two perpendicular directions. Such a lay out is _____

   a) Completely Randomised Design (b) Randomised Block design

   (c) Design of experiment (d) Latin Square Design

5. Acceptance sampling is a statistical measure used in _____

   (a) Quality control (b) control chart (c) Tolerance (d) *np* charts

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Define the moment generating function of Binomial distribution.

7. What is called Karl Pearson correlation coefficient?

8. Define standard error.

9. What is Anova?

10. Which control charts are used for attributes?

(CONTD….2)

SECTION – B (5 X 3 = 15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(Qn. No. 11 to 15)Questions for Short Answers with internal choices – 2 questions from each unit. (K3)

11. a) State and prove Baye's theorem.

(OR)

b) If X and Y are independent .Poisson variates with means λ_1 and λ_2 respectively, compute the probability that $(i)\ X+Y=k$ $(ii)\ X=Y$.

12. a) In partially destroyed laboratory record of an analysis of correlation data, the following results only are legible:
Variance , X=9
Regression equations : $8X-10Y+66=0,\ 40X-18Y=214$
Calculate correlation coefficient between X and Y

(OR)

b) Calculate the rank correlation coefficient for the following data:

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

13. a) Explain mode and skewness of χ^2-distribution

(OR)

b) A random sample of 16 values from a normal population showed a mean of 41.5 inches and the sum of squares of deviations from this mean equal to 135 square inches. Show that the assumption of a mean of 43.5 inches for the population is not reasonable. Obtain 95 and 99 percent fiducial limits for the same

14. a) Explain the advantages and disadvantages of Latin square design.

(OR)

b) Explain the analysis of covariance for two way classification.

15 a) Explain tolerance limits.

(OR)

b) Explain acceptance sampling.

SECTION – C (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. a) Fit a Poisson distribution to the following data which gives the number of doddens in a sample of clover seeds.

No of doddens(x)	0	1	2	3	4	5	6	7	8
Observed frequency (f)	56	156	132	92	37	22	4	0	1

(OR)

b) If X is a normal variate with mean 30 and S.D 5.Find the following probabilities (i) $26 \le X \le 40$ (ii) $X \ge 45$ (iii) $|X-30|>5$

(CONTD….3)

17. a) Let $X_1, X_2, \ldots\ldots\ldots X_n$ be a random sample of size n>1, from a distribution that is $N(\theta,1)$ .Find an MVUE of the function of θ defined by $P(X \le c) = \int_{-\infty}^{c} \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-\theta)^2}{2}} dx = \phi(c-\theta)$ where C is a fixed constant, the joint distribution of X_1 and $\overline{X}$ and variances, correlation coefficient, and conditional expectation of $u(X_1)$.

(OR)

b) State and prove central limit theorem.

18. a) 15,000 random numbers were taken some logarithm table and the following frequencies of each digit were obtained?

Use the χ^2-test to assess the correctness of the hypothesis that each digit had an equal chance of being chosen.

(OR)

b) A random sample of 10 boys had the following I.Q's 70,120,110,101,88,83,95,98,107,100. Do these data support the assumption of a population mean I.Q of 100/ . Find a reasonable range in which most of the mean I. Q values of samples of 10 boys lie.

19. a) Three varieties of cows of same age group are treated with four different types of folders. The yields of milk in deciliters are given below. Perform an analysis of variance and check whether there is any significant difference between the yields of different varieties of cows due to different types of fodders.

Varieties of Cow	Fodders			
	f_1	f_2	f_3	f_4
C_1	61	63	66	68
C_2	62	64	67	69
C_3	63	63	68	69

The yield of different varieties of cows due to different types of fodders is not homogenous

(OR)

b) Analyse the variance in the following Latin square

A8	C18	B9
C9	B18	A16
B11	A10	C20

20. a) Explain the control charts for measurement with neat diagram.

(OR)

b) Explain the Control chart P, C and np chart.

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