(NO. OF PAGES: 3)

(FOR THE CANDIDATES ADMITTED

DURING THE ACADEMIC YEAR 2024ONLY)

24UMS2A2

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS :MAY-2025
B.Sc.-MATHEMATICS **MAXIMUM MARKS: 75**
SEMESTER: II **TIME : 3 HOURS**

PART - III

MATHEMATICAL STATISTICS II

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS. **(K1)**

1. Standard error of the sample mean is _____

a) σ^2 b)σ/n c)$\sigma/\sqrt{n}$ d)$\frac{\sqrt{n}}{\sigma}$

2. If r = +1,then the correlation is called_____
   a) Perfect positive correlation b) Perfect negative correlation
   c) Positive correlation d) Negative correlation

3. The statistic χ^2, with usual notations , in case of contingency table of order (m xn) is given by
   a) $\chi_o^2 = \sum_{i=1}^{m}\sum_{j=1}^{n}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$ b) $\chi_o^2 = \sum_{i=1}^{k}\left[\frac{(O_i-E_i)}{E_i}\right]^2$
   c) $\chi_o^2 = \sum_{i=1}^{k}\left[\frac{(O_i-E_i)}{E_i}\right]$ d))$\chi_o^2 = \sum_{i=1}^{k}\left[\frac{O_i}{E_i}\right]$

4. F-test is also called as_____.
   a) Mean ratio test b) Variance ratio test
   c)Variance test d) standard deviation ratio teat

5. If Var (T2)<Var(T1),then T2 is _____.

   a) Unbiased b) Efficient c) Sufficient d) Consistent

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

6. Define correlation.
7. Define large sample.
8. Explain Attributes.
9. Define the paired t-test statistic.
10. Define Sufficiency.

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K3)

11. a) Find the Karl Pearson correlation coefficient for the following data.

Father	65	66	67	67	68	69	70	72
Son	67	68	65	68	72	72	69	71

(OR)

b) Explain the difference between correlation and regression.

12.a) Explain the Type I and Type II errors.

(OR)

b) Write a procedure for testing of hypothesis.

(CONTD…….2)

13.a) For the 2*2 table

a	b
c	d

Prove that chi-square test of Independence gives

$$\chi 2 = \frac{N\,(ad-bc)^2}{(a+c)(b+d)\,(a+b)(c+d)}$$

(OR)

b) A sample of 900 member has a mean 3.4cms and standard deviation 2.61cms. Prove the sample form a large population of mean 3.25 cms and standard deviation 2.61 cm.

14. a) A random sample of 10 boys had the following I.Q's:
70,120,110,101,88,95,98,107,100.
Do these data support the assumption of a population mean I.Q. of 100?

(OR)

b)Two random samples gave the following results:

Sample	Size	Sample mean	Sum of squares of deviations from the mean
1	10	15	90
2	12	14	108

Test whether the samples come from the same Normal population at 5% level of significance.

Given: $F_{0.05}\,(9,11) = 2.90$, $F_{0.05}\,(11,9)=3.10$ (Approx) and $t_{0.05}\,(20) = 2.086$, $t_{0.05}\,(22) = 2.07$

15. a) Write the properties of maximum likelihood estimators.

(OR)

b) Discuss about "Efficiency" and "Sufficiency"?

SECTION – C (5 X 8 = 40 MARKS)

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

(K4 (Or) K5)

16. a) Ten competitors in a musical test were ranked by the Three Judges A,B and C in the following order.

Ranks by A: 1 6 5 10 3 2 4 9 7 8
Ranks by B: 3 5 8 4 7 10 2 1 6 9
Ranks by C: 6 4 9 8 1 2 3 10 5 7

Using rank correlation method discuss which pair of Judges has the Nearest Approach to common likings in music

(OR)

b) Obtain the equations of two lines of Regression for the following data. Also obtain the estimate of x for y=70

x:	65	66	67	67	68	69	70	72
y:	67	68	65	68	72	72	69	71

17.a) Discuss a test of significance difference of two means.

(OR)

b) In two large populations, there are 30 and 25 percent respectively of blue-eyed people. Is this difference likely to be Hidden in samples of 1200 and 900 respectively from the two populations.

(CONTD…….2)

18. a) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportion of men and women in favour of the proposal, are same against that they are not, at 5% level.

(OR)

b) When the first proof of 392 pages of a book of 1200 pages were read, the distribution of printing mistakes were found to be as follow:

No.of mistakes in a page (x)	0	1	2	3	4	5	6
No.of pages(f)	275	72	30	7	5	2	1

Fit a poisson Distribution to the above data and the test of goodness of fit.

19. a) Below are given the gain in weights (in kgs) of pigs fed on two diets A and B.
Gain in weight
Diet A: 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25
Diet B: 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22
Test, if the two diets differ significantly as regards their effect on increase in weight.

(OR)

b) Samples of two types of electric light bulbs were tested for length of life and following data were Obtained:

	Type I	Type II
Sample No.	$n_1 = 8$	$n_2=7$
Sample means	$\bar{x}_1$=1,234 hrs.	$\bar{x}_2$=1,036 hrs.
Sample S.D.'s	s_1=36 hrs	s_2=40 hrs

Is the difference in the means sufficient to warrant that Type I is superior to Type II regarding length of life?

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20. a) Explain in brief the Characteristics of Estimators.

(OR)

b) Explain in brief the Methods of Estimation.

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