

D 30883

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Name.....

Reg. No.....

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**THIRD SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, NOVEMBER 2022**

(CBCSS)

Econometrics

ECM 3C 11—STATISTICAL INFERENCE

(2020 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Part A (Multiple Choice Questions)

Answer all questions.

Each question carries 1/5 weightage.

1. The probability of committing a Type I error is equal to the _____.
a) Significance level. b) Critical value.
c) p value. d) None of these.
2. The _____ conditions are necessary to conduct a test of hypothesis about a proportion.
a) Normal. b) Binomial.
c) Either a) or b). d) Neither a) or b).
3. In a two tailed test, the significance level is divided equally between the two tails :
a) One. b) Two.
c) Either. d) Neither.
4. In a contingency table, we test the null hypothesis that the two variables are independent :
a) Independent. b) Dependent.
c) Mutually exclusive. d) Normally distributed.
5. To test the hypothesis that the coefficient of correlation is zero, the test statistic is the _____ distribution.
a) F. b) Z.
c) t. d) X^2 .

Turn over

6. ANOVA is used to compare two or more _____.
- a) Means.
 - b) Sample sizes.
 - c) Sample variance.
 - d) Z values.
7. The hypothesized difference between two population means is _____.
- a) One.
 - b) Zero.
 - c) Mean.
 - d) None of these.
8. The test statistic for comparing two population variances is the :
- a) F.
 - b) Z.
 - c) t .
 - d) X^2 .
9. For dependent samples, observations are _____.
- a) Paired.
 - b) Unpaired.
 - c) Independent.
 - d) None of these.
10. For one-way ANOVA treatments must be _____.
- a) Independent.
 - b) Dependent.
 - c) Either a) or b).
 - d) Neither a) or b).
11. The _____ is a statement about the value of a population parameter.
- a) Null hypothesis.
 - b) Alternative hypothesis.
 - c) Sampling distribution.
 - d) None of these.
12. For a 95% confidence interval, approximately _____ % of the similarly constructed intervals will include the population parameter being estimated.
- a) 90.
 - b) 99.
 - c) 95.
 - d) None of these.
13. The Wilcoxon signed ranks test is the non-parametric counterpart to the _____.
- a) Independent samples t test.
 - b) Z test.
 - c) Dependent sample t test.
 - d) None of these.

14. Which non-parametric test involves "tagging" scores from different samples so that they can be returned to their samples after they have been converted into ranks ?
- a) Spearman rank correlation. b) Mann-Whitney.
 c) Wilcoxon signed. d) None of these.
15. The _____ has no effect on the size of the sample.
- a) Level of confidence. b) Margin of error.
 c) Size of the population. d) None of these.

(15 × 1/5 = 3 weightage)

Part B (Very Short Answer Questions)

*Answer any five questions.
Each question carries 1 weightage.*

16. What do you understand by statistical inference ?
17. The following are the scores of certain randomly selected students at midterm and final examinations. Test the hypothesis that the distribution of scores at two occasions are same using Mann Whitney U test.

Mid term Scores (X)	:	55,	57,	72,	90,	57,	74
Final Scores (Y)	:	80,	76,	63,	58,	56,	37, 75

18. Define ANOVA.
19. Opinion about promotions, to be dependent on published work by persons interested in teaching or research was taken and displayed as below. Using Chi-square, test the association between interest and promotion dependent on published work at 5 % level of significance (3.841).

Interest	Promotion dependent on published work		Total
	Agree	Disagree	
Teaching	90	10	100
Research	70	30	100
Total	160	40	200

20. Suppose one sample has an $n = 12$ with an $S^2 = 14$ and another sample has an $n = 10$ with an S^2 of 8. If we wanted to find a critical t score, what df would we use ?

Turn over

21. What are the properties of a good estimator ?
22. A random sample of 200 male students is found to have a mean height of 171.5 cm. Can it be regarded as a sample from a population with mean height of 170.5 cm and a standard deviation of 6.3 cm ? Test at 1 % level of significance ($Z = 2.576$).
23. Explain the term Estimation.

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

Answer any seven questions.

Each question carries 2 weightage.

24. Distinguish between Null and Alternative hypothesis.
25. Explain the difference between one tailed and two tailed test.
26. Distinguish between Parameter and Statistic.
27. A sample of 900 members has a mean 3.4 cm and standard deviation 2.61 cm. Can the sample be regarded as drawn from a population with mean 3.25 cm ? Find the 95 % confidence limit for the population mean.
28. Distinguish point estimate from interval estimate.
29. Discuss the method of Least Squares.
30. Suppose a sample taken for hypothesis testing has a size of 25, the mean of 14600 and the standard deviation of 1645. To test if the hypothesized population mean is 14000, should Z calculated or t calculated be found and that is the relevant value ?
31. Write a note on Contingency table.
32. Write any *two* advantages of the non-parametric test.
33. Distinguish between Type I and Type II error.

(7 × 2 = 14 weightage)

Part D (Essay Questions)*Answer any two questions.**Each question carries 4 weightage.*

34. An agricultural scientist uses fertilizers supplied by three different manufacturers to study the yields. The yields (mt per acre per year) from different plots of similar characteristics are as follow: Using ANOVA test whether the yields differ significantly when fertilizers from different manufacturers are applied.

Observation	Fertilizer		
	I	II	III
1	55	73	70
2	75	87	72
3	73	84	75
4	77	57	80
5	78	65	83
6	85	60	—
7	92	—	—

35. Discuss the method of Maximum likelihood with its properties.

36. (a) What is t distribution? State any two important properties.

- (b) Reon wishes to compare the two companies it uses to appraise the value of residential homes. He selected a sample of 10 residential properties and scheduled both firms for an appraisal. The results, reported in \$000, are furnished below. At .05 significance level (2.262), can we conclude there is a difference in the mean appraised values of the homes?

Home	:	1	2	3	4	5	6	7	8	9	10
Firm A	:	235	210	231	242	205	230	231	210	225	249
Firm B	:	228	205	219	240	198	223	227	215	222	245

37. Briefly discuss the procedure of hypothesis testing.

(2 × 4 = 8 weightage)