D 93161 **(Pages : 4)** **Name.....**

Reg. No.....

FIRST SEMESTER M.A. DEGREE EXAMINATION, DECEMBER 2015

(CUCSS)

Applied Economics

Paper III—QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS

Time : Three Hours **Maximum : 36** Weightage

Part A

Answer **all** *questions.*
Each short answer question carry 1 weightage.

1. **Show that** $\begin{vmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{vmatrix}$ **is** idempotent.

2. **If** $A = \begin{vmatrix} 2 & -1 & 0 \\ 0 & -2 & 1 \\ 1 & 0 & 1 \end{vmatrix}$ **and** $B = \begin{vmatrix} -2 & 1 & -1 \\ 1 & 2 & -2 \\ 2 & -1 & -4 \end{vmatrix}$, **verify that** $(AB)' = B^T A^T$.

3. **Find the rank of the matrix** $\begin{vmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{vmatrix}$

4. **Define the terms** : (i) **Probability** ; **(ii) Conditional probability.**

5. **Define Binomial distribution and indicate its chief characteristics.**

6. **Evaluate** k **if** $f(x) = \begin{cases} k, x = 1, 2, 3, 4, 5, 6 \\ 0, \text{elsewhere} \end{cases}$ **is a probability mass function.**

7. **Distinguish between sampling distribution and standard error.**

8. **Define** χ^2 **distribution and state some of its applications.**

9. **State central limit theorem.**

10. **Distinguish between point estimates and interval estimates.**

Turn over

11. What is a sufficient estimator ? Explain the role of sufficiency in theory of estimation.

12. What are type **I** and type II errors ?

13. Explain the terms 'null hypothesis' and 'degree of freedom' used in x^2 test.

14. Explain the different steps in preparing a research design.

(14 x 1 =14 weightage)

Part B

Answer any **seven** *questions.*
Each paragraph question carry 2 *weightage.*

15. If $A = \begin{vmatrix} 2 & 4 & 10 \\ 6 & 4 & 2 \\ 8 & 12 & 14 \end{vmatrix}$, show that $\frac{1}{}(A + A^T)$ is symmetric.

16. If $A = \begin{vmatrix} 1 & 1 & 2 \\ 2 & -1 & 2 \\ 4 & 1 & 4 \end{vmatrix}$, compute A^{-1}.

17. Describe normal distribution and discuss its properties. Why is it so important in behavioural sciences ?

18. Define lognormal distribution and how it is related to normal distribution. Obtain the mean of lognormal distribution and discuss the role of this distribution in economic studies.

19. What is Students *t* distribution ? Explain some of its applications.

20. Obtain the mean and variance of F distribution.

21. Determine 95 % confidence interval for population mean when a sample of size 'n' is drawn from that population given that the population is normal with variance σ^2.

22. The mean of a sample of size 16 from a normal population is 20. **If** it is known that variance of population is 4, find the standard error of the sample mean and 95% confidence interval for the population mean.

23. Explain the procedure for testing the hypothesis concerning the difference between two population proportions based on samples taken from each of the two populations.

24. Describe the important points in selecting a research problem.

(7 x 2 = 14 weightage)

Part C

Answer any two questions.
Each essay question carry 4 *weightage.*

25. A trucking company owns three types of trucks X, Y, Z which are equipped to carry three different types of machines per load as shown below :

Machines	Trucks		
	Type X	*Type* Y	*Type* Z
Machine I	2	3	4
Machine **II**	**1**	**1**	2
Machine **III**	3	2	1

How many trucks of each type should be used to carry exactly 29 type of Machine I, 13 type of Machine II and 16 of type Machine **III** ? Assume that each truck is fully loaded.

26. A systematic sample of 100 pages was taken from the Concise Oxford Dictionary and the observed frequency distribution of foreign words per page was found to be as follows :

No. of foreign words per page (X)	0	1	2	3	4	5	6
Frequency *(f)*	48	27	12	7	4	1	1

27. (a) In a factory producing 50,000 pairs of shoes daily for a sample of 500 pairs, 2 % were found to be substandard quality. Estimate the number of pairs that can be reasonably expected to be spoiled in the daily production and assign limits at 95 % level of confidence.

(b) A random sample of 10 tins of oil filled in by an automatic machine gave the following weights in kg.

2.05, 2.01, 2.04, 1.98, 1.98, 1.96, 2.01, 1.99, 2.04, 2.02

Can we accept at 5 % level of significance, the claim that the average weight of the tin is 2 kg.

28. A marketing agency gives you the following information about the age groups of the sample informants and their liking for a particular model of scooter which a company plans to introduce

	Age group of informants			*Total*
	Below 20	20 – 39	40 – 59	
Liked	125	420	60	605
Disliked	75	220	100	395
Total	200	640	160	1000

On the basis of the above data, can it be concluded that the model appeal is independent of the age group of the informants ?

(2 x 4 = 8 weightage)