

**FIRST SEMESTER M.A. DEGREE EXAMINATION, DECEMBER 2014**

(CUCSS)

Applied Economics

## QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS

Time : Three Hours

Maximum : 36 Weightage

## Part A

Answer **all** questions.

Each short answer question carry 1 weightage.

1. If  $A = \begin{vmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ & 2 & 0 \end{vmatrix}$  and  $B = \begin{vmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{vmatrix}$  for AB and BA and show that  $AB \neq BA$ .

2. Evaluate the determinant of the matrix  $\begin{vmatrix} -1 & 2 & -3 \\ 2 & -3 & -1 \\ -3 & -1 & 2 \end{vmatrix}$

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

4. If  $P(A \cup B) = 0.7$ ,  $P(A) = 0.5$ ,  $P(B) = 0.4$ , then find  $P(A \cap B)$
5. Find the binomial distribution whose mean is 3 and variance is 2.
6. X is a random variable such that  $f(x) = 2x$  for  $0 < x < 1$  and  $f(x) = 0$  otherwise. Find  $E(X)$ .
7. Distinguish between parameter and statistic. Give examples.
8. Bring out the importance of sampling distribution and the concept of standard error in statistical application.
9. Explain a central limit theorem and its usefulness.
10. When will you say that an estimator is consistent? Give an example.
11. What do you mean by interval estimation? How far it is different from point estimation?
12. Explain the terms :
  - (i) Critical region.
  - (ii) Level of significance.

**Turn over**

13. Explain one way analysis of variance for testing equality of means.
14. Distinguish between research methods and research methodology.

(14 x 1 = 14 weightage)

## Part B

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

15. By reducing to their normal forms, find the rank of  $\begin{vmatrix} 3 & 1 & 2 & 5 \\ -1 & 4 & 1 & -1 \\ 1 & 9 & 4 & 3 \end{vmatrix}$

16. Compute the inverse of the matrix  $\begin{pmatrix} 1 & 1 & 3 \\ -2 & -4 & -4 \end{pmatrix}$
17. If the heights of 1000 soldiers in a regiment are distributed normally with a mean of 172 cms and a standard deviation of 5 cms. How many soldiers have heights greater than 180 cms ?
18. Define Pareto distribution and obtain its mean and variance. Also explain its importance in economic study.
19. Obtain the mean and variance of  $\chi^2$  distribution. List some of important application of  $\chi^2$  distribution.
20. Define F distribution and obtain its mean. Explain the uses of this distribution and write down its relationship with  $\chi^2$  distribution.
21. Distinguish between efficiency and sufficiency and explain its role in statistical estimation. Give examples in each case.
22. Explain the method of construction of confidence interval for difference in means of two populations based on small samples.
23. Explain the tests of goodness of fit and independence of attributes.
24. Discuss the important concepts relating to research design.

(7 x 2 = 14 weightage)

## Part C

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

25. Using matrix method solve the following.

$$5x + 3y + 3z = 48$$

$$2x + 6y - 3z = 18$$

$$8x - 3y + 2z = 21$$

26. Three screws produced by a certain machine were checked by examining samples of 12. The following table shows the distribution of 128 samples according to the number of defective items they contained.

No. of defectives in a sample of 12	0	1	2	3	4	5	6	7
No. of samples	7	6	19	35	30	23	7	1

Fit a binomial distribution and find the mean and variance of the distribution.

27. Discuss the usefulness of normal distribution in economic analysis. The income distribution of workers in a certain factory was found to be normal with mean 500 and standard deviation 50. There were 228 workers getting more than Rs. 600. How many workers were there in all ?
28. A milk producers, union wishes to test whether the preference pattern of consumers for its product is dependent on income levels. A random sample of 500 individuals gives the following data :

<i>Income</i>	<i>Product preferred</i>			<i>Total</i>
	<i>Product A</i>	<i>Product B</i>	<i>Product C</i>	
<i>Low</i>	170	30	80	280
<i>Medium</i>	50	25	60	135
<i>High</i>	20	10	55	85
<i>Total</i>	240	65	195	500

Can you conclude that the preference patterns are independent of income levels ?

(2 x 4 = 8 weightage)