

## SECOND SEMESTER M.A. DEGREE EXAMINATION, JULY 2016

(CUCSS - PG)

(Economics)

CC15P ECO2 C08- QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS-II  
(2015 Admission)

Time: 3 Hours

Maximum: 36 Weightage

**Part A**Answer **all** questions*Each bunch of four questions carries weightage 1.*

1. If  $F(x)$  is the distribution function of a random variable  $X$ , then  $F(\infty) =$  :  
(a) 0. (b) 1. (c)  $\infty$ . (d)  $-\infty$ .
2. If  $X$  is a random variable and 'b' is a constant then  $V(X + b)$  is:  
(a)  $V(X) + b$  (b)  $V(X) + b$  (c)  $V(X)$  (d)  $E(X^2)$ .
3. The expected value of the random variable:  
(a) will also be the most likely value of the random variable. (b) is another term for the mean value. (c) is also called the variance. (d) cannot be greater than 1.
4. If  $X$  follows normal distribution with mean 30 and standard deviation 5 its frequency curve will be symmetric about  $X =$  :  
(a) 5. (b) 30. (c) 25. (d) 0.
5. Let  $\chi^2$  follows chi square distribution with 4 degrees of freedom. Then  $V(\chi^2) =$ :  
(a) 16. (b) 8. (c) 4. (d) 2.
6. The students t distribution is introduced by:  
(a) Karl Pearson. (b) Laplace. (c) William S Gosset. (d) None of these.
7. The frequency curve of lognormal distribution is always:  
(a) Positively skewed. (b) Symmetric. (c) Straight line. (d) Negatively skewed.
8. Following is an example of consistent and biased estimator:  
(a) Sample proportion. (b) Sample variance. (c) Sample mean. (d) None of these.
9. The estimator with ..... is called the most efficient estimator :  
(a) Minimum variance. (b) Maximum variance. (c) Unbiasedness. (d) Consistency.
10. The critical region in hypothesis testing gives:  
(a) Region of acceptance. (b) Region of rejection. (c) Sample space. (d) The experimental region.

11. In ANOVA we test:  
(a) The equality of several variances. (b) Significance of mean.  
(c) The equality of several means. (d) Significance of variance.
12. To test the significance of proportion, we use:  
(a) t-test. (b) F-test. (c) Normal test. (d) Chi-square test.

( $12 \times \frac{1}{4} = 3$  weightage)

### Part B (Very Short Answer Questions)

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

13. Define mathematical expectation of a random variable.
14. For a Binomial distribution mean is 6 and variance is 3.6. Find (i) p, (ii) n.
15. Define a Poisson distribution.
16. Explain unbiased and consistent estimators.
17. Distinguish between simple hypothesis and composite hypothesis
18. Distinguish between point estimation and interval estimation.
19. What is Standard error?
20. What is type II error?

( $5 \times 1 = 5$  weightage)

### Part C (Short Answer Questions)

Answer any **eight** questions. Each question carries a weightage of 2.

21. Let  $X$  be the number of years before a certain kind of pump needs replacement. Let  $X$  have the probability function  $f(x) = kx^3$ ;  $x = 0, 1, 2, 3, 4$ . Find  $k$ .
22. Describe the properties of a good estimator.
23. Define chi-square distribution and state any three properties of it.
24. Derive the confidence interval for the variance of a normal population.
25. What is student's 't' distribution? Explain its important uses.
26. An insurance representative has appointments with four prospective clients tomorrow. From past experience she knows that the probability of making a sale on any appointment is  $\frac{1}{5}$  or 0.20. Use the rule of probability to determine the likelihood that she will sell a policy to 3 of the 4 prospective clients.

27. Define Statistical hypothesis and distinguish between null and alternative hypothesis.
28. Explain the central limit theorem.
29. Explain the concepts significance level and power of test
30. A sample of 80 Chief Financial Officers revealed 20 had at one time been dismissed from a job. Develop a 95 per cent confidence interval for the proportion that has been dismissed from a job.
31. Explain paired 't' test.

(8×2= 16 weightage)

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

32. (a) Explain the characteristics of a normal probability distribution.  
(b) Define log normal distribution and state its applications in economics.
33. A company manufacturing electric bulbs claims that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of 100 bulbs was found to be 1570 and 120 hours. Should we accept the claim of the company.
34. Before an increase in excise duty on tea, 800 persons out of a sample of a sample of 1,000 persons were found to be tea drinkers. After an increase in excise duty, 800 people were tea drinkers in a sample of 1,200 people. Test whether there is a significant decrease in the consumption of tea after an increase in excise duty (use 5% level of significance)
35. The additional hours of sleep gained by 8 patients in an experiment with certain drug were recorded as follows:  

Patient	:	1	2	3	4	5	6	7	8
Hours gained	:	0.7	0.1	3.4	2.0	0.8	0.2	0.0	3.0

 Assuming a normal distribution test the hypothesis that the drug has no effect at level  $\alpha = 0.10$ .
36. (a) Explain clearly the technique of analysis of variance for data with one-way classification.  
(b) Three varieties of coal were analysed by four chemists and ash content in the varieties was found to be as under:  

		Chemists			
Varieties		1	2	3	4
A		8	5	5	7
B		7	6	4	4
C		3	6	5	4

 Do the varieties differ significantly in their ash-content?

(3×4= 12 weightage)

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