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Name:.....

Reg. No:.....

**SECOND SEMESTER M.A.DEGREE EXAMINATION, APRIL 2019**

(Regular/Improvement/Supplementary)

(CUCSS - PG)

**CC15P ECO2 C08 - QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS II**

(Economics)

(2015 Admission onwards)

Time: Three Hours

Maximum:36 Weightage

**PART A**

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

1. If  $F(x)$  is the distribution function of a random variable  $X$ , then  $F(-\infty) = \text{-----}$   
(a) 0.                      (b) 1.                      (c)  $\infty$ .                      (d)  $-\infty$ .
2. If  $X$  denotes the face that turns up when a die is tossed then  $E(X)$  is  
(a) 3                      (b) 3.5                      (c) 4                      (d) 4.5
3. In a Binomial distribution the relationship between mean and variance is  
(a) Mean = variance    (b) Mean < variance    (c) Mean > variance    (d) none of these
4. The variance of Poisson distribution with mean 2 is  
(a) Less than 2          (b) equal to 2          (c) greater than 2          (d) does not exist
5. The following is an example for a continuous probability distribution  
(a) Binomial              (b) Poisson              (c) Normal              (d) None of these
6. The range of variation of  $\chi^2$  statistic is  
(a) -1 to +1              (b) 0 to  $\infty$               (c) 0 to 1              (d)  $-\infty$  to  $+\infty$
7. The students t distribution is introduced by:  
(a) Karl Pearson          (b) Laplace              (c) William S Gosset    (d) None of these
8. ----- is an example of an unbiased estimator of population mean  
(a) sample median                      (b) sample mean  
(c) sample variance                      (d) sample mode
9. An estimator is a function of -----  
(a) Population observations              (b) Sample observations  
(c) mean and variance of the population    (d) None of these
10. A sample of 10 observations from a normal population has a mean 42 and standard deviation 4. To test  $H_0: \mu = 40$  against  $H_1: \mu \neq 40$  we use,  
(a) Z test                      (b) F test                      (c)  $\chi^2$  test                      (d) t test

11. Level of significance is the probability of  
 (a) Type I error (b) Type II error  
 (c) non committing error (d) none of the above
12. Area of critical region depends on  
 (a) null hypothesis (b) alternate hypothesis  
 (c) simple hypothesis (d) none of these

(12 × ¼ = 3 Weightage)

**PART B (Very Short Answer Questions)**

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

13. A die is tossed until an odd number appears. Obtain the probability distribution of the number of tosses.
14. What is skewness of a binomial distribution with parameters n and p?
15. Define lognormal distribution.
16. Define standard error.
17. Give an example of an unbiased estimator for the mean of the normal distribution
18. Define efficiency of an estimator
19. Distinguish between null hypothesis and alternative hypothesis.
20. Define type II error?

(5 × 1 = 5 Weightage)

**PART C (Short Answer Questions)**

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

21. A random variable X has p.m.f given by  $P(X = x) = \frac{x}{10}$ , x = 1, 2, 3, 4. Write down distribution function of X.
22. Find the probability that no defective fuse will be found in a box of 200 fuses, past experience shows that 2% of such fuses are defective.
23. Derive the mean of binomial distribution.
24. The weights of 1000 students are normally distributed with mean 40 kgs. And standard deviation 4 kgs. Find the number of students with weight (i) less than 50 kgs. (ii). Between 40 and 45 kgs.
25. What are the properties of  $\chi^2$  distribution?
26. Explain the maximum likelihood method of estimation. State some important properties of maximum likelihood estimate.
27. Explain the athenatical model for one way ANOVA.

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28. Explain the terms (i) null hypothesis (ii) alternative hypothesis (iii) level of significance and (iv) Type I and Type II error.
29. What is student's 't' distribution? Explain its important uses.
30. A sample of 10 observations gives a mean equal to 38 and standard deviation 4. Can we conclude that the population mean is 40.
31. Before an increase in exercise duty on tea 800 persons out of a sample 1000 persons were found to be tea drinkers. After an increase in duty 800 people were tea drinkers in a sample of 1200 people. Test whether there is significant decrease in the consumption of tea after the increase in duty.

(8 × 2 = 16 Weightage)

**PART D (Essay Questions)**

Answer any *three* questions. Each question carries 4 weightage.

32. a) Define probability density function of a random variable  
 b) Define Poisson distribution and obtain its mean and variance.
33. According to genetic theory, the seeds collected from a field of pink pea should produce plants with white, pink and red flowers in the proportion 1:2:1. Of 400 plants grown from such seeds, 93 were white, 211 were pink and 96 were red. Does this result contradict genetic theory?
34. a) Define normal distribution and explain its chief properties  
 b) Distinguish between interval estimation and point estimation.
35. a) Explain the test for equality of proportions of two populations  
 b) It is believed that life time of an electronic device is 500 hours. A sample of 100 items yielded mean 450 and variance 16. Based on this data test whether the belief is true.
36. a) Explain paired t test.  
 b) Three varieties of wheat were sown in 4 plots each and the following yields in quintals per acre were obtained.

	Type I	Type II	Type III
Plot I	10	9	4
Plot II	6	7	7
Plot III	7	7	7
Plot IV	9	5	6

Find out whether there is significant difference between the mean yield of the three varieties.

(3 × 4 = 12 Weightage)

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