PG Odd Semester (CBCS) Exam., December—2016

ECONOMICS

(1st Semester)

Course No. : EC–104 (C)

(Statistical Methods for Economic Analysis)

$\dfrac{\textit{Full Marks} : 75}{\textit{Pass Marks} : 30}$

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Answer **five** questions, selecting **one** from each Unit

UNIT—I

1. *(a)* Derive Spearman's rank correlation coefficient formula in case of untied ranks. 8

   (b) Distinguish between partial correlation and multiple correlation. In a trivariate distribution r_{12} 0 7, r_{23} r_{31} 0 5, find the values of $r_{23\,1}$ and $R_{1\,23}$. 2+3=5

   (c) Find the arithmetic mean of the regression coefficients in case of positively and perfectly correlated variables. 2

2. *(a)* Show that Karl Pearson's correlation coefficient lies between –1 and +1. 4

   (b) Express multiple correlation in terms of simple and partial correlations. 4

   (c) For 10 observations on price (*X*) and supply (*Y*), the following data are obtained :

   X 130, Y 220, X^2 2288

   Y^2 5506, XY 3467

   (i) Obtain the lines of regression of Y on X and X on Y. 2+2=4

   (ii) Estimate supply when price is ₹ 16. 1

   (iii) Compute the value of r. 2

UNIT—II

3. *(a)* Define mutually exclusive events. Show that two mutually exclusive events are not independent events and vice versa. 2+4=6

   (b) Show that $V(aX\ b)\ a^2 . V(X)$, where a and b are two constants. 2

   (c) Obtain the moment generating function of binomial distribution. 4

(3)

(d) Discuss the importance of normal distribution in statistics. 3

4. (a) State and prove additive theorem of probability. 3

(b) Show that mean and variance of Poisson distribution are equal. 6

(c) If median of the normal distribution is 14, then what will be the value of the mode? 1

(d) Define probability density function. The distribution function of a continuous random variable X is given by

$$F(x) \quad 1 \quad (1 \quad x) \, e^{-x} \; ; \; \text{for } x \quad 0$$
$$0 \qquad ; \quad x \quad 0$$

Find the corresponding probability density function of X. 2+3=5

UNIT—III

5. (a) Distinguish between SRSWR and SRSWOR. 4

(b) Distinguish between estimator and estimate. Explain various criteria of a good estimator as suggested by Prof. R. A. Fisher. 2+6=8

(4)

(c) A population consists of 4 units, viz., 2, 4, 6 and 8. Draw all possible samples of size 2 in case of SRSWOR and calculate their sample means. Also find the mean of the sample means. 1+1+1=3

6. (a) Write a short note on stratified random sampling. 5

(b) Show that sample mean is an unbiased estimator of population mean. 5

(c) Explain the concepts of sampling distribution and standard error of a statistic. 2+2=4

(d) Why population mean does not have a sampling distribution? 1

UNIT—IV

7. (a) Write a short note on paired t-test. 5

(b) What are the important applications of F-test? 5

(c) A random sample of size 20 from a normal population gives a sample mean of 42 and standard deviation of 6. Test the hypothesis that the population mean is 44. Use 5% level of significance. 5

8. *(a)* What are the important applications of chi-square test? 5

(b) Define the concepts of degrees of freedom, level of significance, critical region and power of a test. 1½×4=6

(c) A random sample of 18 pairs of observations from a bivariate normal population gives a correlation coefficient 0 3. Is it likely that the variables are uncorrelated in the population? Test at 5% level of significance. 4

UNIT—V

9. *(a)* What is analysis of variance? 2

(b) What are the assumptions under analysis of variance? 3

(c) Describe the technique of analysis of variance in two-way classified data, stating clearly the mathematical model and the assumptions you make by giving analysis of variance table. 10

10. *(a)* Explain the advantages of non-parametric tests over parametric tests. 5

(b) A panel of judges *A* and *B* have independently awarded the following marks to the seven debaters :

Debaters	1	2	3	4	5	6	7
Marks by judge A	40	34	58	30	40	48	42
Marks by judge B	32	39	26	30	38	34	28

Calculate Spearman's rank correlation coefficient and test its significance at 5% level of significance. 5+5=10

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