

2023

ECONOMICS

B.A. 3rd Semester Examination - 2023

PAPER - CC7

Full Marks : 60

Time - 3 hours

Statistical methods for Economics

The figures in the right-hands margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group - A

Q No.1 Answer any ten question of the following : 10 x 2 = 20

- a) A.M. of two observations is 36 and their G.M. is 24. Find out their H.M.
- b) For a distribution the three quantiles are $Q_1=10$, $Q_2=25$ and $Q_3=35$. Find the quantile deviation of the distribution.
- c) Define conditional probability for two events.
- d) For any two events A and B, prove that $P(A + B) \leq P(A) + P(B)$

(Turn Over)

(2)

- e) If $P(A/B) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A) = \frac{1}{2}$, find the probability that exactly one of the events A and B occurs.
- f) Show that two mutually exclusive events cannot be independent.
- g) State and prove sum law of expectation.
- h) Define probability mass function.
- i) Define stratified random sample.
- j) Define type-I error, type-II error and power of test and briefly explain the relation among them.
- k) Distinguish between estimate and estimator.
- l) Define Lorenz Curve.
- m) In how many ways can the letters of the word ECONOMICS be arranged?
- n) Prove that $r^2 = byx \cdot bzy$

(3)

- o) The AM of a variable x is 100. Find the mean of the variable $5x - 10$

Group - B

- Answer any four questions of the following : $4 \times 5 = 20$
- 2 For two values say 'a' and 'b' where ($a \leq b$) of a variable x the mean and s.d. are respectively 25 and 4. Find the values of 'a' and 'b'.
- 3 If 10 persons are arranged at random (i) in a line (ii) in a ring, find the probability that 2 particular persons will be next to each other.
- 4 If A and B are independent events then show that (i) A and B^c (ii) A^c and B and (iii) A^c and B^c are also independent.
5. What are the characteristics of good estimator?
6. Suppose X is $B(m, P)$, where symbols have their usual meaning. The mean and the variance are respectively 4 and $4/3$. Find the value of 'm'
7. Find the expectation and standard error of sample mean under SRSWR.
8. Let T_1 and T_2 be statistics with expectations $(T_1) = \theta_1 + \theta_2$ and $E(T_2) = \theta_1 - \theta_2$. Find the unbiased

Group - C

Answer any two questions of the following : 2 x 10 = 20

10. The mean wage of 100 labours working in a factory is Rs. 38. There are 60 men and 40 women. If mean wage of men is Rs. 40, find out the mean wage of women.

11. Prove that the mean and the variance of poisson distribution are equal. Show that poisson distribution can be obtained as a limiting form of a Biromial distribution. 5 + 5

12. Define correlation coefficient. Describe its properties. If correlation between two variables x and y is found be -0.70 , how will you interpret the result.

12.a) State and prove Bayes' theorem of probability. Define prior and posterior probabilities. 5 + 5

12.b) A radio station broadcasts the correct time every hour on the hour. If a listener switches on the radio at random, what is the probability that he has to wait at least 20 minutes before hearing the time broadcast ?