

(R) With usual notations in 2×2 contingency table

a	b
c	d

show that :

$$\chi^2 = \frac{N(ad - bc)^2}{(a+b)(c+d)(a+c)(b+d)} \quad 4$$

AP-453

**B.Sc. (Part-II) Semester-III Examination
STATISTICS**

Time—Three Hours]

[Maximum Marks—80

Note:— ALL questions are compulsory.

1. (A) Fill in the blanks : 2

(i) Crude death rate is a _____ rate.

(ii) In life table ${}_n p_x =$ _____.

(iii) A square of standard normal variate is _____ variate.

(iv) Population constants are known as _____.

(B) Choose the correct alternative from the following : 2

(i) In life tables $e^0_x =$

(a) $e_x - \frac{1}{2}$

(b) $\frac{1}{2} e_x$

(c) $2e_x$

(d) $e_x + \frac{1}{2}$

(ii) Crude rate of natural increase =

- (a) $\frac{CBR}{CDR}$
- (b) $CBR \times CDR$
- (c) $CBR - CDR$
- (d) $CBR + CDR$

(iii) If $E(\text{statistics}) = \text{Parameter}$ then statistic is _____ estimator for parameter.

- (a) Biased
- (b) Unbiased
- (c) Efficient
- (d) Sufficient

(iv) The sampling distribution of sum of Poisson variates is _____

- (a) Binomial
- (b) Normal
- (c) Poisson
- (d) Chi-square

(C) Answer in one sentence : 4

- (i) What do you mean by specific death rate ?
- (ii) What is infant mortality rate ?
- (iii) What do you mean by estimator ?
- (iv) What is type-II error ?

(Q) What is null hypothesis ? Give the steps involved in testing of hypothesis problems. 4

(R) Discuss the terms level of significance and p-value. 4

10. (A) What is random sample ? Give procedure of drawing random sample from continuous distribution. 6

(B) Obtain the sampling distribution of sum of Poisson variates. 6

OR

11. (P) Describe the procedure of drawing random sample from discrete distribution. Obtain the sampling distribution of sum of independent binomial variates. 6

(Q) Obtain the sampling distribution of mean of normal distribution. 6

12. (A) State and prove the additive property of Chi-square variates. 4

(B) Obtain the mgf of Chi-square variate. Hence find mean and variance. 4

(C) Explain Chi-square test for testing goodness of fit. 4

OR

13. (P) Define Chi-square variate and obtain its pdf. 4

(Q) Discuss the Chi-square test for population variance. 4

6. (A) What do you mean by life table ? State the assumptions for construction of life table. 6

- (B) Explain CBR and GFR. State their merits. 6

OR

7. (P) What do you mean by curate expectation of life ? Show that :

$$e_x = \left(\sum_{n=1}^{\infty} l_{x+n} \right) / l_x. \quad 6$$

- (Q) Explain crude rate of natural increase and Pearle's Vital Index. 6

8. (A) Define with the help of an example :

(i) Unbiased estimator

(ii) Consistent estimator. 4

- (B) What do you mean by Standard Error ? Obtain the standard error of sample mean. 4

- (C) Explain the concept of error in testing of hypothesis and discuss any one of them. 4

OR

9. (P) Define with the help of an example :

(i) Point estimation

(ii) Interval estimation. 4

2. (A) Explain the present official statistical system in India. 4

(B) Discuss De-facto method of Census and state its merits and demerits 4

(C) State any four important publications of banking and finance. 4

OR

3. (P) Explain De-Jure method and state its merits and demerits. 4

(Q) State the working of CSO in brief. 4

(R) State any four major publications of Agricultural Statistics. 4

4. (A) Discuss registration method of obtaining vital statistics and state its shortcomings. 4

(B) Define Age Specific death rate and state its merits and demerits. 4

(C) Explain Direct method of Standardization. 4

OR

5. (P) Discuss Census method of obtaining vital statistics and state its merits and demerits. 4

(Q) Define crude death rate. State its merits and demerits. 4

(R) Explain indirect method of standardization. 4