AT–335

**B.Sc. Part—II (Semester—III) Examination**

**3S : STATISTICS**

Time : Three Hours] [Maximum Marks : 80

**Note :— All** questions are compulsory.

1. (A) Fill in the blanks :

(i) CSO was established in the year _____.

(ii) Sum of independent Chi-square variate is a _____ variate.

(iii) Complimentary statement to null hypothesis is called a _____ hypothesis.

(iv) NRR is a rate of _____ of the population. 2

(b) Choose the correct alternative :

(i) Theory of testing of hypothesis was initiated by :

(a) C.R. Rao (b) J. Neyman

(c) R.A. Fisher (d) Karl Pearson

(ii) The variance of Chi-square distribution with 'n' degree of freedom is :

(a) n (b) $\sqrt{n}$

(c) 2n (d) $\sqrt{2n}$

(iii) In life table terminology, $e^0_x$ is given by :

(a) $\frac{Lx}{\ell x}$ (b) $Lx - \ell x$

(c) $\frac{Tx}{\ell x}$ (d) $Tx - \ell x$

(iv) Generally census in every country is conducted after _____ years.

(a) Two (b) Five

(c) Ten (d) Twenty 2

(c) Answer in **one** sentence each :

(i) Define type-I error.

(ii) What is meant by vital event ?

(iii) State the various measures of mortality.

(iv) What are the parameters ? 4

2. (A) What are the sources of population statistics ? 4

(B) State the important publications of transport statistics. 4

(C) Explain the function of CSO in brief. 4

**OR**

3. (P) Explain De-facto method of census with its merits and demerits. 4

(Q) Name the important publications in agricultural statistics. 4

(R) Explain the working of NSSO in brief. 4

4. (A) What are various measures of mortality ? Explain age SDR with its merits and demerits. 6

(B) Explain the registration method of obtaining vital statistics with its drawbacks. 6

**OR**

5. (P) Explain indirect method of standardization of death rates along with merits and demerits. 6

(Q) Explain infant mortality rate and state the uses of vital statistics. 6

6. (A) Write the assumptions for construction of life table. 4

(B) Explain crude birth rate with its merits and demerits. 4

(C) Describe Gross Reproductive Rate in brief. 4

**OR**

7. (P) What are the various uses of life table ? 4

(Q) Explain Total Fertility Rate along with merits and demerits. 4

(R) Describe Net reproductive rate in brief. 4

8. (A) Explain simple and composite hypothesis with example. 4

(B) Distinguish between point estimates and interval estimates. 4

(C) What do you mean by standard error of estimate ? Obtain standard error of sample proportion. 4

**OR**

9. (P) Explain Type-I and Type-II errors is testing of hypothesis. 4

(Q) Describe the concept of critical region in brief. 4

(R) Show that $\frac{T(T-1)}{n(n-1)}$ is an unbiased estimate of $\theta^2$, for a sample $x_1, x_2, \ldots, x_n$ drawn on x which takes the value 1 or 0 with probability $\theta$ and $(1-\theta)$ where $T = \sum_{i=1}^{n} x_i$. 4

10. (A) Explain the concept of random sample. Give the steps for drawing a random sample from binomial distribution. 6

(B) Give the detailed procedure of drawing random sample from continuous distribution. 6

**OR**

11. (P) What do you mean by statistics ? Obtain sampling distribution of sum of binomial variates. 6

(Q) What do you mean by sampling distribution of statistics ? Obtain sampling distribution of sum of Poisson variates. 6

12. (A) Define Chi-square variate with n.d.f. and obtain its m.g.f. 4

(B) Give the conditions for the validity of Chi-square test. 4

(C) Explain Chi-square test for testing independence of attribute in r × s contigency table. 4

**OR**

13. (P) State and prove additive property of Chi-square variates. 4

(Q) Discuss the Chi-square test for testing goodness of fit. 4

(R) Prove that, in 2 × 2 contigency table $\begin{array}{|c|c|}\hline a & b \\ \hline c & d \\ \hline \end{array}$ Chi-square test for testing independence of attribute is given by $\chi^2 = \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$. Where notations have their usual meanings. 4