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**SIIS 198 B-15**  
**B.Sc. IIIrd Semester Degree Examination**  
**Mathematical Statistics**  
**(S.Q.C. and Demographic Methods)**  
**Paper : III**

Time : 3 Hours

Maximum Marks : 80

***Instructions to Candidates:***

Statistical tables and graph sheets supplied on request.

**I** Answer All the following questions:

**(15×1=15)**

1. The product control is achieved through the technique of
  - a) Sampling plan
  - b) Control chart
  - c) Bar chart
  - d) Pie chart.
2. Control charts were discovered by
  - a) Dr. Mahalanobis
  - b) Karl pearson
  - c) Dr. W.A. Shewart
  - d) Bowley.
3. Which chart is applicable for number of defects?
  - a) R-chart
  - b) P-chart
  - c)  $\bar{X}$ -chart
  - d) C-chart

4. Upper control limit for R-chart, when standards are not known
- $D_3 \bar{R}$
  - $B_2 \sigma$
  - $A \sigma$
  - $D_4 \bar{R}$
5. The probability of rejecting a lot of quality  $\bar{p}$  is known as:
- Producer's risk
  - Type I error
  - Consumer's risk
  - Type II error.
6. Census period in India is:
- 5 years
  - 10 years
  - 12 years
  - 6 years
7. Age specific birth rate for age group  $x$  to  $x+n$  is given by:
- ${}_n i_x = \frac{{}_n B_x}{{}_n P_x} \times 1000$
  - ${}_n i_x = \frac{B_x}{P_x} \times 1000$
  - ${}_n i_x = \frac{{}_n B_x}{{}_n P_x^r} \times 1000$
  - ${}_n i_x = \frac{{}_n B_x^r}{{}_n P_x^r} \times 1000$

8. City A is more fertile than city B if
- $TFR_A < TFR_B$
  - $TFR_A > TFR_B$
  - $TFR_A = 2TFR_B$
  - None of these.
9. The death rate of mother due to child birth is known as
- Infant mortality rate
  - Maternal mortality rate
  - Neonatal mortality rate
  - None of these.
10. The value of  $NRR > 1$  is an indication of
- Increase in population
  - Decrease in population
  - No change in population
  - None of these.
11. The variation due to \_\_\_\_\_ causes can be removed.
12. The probability of accepting  $3\sigma$  limits is \_\_\_\_\_
13. In control chart, if the sample points are out of control limits, then the process is said to be \_\_\_\_\_
14. \_\_\_\_\_ and \_\_\_\_\_ are two sources of vital statistics.
15. \_\_\_\_\_ age group is known as child bearing age group.

II. Answer any Five of the following questions.

(5×5=25)

- Describe the construction of  $\bar{X}$  and R charts.
- Discuss the  $3\sigma$  control limits.
- Discuss the natural tolerance limits and specification limits.

19. Define the following terms

- a) AOQ
- b) Producers risk
- c) L.T.P.D

20. What do you mean by the fertility rates? Discuss G.F.R.

21. Explain how growth of a population is measured.

22. Explain difference between C.D.R and S.T.D.R

III. Answer any **Four** of the following questions:

**(4×10=40)**

23. Explain construction of P and C-charts. Give application of C-chart.

24. Explain the following.

- a) Chance causes and assignable causes
- b) Process control and product control.
- c) Defective and defect.

25. Describe the construction of single sampling plan. Explain OC, ASN and ATI of single sampling plan.

26. Define vital statistics. Explain the method of collecting vital statistics and uses of vital statistics.

27. Explain direct and indirect method of finding standardized death rates.

28. Explain all components of life table with assumptions.

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