## FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2014

(CUCBCSS—U.G.)

Complementary Course—Statistics

ST 1C 01—BASIC STATISTICS AND PROBABILITY

Time : Three Hours                                                                 Maximum : 80 Marks

### Section A

*One word questions.*
*Answer all questions.*

1. Mode + 2 Mean = —————.

2. The average that can be used for finding population growth is —————.

3. The result of a random experiment is called —————.

4. Probability of an impossible event is —————.

5. If X is a continuous random variable over (0, 1), then $P(X = 0.5)$ = Write true *or* false :

6. Variance is the least value of mean square deviation.

7. Two uncorrelated variables are independent.

8. Any event A in the sample space S is independent of S.

9. For any events A and B, $P(A/B) \leq P(A)$.

10. Distribution function of a random variable is always non-decreasing.

                                                                               (10 × 1 = 10 marks)

### Section B

*One sentence questions.*
*Answer all questions.*

11. Define harmonic mean.

12. Define percentiles.

13. Define a random variable.

14. Define a field.

15. What are equally likely events ?

16. Define probability mass function.

17. When a function is said to be right continuous.

                                                                               (7 × 2 = 14 marks)

**Turn over**

## Section C

*Paragraph questions.*
*Answer any* **three** *questions.*

18. State the merits and demerits of median as a measure of central tendency.

19. Explain coefficient of variation and its importance.

20. Describe the fitting of a second degree polynomial, by least square method.

21. Explain the term "regression" by giving suitable examples.

22. For any independent events A and B with $P(A) < P(B)$, $P(A/B) + P(B/A) = 1$ and $P(AB) = \dfrac{15}{64}$, find $P(A)$.

(3 × 4 = 12 marks)

## Section D

*Short essay questions.*
*Answer any* **four** *questions.*

23. Define mean deviation about mean. Show that standard deviation is not less than mean deviation about mean, for any discrete distribution.

24. Explain the angle between two lines of regression.

25. Distinguish between classical and empirical definitions of probability.

26. Distinguish between partial and multiple correlation coefficients.

27. Prove or disprove: Pair-wise independence implies mutual independence.

28. $f(x) = \begin{cases} \dfrac{x}{21}, & x = 1, 2, ..., 6 \\ 0 & \text{otherwise} \end{cases}$.

Let Find (i) $P(X = 1 \text{ or } 2)$ ; (ii) $P\left(\dfrac{1}{2} < X < \dfrac{5}{2} \mid X > 1\right)$.

(4 × 6 = 24 marks)

## Section E

*Essay questions.*
*Answer any* **two** *questions.*

58

29. Explain "rank correlation". Derive the formula for Spearman's rank correlation coefficient.

30. State and establish Bayes theorem for finite number of events.

31. From a survey it is found that the probability of selecting (i) A male or a smoker is $\dfrac{7}{10}$ ; (ii) A male smoker is $\dfrac{2}{5}$ ; and (iii) A male, if a smoker is already selected is $\dfrac{2}{3}$. Find the probability of selecting (a) A non-smoker ; (b) A male ; and (c) A smoker, if a male is first selected

32. Let X be a continuous random variable with probability density function

$$f(x) = \begin{cases} k, & -2, \le x \le 12 \\ 0, & \text{otherwise} \end{cases}$$

Determine (i) $k$ ;and (ii) The cumulative distribution function $F(x)$.

$(2 \times 10 = 20 \text{ marks})$