CHRIST UNIVERSITY, BANGALORE-560029
B.Sc. I End Semester Examination October 2009

Code: STA131

Sub: Basic Statistics & Probability

Max. Marks: 100

Duration: 3 Hrs

SECTION - A

Answer any TEN questions. Each question carries TWO marks.   **10 x 2 = 20**

1. List any two advantages of secondary data collection
2. Define the following: a. correspondent b. informant
3. Define a discrete variable and give an example
4. What are open end class intervals? Give an example.
5. Define the term measures of central tendency.
6. Define standard deviation
7. Prove that probability of an event lying between 0 and 1.
8. Define distribution function of a continuous random variable.
9. Give an example of a continuous random variable.
10. Define mathematical expectation of discrete random variable.
11. If $E(X) = 8$, find $E(9X)$, $E(2X+6)$.
12. Define moment generating function.

SECTION – B

Answer any FOUR questions. Each question carries SIX marks.   **4 x 6 = 24**

13. For the following scores show the amount of weight lost (in pounds) by each client of a weight control clinic during the last year draw suitable stem and leaf display.

10	13	22	26	46	16	23	35	53	17
32	41	35	24	33	27	16	20	60	48
43	52	31	17	20	33	18	23	8	24
15	26	46	30	19	22	13	22	14	21
42	19	26	57	7	16	26	60	48	68
53	20	33	11	25	9	48	17	21	24
18	16	21	52	31	34	28	42	19	16

14. What are the properties of a good average? Examine these properties with reference to Arithmetic mean.
15. Write short notes on Gini's coefficient.
16. Define a null event and prove that the probability of a null event is zero.
17. State and prove addition theorem of expectation for a discrete random variable.
18. Write a short note on uniqueness theorem of moment generating function. What is moment generating function of a random variable X about a point A if (1)X is discrete? 2)continuous

SECTION – C

Answer any FOUR questions. Each question carries FOURTEEN marks.   4 x 14 = 56

19. a. Explain different methods of primary data collection
    b. Describe the construction of percentage bar chart.

20. a. Show that the sum of squared deviations is minimum when taken about mean.
    b. Distinguish between absolute and relative measures of dispersion. Discuss various measures of absolute and relative measures of dispersion.

21. a. Find the mean deviation from the mean and standard deviation of the arithmetic progression a, a+d, a+2d, a+3d, ..., a+2nd and verify that the latter is greater than the former.
    b. Write short notes on moments. Explain the role of moments in studying the characteristics of a distribution?

22. a) Prove that $P(A^c \cap B) = P(B) - P(A \cap B)$
    $P(A \cap B^c) = P(A) - P(A \cap B)$
    b) Define mutually exclusive events. State addition theorem for mutually exclusive events. (8+6)

23. a) If A and B are mutually independent, prove that A.B and C are also independent.
    b) If A, B, C are pair wise independent and A is independent of BUC, then A, B and C are mutually independent. (7+7)

24. (a) Let X be a continuous random variable with pdf $f_X(x)$. Let y=g(x) be strictly monotonic function of x. Assume that g(x) is differentiable and hence continuous for all x. Then the pdf of the random variable Y is given by $h_Y(y) = f_X(x) |dx/dy|$ where x is expressed in terms of y.
    (b) If the cumulative distribution function of X is F(x), find the cumulative distribution function of (i) Y=X-b (ii) Y=aX