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Code No. 229

FACULTY OF SCIENCE
B.Sc. I-Semester (CBCS) Examination, December 2016

Subject : Statistics

Paper - 1 : Descriptive Statistics and Probability

Time : 3 Hours

Max. Marks: 80

PART - A (5 x 4 = 20 Marks)
(Short Answer Type)

Note : Answer any FIVE of the following questions.

1. Explain the Sources of Secondary data.
2. Show that Bowley's coefficient of Skewness lies between ± 1 .
3. State the axioms of probability.
4. Show that if A and B are independent, \bar{A} and \bar{B} are also independent.
5. Define distribution function and state its properties.
6. Show that $V(aX + b) = a^2V(X)$.
7. Explain the procedure for transformation of a random variable.
8. State and prove additive property of CGF.

PART - B (4 x 15 = 60 Marks)
(Essay Answer Type)

Note: Attempt ALL the questions.

9 (a) Distinguish between primary and secondary data. Explain the methods of collecting Primary data with advantages and disadvantages. (5+10)

OR

- (b) (i) Define Central and Non central moments. Derive the relationship between central moments in terms of a raw moments. (3+7)
- (ii) In a certain distribution the first four moments about the point 5 are -4, 2, -110 and 260 respectively. Find mean, variance and β_1 .

10 (a) (i) For n events E_1, E_2, \dots, E_n . Prove that $P\left(\bigcap_{i=1}^n E_i\right) \geq \sum_{i=1}^n P(E_i) - (n-1)$.

(ii) A bag contains 50 tickets numbered 1, 2, ..., 50. Five tickets are drawn at random and arranged in as ascending order of magnitude. What is the probability that the third ticket is 30? (10+5)

OR

(b) (i) State and prove addition theorem of probability for n events. (10)

(ii) If $P(A \cup B) = \frac{5}{6}$; $P(A \cap B) = \frac{1}{3}$ and $P(\bar{B}) = \frac{1}{2}$. Prove that the events A and B are Independent. (5)

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- 11 (a) (i) Define Random variable, pmf and pdf.
 (ii) A random variable X has the density function given by (1+2+2+3+3+4)

$$f(x) = c(1-x^2), -1 \leq x \leq 1$$

Determine the constant c and find the mean and Variance.

OR

- (b) A two dimensional random variable (X, Y) have a bivariate distribution given by

$$P(X=x, Y=y) = \frac{x^2+y}{32}, \text{ for } x=0, 1, 2 \text{ and } y=0, 1$$

- (i) Find the marginal distribution of X and Y
 (ii) Conditional distribution of $X=x$ given $Y=1$
 (iii) $P(X < 1, Y=0)$. (3+2+2+5+3)

- 12 (a) Define MGF and CGF of a random variable. Establish the relationship between moments and cumulants. (5+10)

OR

- Q (b) (i) State and prove Chebyshev's in equality.
 (ii) A r.v. ' x ' is exponentially distributed with parameter 1. Find the density function of $Y = \sqrt{x}$.
