TI-116

B.Sc. Sem.-I Examination
May-2013
STATISTICS
Paper : 101

Time : 3 Hours]   **[Max. Marks : 70**

Instructions :   (1)   **All** questions are compulsory.
           (2)   **Each** question carries equal marks.
           (3)   Statistical tables and graph papers will be provided on request.
           (4)   Use of Scientific calculator is allowed.

1.   (a)   Define the following terms with illustration :   7
       (1)   Population and its type.
       (2)   Parameter and Statistic.
       (3)   Interval and Ratio type data.
       OR
    Attempt any **one** :
    (i)   State the procedure to prepare a frequency distribution for the given raw data.
    (ii)   For the following data, find median graphically :

Class	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75	75 – 85
Frequency	4	4	12	31	28	23	17

    (b)   (i)   State the different measures of central tendency.   7
          (ii)   State merits and demerits of mean and median.
          OR
    State the formula for the combined mean, geometric mean and harmonic mean. The average marks of two batches of students having 70 and 30 students are 50 and 40 respectively. Find the average marks of all the 100 students, taken together.

2.   (a)   Define following terms :   7
       (i)   Sample Space
       (ii)   Event
       (iii)   Null and certain events

     (iv) Complementary events

     (v)   Mutually exclusive and exhaustive events

<div align="center">**OR**</div>

A glass jar contains 6 red, 5 green, 8 blue and 3 yellow marbles. If a single marble is chosen at random from the jar, what is the probability of choosing a red marble ? A green marble ? A blue marble ? A yellow marble ?

  (b) Define : (i)   Classical and axiomatic definitions of probability.

               (ii) In usual Notations, state and prove the addition rule of probability.   **7**

<div align="center">**OR**</div>

In usual notations, prove following :

(i) $P(A \cap B') = P(A) - P(A \cap B)$

(ii) If $A \subset B$, then prove that $P(B - A) = P(B) - P(A)$

3. (a) Define terms : Demand and Supply. Also state demand and supply laws.   **7**

<div align="center">**OR**</div>

Define : Total Revenue, Marginal Revenue and Average Revenue.

If the demand function is $x = 100 - 5p$, then find

(i)   the maximum value of the price

(ii)   demand of a commodity, if it is given free of cost

(iii) the maximum revenue.

  (b) Write a short note on Market equilibrium.   **7**

<div align="center">**OR**</div>

Define elasticity of demand. In usual notations, if the demand law for an item is $x = (a / p) - b$, (a and b are constants to be determined). If price is 4 units, demand is 3 units and if price is 5 units, its demand is 4 units, find a and b. Also find the elasticity of demand at price 4 units.

4. (a) Define Karl Pearson's Correlation Coefficient and Spearman's Rank Correlation. State their formulas. Also state the formula of Spearman's rank correlation, when ranks are repeated.   **7**

<div align="center">**OR**</div>

Using principles of least squares, fit a curve $y = a\, b^x$.

  (b) Show that Spearman's rank correlation assumes its values in the interval $[-1, 1]$ **7**

<div align="center">**OR**</div>

Define term Regression. Obtain the line of regression of X on Y.

5. Answer the following in brief : **14**

   (1) Two unbiased dice are tossed once. The probability of getting sum of points on both the dice is 5 is _____.

      (i) 1/9

      (ii) 3/12

      (iii) 1/6

      (iv) 4/12

   (2) One card is randomly drawn from a pack of 52 cards. The probability that the drawn card is black and a queen is _____.

      (i) 2/52

      (ii) 1/28

      (iii) 1/52

      (iv) None of these

   (3) Give one example, each of primary and secondary data.

   (4) The range of correlation coefficient is _____.

      (i) $(-1, 0)$

      (ii) $(0, 2)$

      (iii) $[-1, 0]$

      (iv) $[-1, 1]$

   (5) When r = 1, two regression lines _____.

      (i) will be perpendicular

      (ii) will be parallel

      (iii) will coincide

      (iv) none of these

   (6) Give one example of hypothetical population.

   (7) An observation 12 is excluded in a series of 11 observations and its mean remained unchanged. The mean of the series was _____.

      (i) 11

      (ii) 15

      (iii) 165

      (iv) 12

(8) If an observation in a series is zero, then arithmetic mean of that series is _____.

    (i)   not necessarily zero

    (ii)   positive

    (iii) zero

    (iv) neither (a) nor (b)

(9) If the demand law is $p = 36 - 9x$, then the total revenue will be maximum for the value of x as _____.

    (i)   3

    (ii)   5

    (iii) 0

    (iv) 2

(10) If demand curve is D: $p = \dfrac{40 - 5x}{8}$ and supply curve is S : $p = 2$, then market equilibrium quantity is _____.

    (i)   24/2

    (ii)   8/3

    (iii) 4

    (iv) 3/5

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