Q. P. Code: 12214

(Time: 2½ Hours)   [Total Marks: 75]

N.B.   1) All questions are compulsory.
        2) Figures to the right indicate marks.
        3) Illustrations, in-depth answers and diagrams will be appreciated.
        4) Mixing of sub-questions is not allowed.
        5) Use of own non-programmable calculator is allowed.

Q. 1   Attempt All(Each of 5Marks)   (15M)
(a)   Multiple choice questions
        i.   If Covariance of X and Y is zero then Correlation coefficient will be
              ....
              A. 0   B. 1   C. -1   D. None of the above

        ii.   If B is subset of A then $p(A/B)$ =
              A. 1   B. P (A)   C. P(B)   D. None of the above

        iii. In greater than type ogive curve, the points are plotted for
              ....
              A. the lower boundary and frequency.
              B. the upper boundary and cumulative frequency.
              C. the lower boundary and cumulative frequency.
              D. None of the above

        iv.   The measure of central tendency which is affected by extreme
              values is ....
              A. Mean
              B. Median
              C. Mode
              D. All the above.
        v.   If the lower and upper limits of the class interval are 20 and 30
              respectively then the class length will be ...
              A. 10   B. 50   C. 30   D. 25

(b)   Fill in the blanks
        i.   Deciles divides, data into ....parts.
        ii.   In Bar chart the height of the bar indicates ......
        iii. If the correlation coefficient between two variables X and Y is
              perfect then the correlation coefficient r =...............
        iv.   For Y = a + bx, x is called as ....variable.
        v. $p(A \cup A')$ = ...

(c)   Short answers
        i.   Write two requisites of good measure of central tendency.
        ii.   Define coefficient of range.
        iii. Write two properties of regression.
        iv.   Define conditional probability.
        v.   Define mutually exclusive events

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Q. 2   **Attempt the following (Any THREE)(Each of 5Marks)**   (15M)

(a)   Explain with one example Quantitative data and Qualitative data.

(b)   Write a short note on
      i.   Bar charts   ii.   Stem and leaf plot

(c)   Given the following data on the processing time required for some operations in seconds :-
2,4,5,5,3,7,4,8,3,4,4,6,2,4,6,7,8,8,10,9,7,7,8,9,2,3,3, 3,8.
Construct frequency distribution with class interval of the type 2-4, 4-6 and so on.

(d)   Obtain mean and Median for the following data

C.I.	100-200	200-300	300-400	400-500	500-600	600-700
Frequency	5	7	4	9	3	3

(e)   Explain the procedure of obtaining Coefficient of variation for grouped data.

(f)   Define Median and Find coefficient of Quartile deviation for the following data   X: 2, 5, 4, 3, 6, 8, 9, 2, 7, 8, 5, 9, 5, 10, 13, 15, 3, 7, 8, 6, 12, 17, 17, 18

Q. 3   **Attempt the following (Any THREE)(Each of 5Marks)**   (15M)

(a)   Define first four raw moments about origin zero and central moments of a distribution. Also state the relationship between raw and central moments.

(b)   Define 'Kurtosis'. Discuss different types of kurtosis.

(c)   Obtain Bowley's coefficient of skewness, if $Q_1=45$, $Q_2=48$ and $Q_3=55$.

(d)   Explain coefficient of Determination. Explain its uses and different interpretation.

(e)   Explain the concept of correlation and regression. Also comment, how regression is different from correlation.

(f)   For the following data obtain the regression line of the type X on Y

X	22	26	17	19	15	28
Y	8	12	7	14	10	13

Q. 4   **Attempt the following (Any THREE)(Each of 5Marks)**   (15M)

(a)   Explain the following using Venn Diagram
      i.   Union of two events.   ii.   Intersection of two events

(b)   Two dice are tossed simultaneously write the sample space and find the probability of
      i.   Odd sum.   ii. Prime number on first dice.

(c)   Five gentleman and three ladies have to stand in a row for photograph. If they stand at random, find the probability that
      i.   Gentleman at the two extreme positions
      ii.   All ladies together.

(d)   State Multiplication theorem and Bay's theorem.

(e)   A test paper containing 10 problems is given to three students A, B & C. It is considered that student A can solve 60% problems, student B can solve

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40% problems and student C can solve 30% problems. Find the probability that the problem chosen from the test paper will be solved by all the three students.

(f)   In a box, there are 3 red and 2 blue balls. One ball is selected at random; its colour is noted and is discarded. Now Second ball is selected and its colour is noted. Find the probability that
  i.   Both balls are blue
  ii. First is red and second is blue
  iii. One is red and one is blue

Q. 5   **Attempt the following (Any THREE)(Each of 5Marks)**   (15M)
(a)   Explain the procedure of plotting histogram.
(b)   Write the merits and demerits of mean and Variance.
(c)   Define skewness. Explain different types of skewness.
(d)   Obtain Spearman's Rank correlation for the following data:-

Rank by Judge 1	6	2	4	1	3	5	10	9	8	7
Rank by Judge 2	5	1	3	4	2	6	8	10	7	9

(e)   Define the Following with one example
  i.   Random Experiment with one example.
  ii. Sample space and Event with one example.
(f)   A ticket is drawn from a box containing 30 tickets and a number on it is observed. Obtain the probability that ticket drawn has a number
  i.   Less than 6
  ii. Greater than 20
  iii. Multiple of 5

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