USCS106 – SP

QP CODE : 781402

(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) 15

(a) Multiple Choice Questions

i. If $\beta_{YX} < 1$, then β_{XY} is
   A. Less than 1
   B. Greater than 1
   C. Equal to 1
   D. Equal to 0

ii. For two mutually exclusive events A and B, P(A) = 0.3 and P(B) = 0.4 than P(A ∩ B) = ---
   A. 0.12
   B. 0.3
   C. 0.4
   D. None of the above

iii. In an less than ogive curve, the points are plotted for ---
   A. The lower boundary and frequency
   B. The upper boundary and frequency
   C. The class mark and less than cumulative frequency
   D. None of the above

iv. The measure of central value which is affetced by extreme values is ---
   A. Median
   B. Mean
   C. Mode
   D. Third quartile

v. Frequency of a variable is always ---
   A. In percentage
   B. A fraction
   C. An integer
   D. None of the above.

(b) Fill in the blanks

i. Median divides entire data in ---- equal parts.

ii. Histogram can be drawn only for ---- frequency distributions.

iii. The difference between the upper and lower class boundaries is called as----.

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iv. If correlation coefficient between X and Y is perfect then regression lines of X on Y and Y on X are---.

v. $P(A \cap A') =$ -----

(c) Short Answers

i. Define independent events.

ii. Explain the concept of nonsence correlation.

iii. Write any three properties of good measure of central tendency.

iv. Define sample space.

v. Qualitative characteristic.

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

(a) Explain the procedure for drawing stem-leaf diagram.

(b) Explain with illustrations;

i. Open-end class intervals

ii. Inclusive and exclusive type of class intervals.

(c) Prepare frequency distribution for the following data on number of mangoes; 3,0,0,1,3,2,1,0,4,2,3,3,0,1,3,2,1,4,3,2,0,1,4,2,1,1,1,3,2,2.

(d) Represent the following information using, Histogram.

Yearly profit (in laks of Rs.)	5-10	10-15	15-20	20-25	25-30
Number of companies	30	50	100	40	30

(e) Define variance, standard deviation and coefficient of variation. Explain how to calculate them for raw data.

(f) Find first three quartiles for the following dada.

Number of mistakes	0-3	4-7	8-11	12-15	16-19	20-23
Number of books	5	20	14	10	8	5

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

(a) Define first four raw moments about zero and first four central moments. Write down the relations between raw and central moments.

(b) Explain the concept of skewness and state the relation between mean, mode and median.

(c) For the following frequency distribution obtain coefficient of skewness based on quartiles.

Marks	00-10	10-20	20-30	30-40	40-50	50-60
Number of students	5	20	14	10	8	5

(d) Explain the way of presenting correlation graphicaly and present the no correlation using it.

(e) What is coefficient of determination? Expalin its uses. Is it usefull to calculate correlation coeffficient between two variable? Justify your answer.

(f) For the following data obtain correlation coefficient between of X on Y and comment on your finding.

X	46	44	56	53	76	34	48
Y	32	40	31	52	56	30	63

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

(a) Explain the following concepts;

i. Union of two events.

ii. Intersection of two events.

and represent them by Venn diagram.

(b) Define conditional probability and state Bayes' theorem.

(c) The probability that a student passes a Physics test is 2/3 and the probability that he passes both the Physics test and English test is 14/45. The probability that he passes at least one test is 4/5. What is the probability that he passes the English test?

(d) The probability that a student passes a Physics test is 2/3 and the probability that he passes both the Physics test and English test is 14/45. The probability that he passes at least one test is 4/5. What is the probability that he passes the English test?

(e) The probabilities of X, Y and Z becoming managers are 4/9, 2/9 and 1/3 respectively. The probabilities that the Bonus scheme will be introduced if X, Y and Z becomes managers are 3/10, 1/2, 4/5 respectively.

i. What is the probability that Bonus scheme will be introduced and

ii. If the Bonus scheme has been introduced, what is the probability that the manager appointed was X?

(f) Given the following sample space, form the following events where,

$$\Omega = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$$

A: the set of numbers not dividsible by three.

B: the set of even numbres.

C: the set of odd numbers.

Give the sample points belonging to the following events;

$$A \cap B, A \cup C', A' \cap B$$

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

(a) Explain the concepts of discrete and continuous variable using illustrations.

(b) Define mean, median and mode. Explain how to calculate them for continuous frequency distribution.

(c) i. State the two definitions of probability.

ii. Define conditional probability.

(d) Bag I contains 6 blue and 4 red balls. Bag II contains 2 bue and 6 red balls. Bag III contains 1 blue and 8 red balls. A bag is chosen at random and a ball is drawn randomly from this bag. It turns out to be blue. Find the probability that bag I was chosen.

(e) Find mean, variance and median for the following data.

86,46,44,68,47,81,77,48,50,87,41,88,59,80,52,85,56,61,58,72,69,82,78,60,54,71.
