

Max Marks: 75

Duration: 2½ hours

- NOTE:** 1. All questions are compulsory.
 2. Figures to the right indicate full marks
 3. Use of non-programmable electronic calculator is allowed
 4. Graph paper will be provided on request.

Q1(A) Choose the correct alternative from the following (Attempt Any Eight) (8)

- The information is to be collected from educated people in a large area, suitable method shall be _____
 (a) Census (b) Questionnaire
 (c) Direct Personal Investigation (d) Through Correspondents
- Circular diagrams are always _____
 (a) One dimensional diagrams (b) Two dimensional diagrams
 (c) Three dimensional diagrams (d) Cartograms
- Which of the following cannot be obtained by graphical method _____
 (a) Arithmetic Mean (b) Median (c) Mode (d) Quartiles
- Which average is affected most by extreme values _____
 (a) Mode (b) Arithmetic Mean (c) Median (d) None of the above
- Median means _____
 (a) 50th Percentile (b) 40th Percentile (c) 6th Percentile (d) None of these
- Quartile Deviation is _____
 (a) $Q_3 - Q_1$ (b) $Q_3 + Q_1$ (c) $\frac{Q_3 - Q_1}{2}$ (d) $\frac{Q_1 - Q_3}{2}$
- Correlation coefficient is always _____
 (a) More than 1 (b) Less than -1 (c) Between -1 and +1 (d) More than 0
- Regression coefficient (b_{yx}) is _____
 (a) $r \cdot \frac{\sigma_y}{\sigma_x}$ (b) $\frac{\sum xy}{N\sigma_x\sigma_y} \cdot \frac{\sigma_y}{\sigma_x}$ (c) $\frac{\sum xy}{\sum x^2}$ (d) All of the above
- The word 'Programming' means taking decision _____
 (a) Systematically (b) Rapidly (c) Slowly (d) Instantly
- The sampling units are chosen without replacement in the sense that the units once chosen are not placed back in the population are called _____
 (a) SRSWR (b) SRSWOR (c) Both a & b (d) None of these

(B) State whether following statements are True or False (Attempt Any Seven) (7)

- The sources of data are Primary and Secondary both.
- The table giving the frequencies for different class intervals is known as frequency table.
- In Frequency polygon, frequencies are plotted against the lower class limit.
- With usual notation $N\bar{x} = \sum x^2$.
- Dispersion measures the scatter of a set of observation.
- If variable Y tends to decrease as variable X decreases, there is positive correlation.
- If the value of correlation coefficient is zero, the regression lines are parallel to each other.
- The student belonging to the University of Mumbai is an example of finite population.
- Range can be calculated for open end classes.
- Mode can be located by Pie diagram.

Q. P. Code: 31277

Q2 (A) Solve the following linear programming problem (LPP) graphically (8)

Minimize $Z = 90x + 130y$ Subject to $2x + 3y \leq 18$, $2x + y \leq 12$; $x \geq 0$; $y \geq 0$

(B) Prepare a frequency distribution for the following data giving the heights of 30 children's. (7)

121 133 137 127 132 134 131 126 124 135 139 127
 137 130 133 144 131 132 127 140 126 134 128 143
 123 125 136 129 141 137 Take the class intervals, as 120-125,
 125-130..... etc.. Also write less than and more than cumulative frequencies.

OR

(P) SAGARMOTI REVOLUTION makes two types of videos I and II. To produce video I require 2 hours in studio A and 3 hours in studio B. To produce video II requires 3 hours in studio A and 1 hour in studio B. Studio A can operate for at most 15 hours a day and Studio B can operate for at most 12 hours a day. If Production House makes a profit of Rs. 4 on video I and Rs 12 on video II, how many of each should be produce in order to maximize a profit? Formulate LPP. (8)

(Q) Draw a subdivided Bar Diagram of the following data. (7)

Country	No. of tourists (in '000s) in year 2010	No. of tourists (in '000s) In year 2015
Africa	7.8	8.5
Australia	33.3	41.2
Canada	39.8	49.6
France	65.9	57.6
Germany (W)	61.4	66.0
Japan	36.4	34.9

Q3(A) Calculate Quartile (Q_2) and Eighty Sixth Percentile (P_{86}) for the following data. (8)

Marks	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	5	12	32	40	11

(B) Calculate standard deviation for the following data. (7)

No. of Particles	Frequency (f)
0 – 4	54
4 – 8	120
8 – 12	66
12 – 16	30
16 – 20	2

OR

(P) Calculate Quartile Deviation and Coefficient of Quartile Deviation for the following data. (8)

Class Interval	2000-2500	2500 – 3000	3000 – 3500	3500 – 4000	4000 – 4500	4500 – 5000
Frequency	4	6	12	15	8	7

(Q) calculate mean and mode for the following data .

(7)

Daily wages in Rs.	200 – 400	400 – 600	600 – 800	800 – 1000	1000 – 1200	1200 – 1400
No. of Workers	8	15	22	15	13	7

Q4(A). Calculate Karl Pearson's coefficient of correlation for the following data.

(8)

Experience (x)	16	13	17	4	3	11	7	14
Rating (y)	88	87	89	72	70	82	78	84

(B) Given the following data, find the two regression equations.

(7)

Average age of car ($\bar{x}$) = 8 Average annual maintenance ($\bar{y}$) = 2000

Standard deviation of age of cars (σ_x) = 2 Standard Deviation of maintenance cost (σ_y) = 80

Coefficient of correlation between the two (r) = 0.7

Estimate y when $x = 10$ and also estimate x when $y = 69$

OR

P) Find the two regression equations for the following data.

(8)

Age in Years	10	10	11	11	12	13
Marks	5	6	6	7	8	7

Q) Find Karl Pearson's coefficient of correlation given for the following data.

(7)

$$\sum x = 65 \quad \sum y = 30 \quad \sum x^2 = 3261 \quad \sum y^2 = 1004 \quad \sum xy = 750 \quad n = 9$$

Q5 A) What is Correlation coefficient. Write a short note on scatter diagram.

(8)

B) What are the requisites of satisfactory average

(7)

OR

P) Write Short notes : (Attempt Any Three)

(15)

1) Errors in Statistical Investigation

2) Advantages of Sampling

3) Merits & Demerits of Arithmetic Means (A.M.)

4) Types of one dimensional bar diagrams

5) Distinguish between Primary & Secondary data