

[Time:2.30 Hrs]

[Marks:75]

Please check whether you have got the right question paper.

- N.B:
1. All question are compulsory.
 2. Figures to the right indicate full marks.
 3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q.1

Attempt any THREE of the following

- A) From the following data compute mode. 5

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	10	25	30	20	10

- B) Find the quartiles
- Q_1
- and
- Q_3
- of the following data 20, 30, 25, 23, 22, 32, 36. 5

- C) From the following data, Find the harmonic mean. 5

x	10	20	30	40	50
f	20	40	60	30	10

- D) From the following data calculate range and coefficient of range. 5

Class Interval	10-20	20-30	30-40	40-50	50-60
Frequency	10	12	14	8	6

- E) Find the standard deviation of the following data. 5

12, 6, 7, 3, 15, 10, 18, 5

- F) The average pulse rate of patient increased from 62 to 70 and the S.D. also increased from 0.8 to 1.2 after treatment. Is it right to conclude that there is improvement in the patients' health?

Q.2

Attempt any THREE of the following

- A) The first four central moments of a distribution are 0, 3, 5, 10. If the mean of the distribution is 2, find the moments about 3. 5

- B) Find the Bowley's coefficient of Skewness for the following distribution: 5

x	1	3	5	7	9	11
f	3	8	14	20	18	7

- C) If the probability is 0.45 that a program development job; 0.8 that a networking job applicant has a graduate degree and 0.35 that applied for both. Find the probability that applied for atleast one of jobs. If number of graduates are 500 then how many are not applied for jobs? 5

- D) If A and B are two events of sample space S, such that $P(A) = 0.85$, $P(B) = 0.7$ and $P(A \cup B) = 0.95$. Find i) $P(A \cap B)$, ii) $P(A|B)$, iii) $P(B|A)$. 5
- E) The battery life of smart phone manufacturer A has a mean lifetime of 1050 days with a standard deviation of 150 days, while those of manufacturer B have a mean lifetime of 800 days with a standard deviation of 120 days. If random samples of 100 batteries of each brand are tested, what is the probability that the brand A batteries will have a mean lifetime that is at least 200 days? 5
- F) A box contains 5 white and 7 black balls. A person draws 3 balls at random. He gets Rs. 505 for every white ball and losses Rs. 10 every black ball. Find the expectation of him. 5

Q.3

Attempt any THREE of the following

- A) How do you calculate an interval estimate? 5
- B) A sample of 8 items has mean 1408 with standard deviation 192. Construct a 95% confidence interval for the population mean. 5
- C) Explain types of hypothesis in detail. 5
- D) A manufacturer claims that 10% of his product is defective. A sample of 300 items selected at random had 32 defective items. Test his claim at 1% level of significance. 5
- E) A machine produces copper plates of thickness 2cm with standard deviation of 0.4 cm. A sample of 50 copper plates is selected at random. The average thickness of the sample is 2.04cm. Test the hypothesis that the machine is performing in a normal way, at 5% level of significance. 5
- F) Explain in detail paired t-Test for difference Mean. 5

Q.4

Attempt any THREE of the following.

- A) The mean weakly sales of soap bars in departmental stores was 146.3 bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increased to 153.7 and showed a standard deviation of 17.2. Was the advertising campaign successful? 5
- B) In one sample of 8 observations, the sum of the squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6. Test whether this difference is significant at 5% LOS given that 5% point of F for $V_1 = 7$ and $V_2 = 9$ degree of freedom is 3.29. 5

- C) From the following table showing the number of plants having certain characters, test the hypothesis that the flower colour is independent of flatness of leaf at the 0.1 level of significance. 5

	Flat leaves	Curled leaves	Total
White Flowers	99	36	135
Red Flowers	20	5	25
Total	119	41	160

- D) Fit a Poisson distribution to the following data and test for its goodness of fit at level of significance 0.05. 5

X	0	1	2	3	4
F	419	352	154	56	19

- E) A group of 5 patients treated with medicine 'A' weight 42, 39, 48, 60, 41 kgs. Second group of 7 patients from the same hospital treated with medicine 'B' weight 38, 42, 56, 64, 68, 69, 62 kgs. Do you agree with the claim that medicine 'B' increases the weight significantly? (The value of t at 5% level of significance for 10 degree of freedom is 2.2281). 5

- F) Write the application of t-distribution. 5

Q.5

Attempt any THREE of the following.

- A) Fit a straight line of the form $y = ax + b$ using least square method. 5

x	0	1	2	3	4
y	1	2.9	4.8	6.7	8.6

- B) Fit a parabola of the form $y = a + bx + cx^2$ using least square method. 5

Years	1985	1986	1987	1988	1989
Production	20	25	27	35	38

- C) Calculate the coefficient of correlation for the following: 5

X	1	2	3	4	5	6	7	8	9	10
Y	2	4	9	7	10	5	14	16	2	20

- D) Find the coefficient of rank correlation for the ranks according to judges in a beauty contest 5
are given below.

R_1	1	2	3	4	5	6
R_2	4	1	2	3	6	5

E) The following data are given about the expenditure on clothes and expenditure on entertainment. Average expenditure on clothes Rs. 300, average expenditure on entertainment Rs. 100, S.D of expenditure on clothes Rs. 20, S.D of expenditure on entertainment Rs. 15, coefficient of correlation 0.78. Find the two regression equations.

5

F) Explain types of correlation using scatter diagram.

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