

[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, find the value of median

5

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	24	31	42	30	26	15	10

- B) Daily income of ten families of a particular place is below. Calculate Geometric Mean.
85, 70, 15, 75, 500, 8, 45, 250, 40, 36

5

- C) Find out Quartile Deviation and Coefficient of Quartile Deviation from following data.
25, 33, 45, 17, 35, 20, 55

5

- D) Calculate mean deviation from following data.

5

X	20	21	22	23	24
f	6	15	21	15	6

- E) Calculate arithmetic mean, standard deviation and coefficient of variation.

5

C.I	20-25	25-30	30-35	35-40	40-45
F	1	22	64	10	3

- F) Calculate the weighted mean for following data:

5

Subject	Weight	Students		
		X	Y	Z
Physics	2	72	42	52
Chemistry	3	75	52	52
Biology	5	58	88	68

Q.2 **Attempt any THREE of the following**

- A) Find raw moments for the following data:
5, 8, 12, 4, 6.

5

- B) For the following grouped data find the Karl Pearson's Coefficient of Skewness. Also interpret the type of distribution.

5

C.I	0-4	4-8	8-12	12-16	16-20
f	1	3	10	4	2

- C) A bag contains 4 black and 6 white balls; two balls are selected at random. Find the probability that balls are i) both are different colors. ii) both are of same colors. 5
- D) Given that $P(A) = \frac{3}{7}$, $P(B) = \frac{2}{7}$, if A and B are independent events than find i) $P(A \cap B)$, 5
ii) $P(\bar{B})$, iii) $P(A \cup B)$, iv) $P(\bar{A} \cap \bar{B})$.
- E) Suppose it is known that 47% of Indian own smart phone. If a random sample of 50 Indians were surveyed, what is the probability that the proportion of the sample who owned smart phone is between 50% and 54%. 5
- F) A random variable X has probability mass function as follow: 5

$X = x_i$	-1	0	1	2	3
$P(x_i)$	K	0.2	0.3	2k	2k

Find the value of k, and expected value.

Q.3 **Attempt any THREE of the following.**

- A) Write down the difference between a point estimate and an interval estimate. 5
- B) A survey of 40 retired women revealed the mean age at which their income was maximum to be 45 years with a standard deviation of 6.3 years. Find 95% confidence limits for the mean age of maximum earning of women who survive till retire. 5
- C) Explain types of error in details. 5
- D) An old machine produced 10 defective bolts in a batch of 300. After the servicing was done the same machine was found to produce 6 defective bolts in a batch of 200. Help the manufacturer to conclude whether the machine has improved after the servicing? 5
- E) A teacher claims that the mean score of students in his class is greater than 82 with a standard deviation of 20. If a sample of 81 students was selected with a mean score of 90 then check if there is enough evidence to support this claim at a 0.05 significance level. 5
- F) Write down the stepwise procedure of testing of hypothesis. 5

Q.4 **Attempt any THREE of the following.**

- A) A machinist is making engine parts with axle diameter of 0.7 inch. A random sample of 10 parts show a mean diameter of 0.742 inch with a standard deviation of 0.04 inch. Compute the statistic you would use to test whether the work is meeting the specifications and state the conclusion. 5

- B) Two random samples gave the following results:

5

Sample No.	Size	Sum of squares of deviation from the mean
1	10	90
2	12	108

Test at 5% LOS whether there is a difference in variance.

{Given $F_{0.05}(9,11) = 2.9$, $F_{0.05}(11,9) = 3.1$ }

- C) As per Mendel's theory according to the shape and color, certain variety of pea that can be classified into four categories Round and yellow, Round and green, Angular and yellow, Angular and green occur in the proportion of 9:3:3:1. To test this a sample of
- $N = 128$
- peas was taken and the following were the observed frequencies.

5

RY=66	RG=28
AY=29	AG=5

Perform the chi square test for goodness of fit.

- D) A set of five similar coins is tossed 320 times and the result is

5

No. of heads	0	1	2	3	4	5
Frequency	6	27	72	112	71	32

Test the hypothesis that the data follow a binomial distribution.

- E) For a random sample of 10 pigs fed on diet A, the increases in weight in pounds in a certain period were: 10, 6, 16, 17, 13, 12, 8, 14, 15, 9. For another sample of 12 pigs, fed on Diet B, the increase in the same period were: 7, 13, 22, 15, 12, 14, 18, 8, 21, 23, 10, 17. Test whether diets A and B differ significantly as regards to their effect on increase in weight.

5

- F) Write the properties of chi-square variate with
- n
- degrees of freedom.

5

Q.5

Attempt any THREE of the following.

- A) Fit a curve of the form
- $y = ae^{bx}$
- for the following data:

5

x	0	2	4	6	8
y	3	55	1095	22000	442000

- B) If
- $n = 5$
- ,
- $\sum x = 37$
- ,
- $\sum y = 71$
- ,
- $\sum xy = 563$
- ,
- $\sum x^2 = 297$
- ,
- $\sum y^2 = 1079$
- . Find the two regression equations.

5

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

5

x	0	1	2
y	1	6	17

- D) Calculate the coefficient of correlation for the following:

5

x	-2	-1	0	1	2
---	----	----	---	---	---

y	4	1	0	1	4
---	---	---	---	---	---

- E) The coefficient of Rank correlation for certain data is found to 0.6. If the sum of the squares 5 of the differences is given to be 66, find the number of observations.
- F) Write short note on scatter diagram. 5
