

(2)

- (c) If $\frac{1}{{}^5C_r} + \frac{1}{{}^6C_r} = \frac{1}{{}^4C_r}$, then find the value of r . Hence verify the formula ${}^nC_r + {}^nC_{r+1} = {}^{n+1}C_{r+1}$ for $n = 5$ for this value of r .

Unit-II

2. (a) Calculate the mean deviation from the mean and standard deviation for the series $a, a + d, a + 2d, a + 3d, \dots, a + 2nd$.
- (b) Find the unknown frequencies f_1 and f_2 in the following data. It is given that the median of the data is 46 :

Class	Frequency
10-20	12
20-30	30
30-40	f_1
40-50	65
50-60	f_2
60-70	25
70-80	18
Total	229

- (c) Find the weighted arithmetic average (mean) of first n natural numbers whose weights are equal to the corresponding number.

Unit-III

3. (a) An urn contains a white and b black balls and c balls are drawn from the urn. Find the expectation of the number of white balls.
- (b) What is the chance that a leap year selected at random will contain 53 Sundays ?
- (c) Show that the m^{th} -moment M_m about the origin of the binomial distribution of degree n is given by :

$$M_m = \left(p \frac{\partial}{\partial p} \right)^m (p + q)^n$$

Unit-IV

4. (a) The marks of eight students in maths and computer science are given below :

Maths	76	90	98	69	54	82	67	52
Computer Science	25	37	56	12	7	36	23	11

Calculate the coefficient of correlation using rank method.

- (b) Fit a straight line to the following data :

x	0	5	10	15	20	25
y	12	15	17	22	24	30

- (c) Find the value of χ^2 for the following data :

Diet	Males	Females
<i>A</i>	123	153
<i>B</i>	145	150

Unit-V

5. (a) A coin was tossed 400 times and there were 216 Heads. Discuss that the coin is biased or not.
- (b) From a population, 10 men are selected at random, whose heights are following (in inches) :
- 63, 63, 64, 65, 66, 69, 69, 70, 70, 71
- Test the statement that the mean height of population is 65 inch. Given that for 9 degree of freedom and 5% level of significance the student's *t*-value is 2.262.
- (c) Use *z*-test to show that the following data of two samples are taken from one population or not ?

<i>x</i>	17	27	18	25	27	29	27	23	17
<i>y</i>	16	16	20	16	20	17	15	21	—

Given that for degree of freedom $\nu_1 = 8$ and $\nu_2 = 7$ the *z*-value for 5% level of significance is 0.6576.

Also may be used the calculation :

$$\log_e 10 = 2.3026 \text{ and } \log_{10}(4.251) = 0.6285$$