

Module 1
Statistical Techniques I

MCQ (1 Mark)

1. In an asymmetrical distribution mean is 16 and the median is 20 then the value of mode is... (CO1)
A. 28
B. 30
C. 34
D. 29
✓A. 28
2. The first three central moments of a distribution are 0, 15, -31 then moment coefficient of skewness is...(CO1)
A. 0.2847
B. -0.2847
C. 2.847
D. None of these
✓B. -0.2847
3. The mean of 200 items was 50. Later on, it was discovered that two items were misread as 92 and 8 instead of 192 and 88 then correct mean is...(CO1)
A. 50.2
B. 50.7
C. 50.4
D. 50.9
✓D. 50.9
4. The mean of 10 observations is 10. All the observations are increased by 10%.
The mean of increased observations will be: (CO1)
A. 10
B. 1.1
C. 10.1
D. 11
✓D. 11
5. Karl Pearson's coefficient of skewness of a distribution is 0.32, its standard deviation is 6.5 and the mean is 29.6 then the mode of the distribution is... (CO1)
A. 28
B. 27.52
C. 30
D. 32
✓B. 27.52
6. The median of the following observations arranged in ascending order 11, 12, 15, 21, (x+2), (x+4), 33, 34, 37, 42 is 25 then x is... (CO1)
A. 25

- B. 24
C. 20
 D. 22
7. The mean and standard deviation of 100 terms are 50 and 3 respectively. The sum of squares of the 100 terms is...(CO1)
A. 1,249,000
B. 2,50,000
C. 2,70,000
 D. 2,50,900
8. The median of a series is 10. Two additional observations 7 and 20 are added to the series. The median of the new series will be: (CO1)
A. 9
B. 20
C. 7
D. 10
9. If the mode of the following data is 7, then value of k in 2,4,6,7,5,6,10,6,7, $(2k+1)$,9,7,13 is... (CO1)
 A. 3
B. 7
C. 4
D. 2
10. If A.M.=100, Variance=35, Median=99.61 then Karl Pearson's Coefficient of skewness is... (CO1)
A. 0.3
B. 0.4
C. 0.1
 D. 0.2

Very Short Answer Type Questions (2 marks)

11. Compute the quartile deviation for the following data:
10,30,5,12,20,40,25,15,18. (CO1)

Solution:

12. The Standard deviation of n observations is σ if each observation is multiplied by a constant k then what is the new standard deviation? Also, if constant c is added to each observation instead, what happens to the standard deviation? (CO1)

Solution:



13. Calculate the median of the following data that relates to the monthly salaries of employees (in thousand rupees): 110, 115, 108, 112, 120, 116, 140, 135, 128, 132 (CO1)

Solution:

14. In a frequency distribution, the coefficient of skewness based on the quartiles is 0.6. If the sum of the upper and the lower quartile is 100 and the median is 38, determine the values of the upper and the lower quartiles. (CO1)

Solution:

15. The standard deviation of symmetric distribution is 4. Calculate the value of μ_4 so that the distribution must be mesokurtic. (CO1)

Solution:

16. A bus runs at a speed of 60 kph over 50 kilometres; the next 30 kilometres at a speed of 40 kph; the next 20 kilometres at a speed of 30 kph; and the final run of 50 kilometres at a speed of 25 kph. Find the average speed in kilometres per hour. (CO1)

Solution:



Short Answer Type Questions (6 Marks)

17. The first four moments about the working mean 28.5 of a distribution are 0.294, 7.144, 42.409 and 454.98. Calculate the moments about mean and measures the skewness and kurtosis of the distribution. (CO1)

Solution:

18. For a distribution, the mean is 10, variance is 16, $\gamma_1 = 1$, and $\beta_2 = 4$. Find the first four moments about the origin. (CO1)

Solution:

19. Calculate the mode from the following frequency distribution: (CO1)

Size of items	8	9	10	11	12	13	14	15
No. of items	5	6	8	7	9	8	9	6

Solution:

20. Calculate mode and standard deviation for the following data corresponding to the candidates appeared in a competitive exam: (CO1)

Marks	1-10	11-20	21-30	31-40	41-50	51-60
No. of candidates	3	16	26	31	16	8

Solution:

21. Check Skewness of the following two series: (CO1)

Series (a): Mean=32, Median=34, S.D.=20

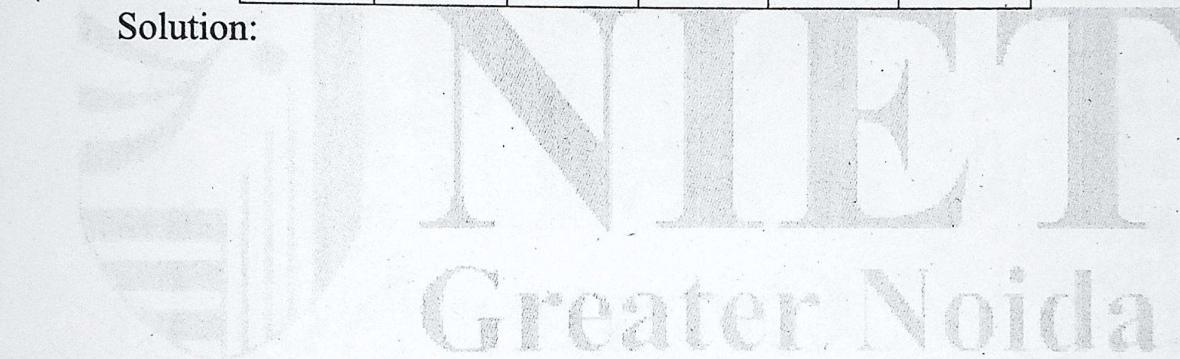
Series (b): Mean=32, Median=36, S.D.=25

Solution:

22. For the following frequency distribution, find the first four moments about the mean. Also, find the value of β_1 . Is it a symmetrical distribution? (CO1)

x	2	3	4	5	6
f	1	3	7	3	1

Solution:



23. The first four moments of a distribution about 2 are 1, 2, 5, 5.5 and 16 respectively. Calculate the four moments about mean and about the origin. (CO1)

Solution:



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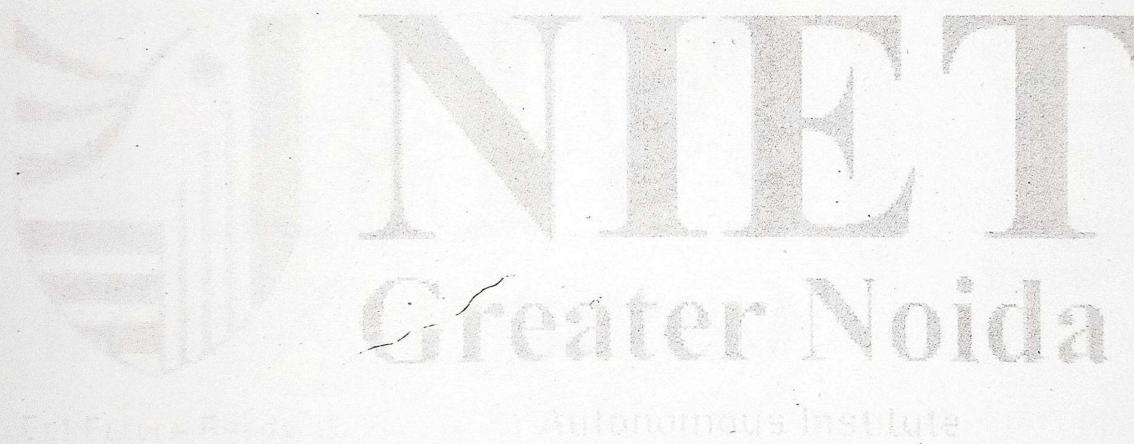
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Long Answer Type Questions (10 Marks)

24. The following table represents the height of a batch of 100 students. Calculate moment coefficient of skewness and moment coefficient of kurtosis. (CO1)

Height(in cm)	59	61	63	65	67	69	71	73	75
No. of students	0	2	6	20	40	20	8	2	2

Solution:



25. Find the mean, median, lower and upper quartiles from the following table:

(CO1)

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80
No. of students	15	35	60	84	94	127	198	249

Solution:

26. An incomplete frequency distribution is given as follows:

Variable	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
frequency	12	30	?	65	?	25	18	229

Given that the median value is 46, determine the missing frequencies using the median formula. (CO1)

Solution:

27. The consumption of number of guava and orange on a particular week by a family are given below.

No. of Guavas	3	5	6	4	3	5	4
No. of Oranges	1	3	7	9	2	6	2

Check consistency of the above data consumed by the family. (CO1)

Solution:

28. Prove that the frequency distribution curve of the following frequency distribution is leptokurtic (CO1)

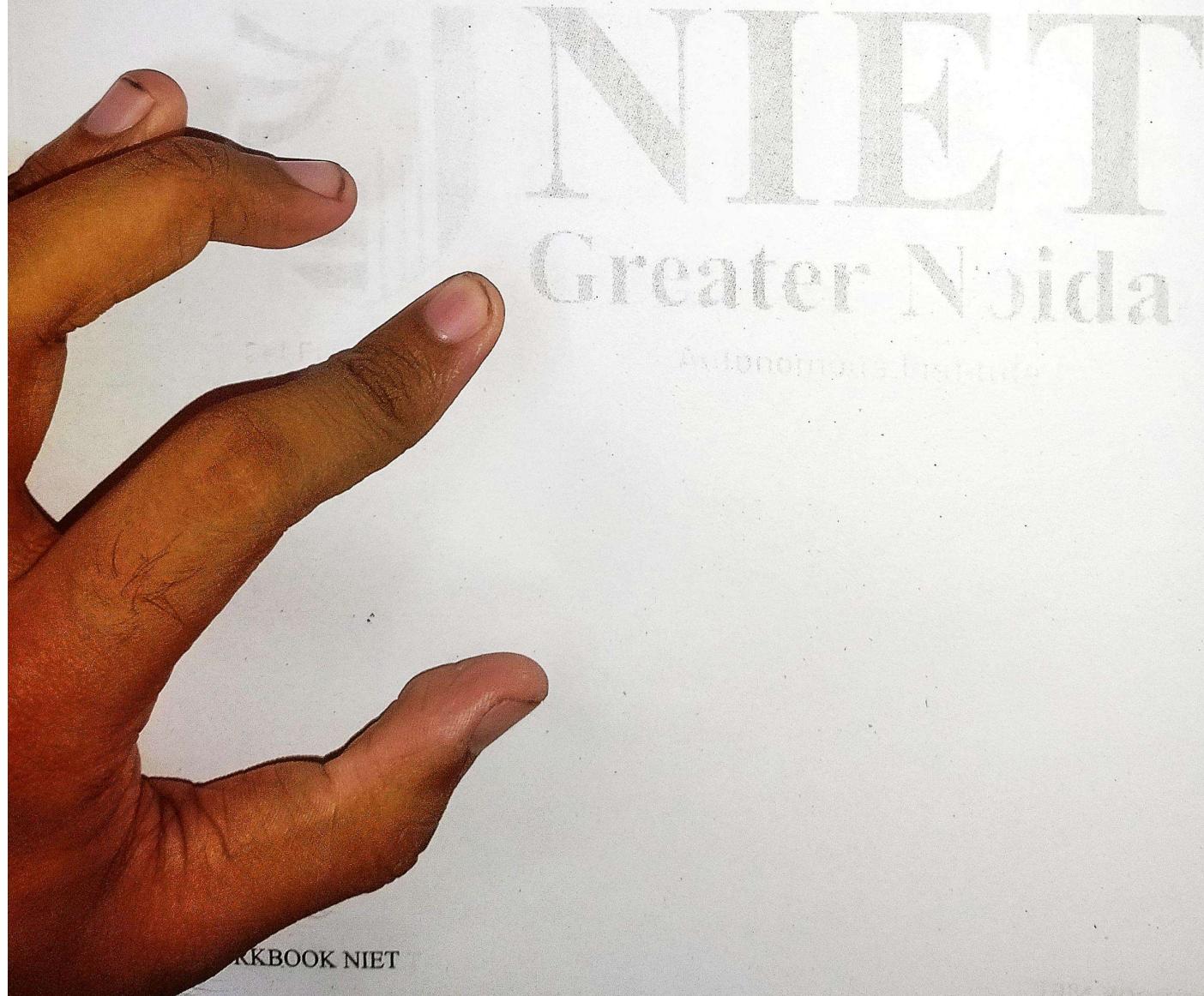
Class	10- 15	15- 20	20- 25	25- 30	30- 35	35- 40	40- 45	45- 50	50- 55
frequency	1	4	8	19	35	20	7	5	1

Solution:

29.(a) The first four central moments of a distribution are 0, 2.3, 0.9 and 15.65. Test the skewness and kurtosis of the distribution. Also discuss the nature of the curve.

(b) The first four moments of a distribution about $x=4$ are 1, 4, 10 and 45. Find the various characteristics of the distribution on the information given. Comment upon the nature of the distribution. (CO1)

Solution:



30. The following table shows the distances between the workers residences and their office situated at Connaught Place, New Delhi. (CO1)

Distances	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of workers	2	5	10	15	10	4	1

Calculate the Bowley's Coefficient of skewness.

Solution: