INDIAN INSTITUTE OF MANAGEMENT & COMMERCE
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B.Com. (Hons/Computer Applications and Business Analytics)
Second Year –Semester III
Subject: Business Statistics – I
Question Bank

(Note: In Question Bank Page Number is provided as per Text Book of Kalyani Publishers BS-I and BS-II (For Unit V – Index No), Authors: Dr. S.L. Aggarwal and Inder Kumar – Old Book As well as New Book of Kalyani Publisher, Author:Arun Kumar Singla)

UNIT I: INTRODUCTION, DATA ORGANIZATION AND PRESENTATION

A. Short Answer Questions

1. Explain Scope and Importance of Statistics in Business and Commerce. (Old Book Pg No. 1.8 to 1.9 and New Book – 1.7 to 1.9)
2. Explain the Methods of classification of data. (old Book 4.3 to 4.4)
3. What is a frequency distribution? (Old Book =2.12 to 2.15, New Book = 2.16 to 2.17)
4. What is meant by classification and tabulation of data? State their importance. (Old Book -5.1 to 5.2.)
5. What is False Base Line? Explain its Utility.(old book pg no. 7.4)
6. Write Short notes on the followings: (Old Book =3.4 to 3.8, New Book = 2.9 to 2.10)
   a) Simple Random Sampling b) Stratified Sampling c) Convenience Sampling

Short Practical Questions:

7. Present the following data in **Sub-Divided Bar Diagram**.
   Old Book pg no. 6.8 to 6.9, Example 8 & 9
   New Book – 3.8 to 3.9 Illustration No.4

Year	Faculty		
	Science	Arts	Commerce
2015	240	560	220
2016	280	610	250

8. Present the Average wages of the firms by **Simple Bar Diagram**
   Old Book pg no. 6.4 to 6.5, Example 2 & 3
   New Book – 3.7 to 3.8 Illustration No.3

Item	Food	Clothing	Rent	Education	Others
Expenditure (in ₹)	4800	4000	7200	3600	2400

9. In a study on Strikes in companies, a researcher collected the following data. Represent the same using **Simple Bar Diagram**.

Courses	Economic	Personnel	Political	Rivalry	Others
Occurrences (In Percentages)	68	26	20	16	20

10. Prepare a **Percentage Bar Diagram** for the data given below:
    Old Book pg no 6.10 to 6.11, Example 10

Item	Food	Clothing	Rent	Education	Others
Expenditure (in ₹)	4800	4000	7200	3600	2400

11. Draw a Bar Diagram to represent the procurement of Rice (in tons) in India:

Year	2020	2021	2022	2023	2024	2025
Rice (in tons.)	4500	570	610	650	430	780

B. Long Answer Questions

12. Define Statistics in Singular Sense. Explain its functions, Characteristics and limitations. (old book - pg no. 1.1 to 1.7, New Book – 1.1 to 1.8)

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13. What do you mean by Primary Data? Explain the various methods of collecting Primary Data. (Old Book 2.5 to 2.16, New Book = 2.7 to 2.13)
14. What do you mean by Mailed Questionnaire Method? Explain the points to be kept in mind while drafting a good questionnaire. (Old Book =2.12 to 2.15, New Book = 2.9 to 2.10)
15. What is a statistical investigation? Explain the various stages involved in planning a statistical enquiry. (Old Book =2.1 to 2.5, New Book = 1.14 to 1.17)
16. Explain General rules for constructing Diagram. (Old Book =6.2 to 6.3, New Book = 2.9 to 2.10)
17. What is Tabulation? What are the parts of a Table?(old book = 5.1 to 5.4, New Book 3.2 to 3.3)
18. Explain the different types of sampling methods. (Old Book =3.4 to 3.8, New Book = 2.9 to 2.10)
19. Explain the different types of diagrams used for presentation of data. (old Book -6.3 to 6.16, New Book 3.6 to 3.11)
20. What is diagrammatic presentation of data? Explain the importance and limitations of graphical presentation of data. (old Book 6.1 to 6.3, New Book – 3.5 & 3.12)

Long Practical Questions

21. Draw **Ogive** Curve from the following data and **find out Median**:
    Old Book Pg.No. 7.9 to 7.10 Example No.6

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	10	20	30	50	40	30

22. Draw a **suitable diagram** for the data given below.
    Old Book Pg No.6.11, Example 11.

Item of Expenditure	**Family A**	**Family B**
Food	150	350
Clothing	38	120
Rent	56	120
Education	24	68
Miscellaneous	70	95

23. How is Histogram different from a Bar Diagram? Prepare a **Histogram** from the following data and **locate MODE(Z).**
    (Old Book Pg No.7.4 Example 1, 2 & 3.

Sales	0-10	10-20	20-30	30-40	40-50	50-60
No. of Co.'s	7	32	56	49	42	14

24. From the following data construct **Ogive** Curve and **locate Median** and Justify it.
    (old Bok – Pg No. 7.16, Question No. 3(i).

Profit in Lakhs (₹)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Companies	3	8	12	16	11	10	7	2

25. From the following data draw **"Less than" and "More Than" Ogives and locate Median and justify it**.
    Old Book Pg.No. 7.9 to 7.10 Example No.6 & (old Bok – Pg No. 7.16, Question No. 3(i). New Book Pg no. 5.11

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Students	5	4	8	12	16	15	10	8	5	2

26. The following table shows the results of B. Com students at a university for the last three years. Represent the same by the **Multiple Bar Diagram**.
Old Book pg no. 6.7 to 6.8, Example 6 & 7

Year	Exam Results of B. Com Students			
	I Division	II Division	III Division	Failed
2014	50	150	250	150
2015	60	200	300	140
2016	50	250	350	150

27. Prepare a **Histogram** from the following data and locate **MODE(Z)**
Old Book Pg No. 7.5 to 7.6, Example No. 1,2,3Question No. 1(i) to 3 (iv)

Wages	10-20	20-30	30-40	40-50	50-60
No. of workers	30	45	75	60	35

28. Construct **Histogram** and locate **MODE(Z)** from the following data
Same as above

X	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
f	5	12	22	25	14	10	8	4

29. Prepare a **Pie chart** from the following data.
Old book pg No. 6.14 example 15, 16 New Book – 3.9, Illustration No. 5

Item	Food	Clothes	Fuel	Rent	Education	Miscellaneous
Family A (₹)	1700	800	400	400	200	100
Family B (₹)	3300	900	800	600	600	200

30. The following data shows the expenditure of two families on various heads during 2018. Draw the **Pie Diagram** for the data given below.
Page no. Same as above

Expenditure Heads	Expenditure (in ₹)	
	Big Family	Small Family
Rent	9600	5400
Electricity, Telephone and Gas Bills	6400	3600
Education	16000	9000
Conveyance	6400	1800
Food and Provisions	22400	14700
Functions and Misc.	3200	1500
Total	64000	36000

UNIT II: MEASURES OF CENTRAL TENDENCY

A. Short Answer Questions

1. What is meant by Central Tendency? State its importance in statistical analysis.
old Book Pg No. 8.2 to 8.3 & 8.25 to 8.26
New book pg no. 4.1 & 4.3

2. What is a positional average? old Book Pg No. 8.28 to 8.29 & 8.25 to 8.26, New Book 0

3. What is meant by weighted average? New book – 4.19

4. Define combined Mean? Old book pg no. 8.20, New book – 4.17

5. State characteristics of a good average. Old book pg no. 8.24 to 8.25

6. What does Weighted Arithmetic Mean? Old Book Pg.no. 8.19 New book pg no. 4.19

7. What is Mode? State the merits and Limitations of Mode.

8. What is Positional Average? Old Book pg no. 8.28

9. What does Combined Mean? Explain its meaning, formula and applications. Old book pg no. 8.20 to 8.22, example 1,2,3 New book – 4.17 Illustration 15 & 16

10. Define Geometric Mean. State the merits and demerits of Geometric Mean.
Old book pg no. 8.71 to 8.76, examples 1 to 7 exercise 8S
New book – 4.23 to 4.30, Illustration: 20 to 28

Short Practical Questions.

11. The height of 25 male workers in a factory is 61 cm and the mean height of 35 female workers in the same factory is 58 cm. Find the combined mean height of 60 workers in the factory. **(Ans. 59.25 cm)** Old book pg no. 8.20 to 8.22, example 1,2,3 Exercise 8G

12. The Mean wage of 100 workers per day was found to be ₹ 80. But later on, it was found that the wages of two labours ₹ 93 and ₹ 59 were misread as ₹39 and ₹95. Find correct mean wage per day. **(Ans. ₹80.18) old book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H, New Book -4.18 to 4.19 Illustration 17 & 18**

13. An investor buys ₹1200 worth of shares in a company each month. During the first 4 months he bought the shares at a price of ₹10, ₹12, ₹15 and ₹24 per share. After 4 months, what is the average price paid for the shares by him? **(Ans. 13.722)** .
old book example no. 8 page no. 8.82

14. The mean monthly salary paid to all employees in a Company is Rs.1,600. The mean monthly salaries paid to Technical and Non-Technical Employees are Rs.1,800 and Rs.1,200 respectively. Determine the **percentage of Technical and Non-Technical employees** of the Company.
(Ans: Technical Employees: 66.67%, Non-Technical – 33.33%)
Old **book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H,**

15. The average salary of Male Employees in a firm was ₹ 5200 and that of female was ₹ 4200. The average salary of all employees was ₹ 5000. Find out percentage of Male and Female employees.
(Ans: Males: 80%, Females: 20%)
old book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H,

16. The mean wages in Factory A of 100 workers is ₹ 720 per week. The mean wages of 30 female workers in the factory was ₹650 per week. Find out the average wage of Male workers in the factory. **(Ans: ₹ 750)**
old **book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H,**

17. An Aeroplan fly along the four sides of a square at varying speeds of 200, 400, 600 and 800 miles per hour respectively. What is the average speed of plane? **(Ans: 500 km per hour)**
Old Book pg no. 8.87 Exercise 8T question no. 11 & 12

18. The average daily wages of all workers in a factory is ₹ 444. If the average daily wages paid to male and female workers are ₹ 480 to ₹ 360 respectively, find the percentage of male and female workers employed by the factory.
(Ans: Male = 70% and Female = 30% i.e. N1:N2 = 7:3)
old book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H,

19. Calculate Geometric Mean for the data given below: **(Ans: 19.9067)**
5000, 500, 50, 0.5 and 0.05
Old book example no .1 pg no. 8.72

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20. Find the **Combined Mean** from the following data: **(Ans. 16)** .
old book pg no. 8.22 to 8.23, example 1 to 3 exercise 8H,

Group	**A**	**B**	**C**
Number	100	125	150
Mean	25	10	15

21. The mean of 50 items was 100. Later on, it was discovered that two items 180 and 90 were wrongly read as 100 and 10. Find out the Correct Mean. **(Ans: 103.2)**

22. Compute **Harmonic Mean** from the following data. **(Ans: 4.07)**
Old book 8.77 to 8.82 , Exercise 8T

X :	125	82	65	2.75	1.73	0.56
Y :	4	8	10	6	4	2

23. Given the following: $N_1 = 112$, $\bar{X}_1 = 114$, $N_2 = 140$, $\bar{X}_2 = 114$. **Find the value of $\bar{X}_{12}$.**
(Ans: $\bar{X}_{12} = 144$) Old Book pg no. 8.22, Exercise 8G ques no. 6

24. Calculate the average daily wages for the workers of two factories**:(Ans: $\bar{X}_{12}$ = ₹ 2.23) refer page no. of combined mean mentioned above**

Particulars	**Factory A**	**Factory B**
No. of wage earners	350	300
Average daily wages	₹ 2.00	₹ 2.50

25. If Mode = 16, Mean ($\bar{X}$) = 15.6, find out the Median. **(Ans: M = 15.733)**
Old Book pg no 8.51 Exercise 8M

26. Median = 20.6, Mode = 26. Find the value of Mean. **(Ans: AM ($\bar{X}$) = 17.9) (same as above)**

B. Long Answer Questions

27. Define Central Tendency. Explain the main characteristics of a good measure of central tendency. Old Book pg no. 8.1 to 8.2 & 8.24 , New Book-4.1 to 4.2 & 4.3 to 4.4

28. What are the obectives and functions of Averages? Old book – 8.23 , New book 4.2 & 4.3

29. Define Median. Explain its merits and limitations.

30. Define Geometric Mean and explain its merits, demerits and uses. Old book pg no. 8.71 & 8.75 to 8.76, New Book 4.26 & 4.28

31. Define Harmonic Mean and explain its merits, demerits and uses. Old Book 8.77 to 8.78 & 8.84 to 8.85, new Book 4.28 & 4.31

Long Practical Questions

32. The following table shows the marks obtained by students in a class, calculate Mean **$\bar{X}$**.
(Ans: 46.29)
Old book pg no. 8.10, exercise 1, New Book 4.9, Illustration 7

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Students	3	10	14	24	17	14	3

33. Calculate **Weighted Arithmetic Mean** from following data. **(ANS: $\bar{X}w = 141.15$)**
Old book pg no. 8.19, exercise 1

Group	**Food**	**Clothing**	**Fuel and Lighting**	**House Rent**	**Misc.**
Index No	125	133	141	173	182
Weights	7	5	4	1	3

34. Compute **Arithmetic Mean using Direct Method and step deviation method** and verify the answers. **(Ans: 285.385)**
Reference Old book exercise 8C question no. 2 pg.no. 8.12

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Wages	0-100	100-200	200-300	300-400	400-500	500-600
No. of workers	14	20	42	24	20	10

35. Calculate Arithmetic Mean ($\bar{X}$) from following data. **(ANS: $\bar{X}$ = 50.4)**
Old Book pg no. 8.14, Example 3

Marks	**Below 10**	**Below 20**	**Below 30**	**Below 40**	**Below 50**	**Below 60**	**Below 70**	**Below 80**
No. of Students	15	35	60	84	96	127	198	250

36. From the following table, find the missing frequencies**, if the mean is 1.8.**
(Ans: frequencies x_1 = 16 and x_2 = 212)
Old book pg no. 8.18 example no. 3, New book pg no. 4.13, Illustration no. 14

No. of Families	0	1	2	3	4	5	Total
No. of Days Worked	92	?	?	50	20	10	400

37. The **mean of the following series is ₹ 115.86.** Find the **missing figure**. **(Ans: 120)**
Old book pg no. 8.17 example no. 2, New book pg no. – 4.12 Illustration no. 13

House Rent ₹	110	112	113	117	?	125	128	130
Number of Houses	25	17	13	15	14	8	9	2

38. Calculate **Arithmetic Mean** from the following data. **(Ans: 62.833)**
Old book pg no. 8.10, Example no. 2

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Students	33	53	108	221	153	322	439	526	495	50

39. The **Mean** profit per shop is ₹29, Calculate the number of shops corresponding to the class interval of 20-30 of the following distribution. **(Ans. 28 Shops)**
Same as Q.No.37

Profit Per Shop ('00 Rs.)	0-10	10-20	20-30	30-40	40-50	50-60
No. of Shops	12	15	?	25	14	9

40. Calculate **Median** from the following data. **(Ans: Median = 34.40)**
Old book reference example 1 pg no. 8.43

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69
No. of Students	6	10	20	25	16	12	5

41. Calculate **Median** from the following data. **(Ans: M = 153.79)**
Old book reference example 6 pg no. 8.46

Mid-Value	115	125	135	145	155	165	175	185	195
Frequency	6	25	48	72	116	60	38	22	3

42. Calculate Median from the following data. (Ans: M = 76)
Old book Example No. 2 page no. 8.43

Marks	Above 20	Above 30	Above 40	Above 50	Above 60	Above 70	Above 80	Above 90
No. of Students	200	195	177	157	142	124	84	16

43. An incomplete distribution is given below. You are given **Median** value is **46**. Using **Median**, find out missing frequencies. **[Ans: Missing Frequencies X_1 = 34 and X_2 = 46)**
Same as Q.No. 36 missing in AM.

Income (in ₹)	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
No. of persons	12	30	?	65	?	25	18	229

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44. Calculate the **Median** and the **Quartiles** from the following data
(Ans: Median: = 54.95, Q_1 = 41.33, Q_3 = 69.42)
Old book reference example 6 pg no. 8.46

Mid value	15	25	35	45	55	65	75	85	95	105
Frequency	18	29	46	62	96	56	42	30	16	10

45. Calculate the **Median** and the **Quartiles** from the following data.
(Ans: Median: = 40, Q_1 = 30.385, Q_3 = 53.33)
Old book reference example 4 pg no. 8.45

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80
No. of Students	4	10	24	50	70	85	95	100

46. Following is the distribution of marks obtained by 50 students in Mercantile Law. Calculate the **Median** Marks. **(Ans: 27.5)**
Old book reference example 2 pg no. 8.43

Marks More than	0	10	20	30	40	50
No. of Students	50	46	40	20	10	3

47. Calculate **Modal Weight** from the following data. **(Ans: Modal Weight = 140.59 lbs)**
Old book example no. 5 pg no.8.63

Wt. in lbs	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180
No. of Persons	4	6	20	32	33	17	8	2

48. Calculate **Mode** for the following data: **(Ans: 66.78)**
Old book example no. 2 pg. no. 8.61

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80
No. of Students (f)	15	35	60	84	96	127	198	250

49. From the following information, calculate **Mode**: **(Ans: 210.91)**

Lower Limit of Model Class	200
Upper Limit of Model Class	220
Frequency of Model Class	40
Frequency of Succeeding class of Model Class	30
Frequency of preceding class of Model Class	28

50. Draw **Histogram** from the following distribution and find **Modal wage and check the value by direct calculation. (Ans: Z = 28)**
Old book reference example no. 1 pg no. 8.67

Wages (In ₹)	10-15	15-20	20-25	25-30	30-35	35-40	40-45
No. of Workers	60	140	110	150	120	100	90

51. Construct a **Histogram** from the following data and find **Modal value (Ans: Mode = 19.33)**
Old book reference example no. 1 pg no. 8.67

Marks	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
No. of Students	7	10	16	32	24	18	10	5	1

52. Compute the **Geometric Mean** of the Following: **(Ans: GM ($\bar{X}g$) = 3.4898)**
Old book reference example no. 1 pg no. 8.72
1111, 111, 11, 1.1, 0.11, 0.011

53. Compute the **Geometric Mean** of the Following: **(Ans: GM ($\bar{X}g$) = 2.199)**
Old book example no. 1 pg no. 8.72
2200,220,22,0.22,0.022,0.0022

54. Find Out the **Geometric Mean** from the Following data:**(Ans: GM ($\bar{X}g$) = 25.2988)**
Old book example no. 3 pg no. 8.73

X	10	20	30	40	50	60
F	12	15	25	10	6	2

55. Growth rate of Indian Economy for the years 2000,2001 and 2002 are 6%, 5% and 5.5% respectively. Find the **average rate of growth**. **(Ans: 2.6%)**

56. A person travels the first km at 10 km per hour, the second km at 3 km per hour and third km at 6 km per hour. What is his average speed? **(Ans: HM = 5 kms)**
Old Book example no. 7 page no. pg no. 8.81

57. Calculate the **Harmonic Mean** from the following data: (Ans: HM = 13.526)
Old book reference example no. 3 page no. 8.79

X	10	12	14	16	18	20
F	5	18	20	10	6	1

UNIT III: MEASURES OF DISPERSION

A. Short Answer Questions

1. What is meant by dispersion? Why is it important in statistical analysis. (Old book pg.no. 9.2)
2. Explain Range. Discuss its merits and demerits. (old book pg no. 9.3 & 9.5)
3. Explain Standard Deviation. Discuss its merits and demerits.
(old book pg.no. 9.32 & 9.54 to 9.55)
4. Explain Quartile Deviation. Discuss its merits and demerits.
(old book pg.no. 9.6 & 9.12 to 9.13)
Define Mean Deviation. State the merits and limitations of Mean Deviation. (old book pg.no. 9.16 & 9.30 to 9.31)
5. What is Coefficient of Standard Deviation? Explain its significance. (old book pg.no. 9.33)
6. Range and Its Coefficient in All Series Practical Problem
7. Quartile Deviation in All Series Practical Problems.

Short Practical Questions.

8. Compute **Standard Deviation** from the following data of income of 200 employees of a firm.
(Ans: Mean = 74, Standard Deviation = 30.72)
Old book reference example no. 1 pg.no. 9.40

Income	10	30	50	70	90	110	130
No. of Employees	6	20	40	60	30	24	20

9. Calculate the Standard Deviation and Coefficient of Variation from the following data.
Same reference as Q.No.6

Marks	20	30	40	50	60	70	80
No. of Students	2	5	7	14	28	12	9

10. Calculate the value of standard deviation Mean=45, Median=48, Karl Pearson's coefficient of skewness = -0.4 **(Answer: Standard Deviation = 22.5)**
Old book example no. 8, page no. 10.25

11. Calculate Mean Deviation and its Co-efficient from Arithmetic Mean.

7, 5, 12, 10, 8, 11, 16

(old Book reference example no. 4 page no. 9.19)

12. Find the Coefficient of Variation of a frequency distribution given that its Mean=100, Mode=102, Karl Pearson's Co-efficient of skewness = - 0.4 **(Ans: S.D. = 5, CV = 5%)**

13. Sum and difference of Q1 and Q3 are 22 and 8 respectively. Arithmetic Mean and Mode are 8 and 11 respectively find the coefficient of skewness **(Ans: SK(b) = 0.5)**

New book example no. 10 page no. 7.16

14. Following are the prices of a share of a company from Monday to Saturday. Calculate Range and its Co-efficient. **(Ans: Range = 45, Coefficient of Range = 0.137**

New book example no. 1 page no. 6.4

Day	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Price	**160**	**158**	**170**	**142**	**176**	**187**

15. Two workers on the same job show the following results:

(Answer: CV_X = 20% and CV_Y = 16%)

Old book example no. 3 page no. 9.50

Details	**Worker X**	**Worker Y**
Mean time of completing the Job (Minutes)	30	25
Standard Deviation (Minutes)	6	4

(i) Which worker is faster in completing the job?

(ii) Which worker is more consistent in time, he requires in completing the job?

16. From the marks of two students given below. Find out who is **more consistent**.

(**Ans: Mean of A= 44, Mean of B = 53, SD of A = 13.45, SD of B = 25.59, CV of A = 30.57%, CV of B = 48.28%, Student A is More Consistent)**

Old book example 2 page no. 9.49

A	25	50	45	30	70	42	36	48	34	60
B	10	70	50	20	95	55	42	60	48	80

B. Long Answer Questions

17. Define dispersion and explain the requisites/characteristics of a good measure of dispersion.

18. Explain the various absolute measures of dispersion and discuss their merits and limitations.

19. Explain Range, Quartile Deviation and Mean Deviation with their relative measures and applications.

20. Explain Standard Deviation and discuss its important properties, applications, advantages and limitations.

21. What is Combined Standard Deviation? Explain its significance and applications in business and economic analysis.

22. Define Kurtosis and briefly describe its three types (Leptokurtic, Mesokurtic, Platykurtic).

Long Practical Questions

23. Calculate the **Mean Deviation** from the **Median** for the following distribution.

Old book reference example no. 3 page no. 9.27

Class Interval	6–10	11–15	16–20	21–25	26–0	31–35	36–40	41–45	46–50	51–55	56–60
Frequency	8	10	16	7	3	2	1	2	3	6	2

24. Calculate **Mean Deviation** and its Coefficient through **Median**

Old book reference example no. 2 page no. 9.26.

Size	**0–10**	**10–20**	**20–30**	**30–40**	**40–50**	**50–60**	**60–70**

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Size	**0–10**	**10–20**	**20–30**	**30–40**	**40–50**	**50–60**	**60–70**
Frequency	7	12	18	25	16	14	8

25. From the following data, which of the two **makes shows more consistency**?

(Ans: Mean (X) = 11.30 years, Mean (Y) = 11.90 years, SD (X) = 5.618, SD(Y) = 5.161, CV(X)=49.72%, CV(Y) = 43.37%, Make Y is more consistent than Make X because its coefficient of variation is lower (43.37% < 49.72%). (old book example no. 3 page no. 9.50)

Life (No. of Years)	0-5	5-10	10-15	15-20	20-25
'Make X' No. of Cars	8	12	17	10	3
'Make Y' No. of Cars	6	10	20	12	2

26. From the following data calculate **Mean Deviation** from the **Median**.

(Answer: Median: 31.5, Mean Deviation: 7.28)

Old book example no. 4 page no. 9.28

CI	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
Frequency	8	15	13	20	11	7	3	2	1

27. The annual salaries of a group of employees are given in the following table. Calculate Standard Deviation.

(Answer: 17.46)

Old book example no. 3 page no. 9.36

Wages (in ₹)	42	46	56	62	64	66	72	82	92	98

28. From the following data calculate **Standard Deviation**.

(Answer: 10.35)

Old book example no. 1 page no. 9.40

Salaries (in ₹ 000)	45	50	55	60	65	70	75	80
No. of Employees	3	5	8	7	9	7	4	7

29. From the following data calculate **Standard Deviation** and **Coefficient of Variation**.

(Answer: S.D. = 17.26, Mean = 40.43, CV = 49.69%)

Old book example no. 3 page no. 9.46

Marks	Upto 10	Upto 20	Upto 30	Upto 40	Upto 50	Upto 60	Upto 70	Upto 80
No. of Students	12	30	65	107	157	202	222	230

30. Goals scored by two football teams, A and B in some matches were as follows. Which team is more consistent?

(Answer: S.D.(A)= 8.40476, Mean(A) = 10.6, CV(A) = 79.29%
S.D.(B)= 4.89897, Mean(B) = 8, CV(B) = 61.24%)

As Team B has less CV so Team B is more consistent.

Old book example no. 1 page no. 9.48

No. of goals scored	0	1	2	3	4
No. of Matches of Team A	27	9	8	5	4
No. of Matches of Team B	17	9	6	5	3

31. From the following data, which of the two makes shows more consistency?

(Answer: S.D.(x)= 4.6043, Mean(x) = 10, CV(x) = 46.04%
S.D.(y)= 6.0663, Mean(y) = 10, CV(y) = 60.66%)

Make of X is more consistent as CV of X is Less.

Old book example no. 3 page no. 9.50

Life(No. of Years)	0-5	5-10	10-15	15-20	20-25
Make x No. of Cars	8	12	17	18	3
Make y No. of Cars	6	10	20	12	2

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UNIT IV — RELATIVE DISPERSION AND SHAPE OF DISTRIBUTION

1. What is Lorenz Curve? State the uses of a Lorenz Curve. (New Book page No. 6.44 to 6.45)
2. What is meant by concentration or inequality in a distribution? (New Book page No. 6.45 to 6.46)
3. What is skewness? Explain Positive and Negative Skewness by drawing diagram. (Old book page no. 10.1 to 10.2)
4. What is Karl Pearson's coefficient of skewness? State the formula. (Old book page no. 10.4 to 10.5)
5. What is Bowley's coefficient of skewness? State the formula. (old book page no. 10.11 to 10.12)

Short Practical Questions

6. For a moderately skewed distribution Mean = 160, Mode = 157 and standard deviation = 40. Find (i) Co-efficient of variation (ii) Pearson's Coefficient of Skewness. (old book example no. 2 pg no. 10.22)
7. Given that the Quartile Deviation of a frequency distribution is 40, Median is 32 and Bowley's Coefficient of Skewness is 0.5. Find the two Quartiles.
8. If the Mode and Mean of a moderately skewed series are 30.2 and 20.4 respectively, what would be its Median? **(Ans: 23.67)**
9. For a distribution, if mean is 200, the co-efficient of variation is 8 and Karl Pearson's co-efficient of skewness is 0.3, find the mode and median.
10. In a certain distribution the following results were obtained. Mean=45, Median=48, Karl Pearson's Co-efficient of skewness = -0.4, calculate the value of standard deviation.
11. Given that Mean: 30, Standard Deviation: 8, Karl Pearson's Co-efficient of Skewness is 0.4, find Median and Mode. **[Answer: M=28.9, Z=26.8]**

Long Important Questions (All Theory Questions and Examples in Old book of Kalyani publisher)

12. Explain the meaning, significance and uses of Coefficient of Variation. How is it useful in comparing the consistency of two or more series?

13. What is a Lorenz Curve? Explain its meaning, significance and uses in the measurement of inequality.

14. Explain the procedure for constructing a Lorenz Curve. How does it help in measuring inequality or concentration?

15. Explain the applications of Lorenz Curve in the analysis of income, wealth and market-share distribution.

16. What is skewness? Explain the different types of skewness with suitable diagrams.

17. Explain the meaning and significance of kurtosis in statistical analysis.

18. What is skewness? Explain positive, negative and zero skewness with diagrams and the corresponding Mean-Median-Mode relationships.

19. Explain Karl Pearson's and Bowley's measures of skewness with their formulae and interpretation.

20. What is Kurtosis? Explain its meaning, significance and different types of Kurtoses, with their interpretation in statistical analysis.

21. Calculate the **Coefficient of Skewness based on Quartiles** from the following data.

Class Interval	**20–30**	**30–40**	**40–50**	**50–60**	**60–70**	**70–80**	**80–90**	**90–100**
Frequency	6	10	18	30	12	10	6	2

22. Calculate **Standard Deviation and Coefficient of Variation** for the given dataset:

Wages (₹)	100–120	120–140	140–160	160–180	180–200
Workers	17	28	35	12	15

23. Calculate the **Karl Pearson's Coefficient of Skewness**.

X	100-200	200-300	300-400	400-500	500-600
Y	5	8	12	9	6

24. Calculate **Coefficient of Skewness based on quartiles** from the following data.

Size	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	6	10	18	30	12	10	6	2

25. Find **Bowley's Coefficient of Skewness**

Wages More Than (in Rs)	5	15	25	35	45	55	65
No. of Workers	100	80	75	60	55	20	0

26. From the following data calculate **Karl Pearson's Coefficient of Skewness**.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	12	28	40	60	32	18	10

UNIT V: INDEX NUMBERS

A. Short Answer Questions

1. What are **Index Numbers**? State their importance in economic and business analysis (Old Book Pg No. 2.2 & 2.4, New Book 8.1 to 8.3)
2. What are the **uses and limitations of Index Numbers**? (Old Book Pg.No. 2.4 & 2.5, New Book Pg No. 8.2 to 8.4)
3. What is meant by the **Time Reversal Test and Factor Reversal Test**? (Pg No. Old Book 2.35 to 2.38 and Exercise No.15, New Book Pg No. 8.22 to 8.26)
4. What is **Base Shifting, Splicing and Deflating of Index Numbers**? (old Book pg no. 2.53 to2.59, New Book pg no. 8.34 to 8.38)

Short Practical Questions

5. Given Laspeyres' Price Index (L) = 234.2 and Paasche's Price Index (P) = 229.6, calculate Fisher's Ideal Index Number.
6. Define **Deflating Index Numbers** and calculate the real wage for an employee whose salary is ₹24,000 and the Consumer Price Index (CPI) is 150.
7. Mr. Ashok was getting ₹400 in the base year and ₹800 in the current year when consumer price index is 350. What extra amount is required for maintaining the earlier standard of living? (new Book pg no. 8.40 Question 10)
8. During a period the coat-of-living index goes up from 110 to 200 and income from ₹325 to ₹500. Does the worker gain or loss? If so how much? Interpret it. ? (new Book pg no. 8.40 Question 11)
9. Calculate the price index number for the current year with the base year as 100 by using the Simple Aggregative Method. (old book pg no. 2.6 to 2.7 examples, New Book 8.6 to 8.8 examples)

Commodity	Base-year Price	Current-year Price
A	10	12
B	20	25
C	15	18
D	25	30

10. Construct an Index Number for 2023 taking 2018 as base year using:
11. Simple Aggregative Method, 2. Simple Average of Price Relatives Method (old book pg no. 2.61 Q.No.5, New Book 8.13, Question No.7)
    1.

Commodity	Price in 2018 (p0)	Price in 2023 (p1)
A	50	70
B	40	60
C	80	90
D	110	120
E	20	25

1. Splice Series B (New Series) with Series A (Old Series) to form a continuous series with **2016 as base year**: ? (old Book pg no. 2.53 to2.59, New Book pg no. 8.34 to 8.38)

Year	Series A (Base 2016)	Series B (Base 2019)
2016	100	—
2017	110	—
2018	120	—
2019	130	100
2020	—	112
2021	—	125

2. **Calculate the Real Wage Index for an industrial worker given the following figures: old book pg no. 2.59 example 52, New book pg no. 8.37, illustration 16)**

Year	Monthly Wages (₹)	Consumer Price Index (CPI)
2019	12,000	100
2020	13,500	110
2021	15,000	125
2022	16,800	140
2023	18,000	150

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B. Long Answer Questions

3. Define Index Numbers and explain their **importance, uses and limitations in business and economic analysis**. (Old Book Pg No. 2.2 & 2.4, New Book 8.1 to 8.3)
4. Explain the **problems involved in the construction of Index Numbers**. (Old Book Pg No. 2.2 & 2.4, New Book 8.1 to 8.3)
5. Explain the various methods of constructing **simple and weighted index numbers**, with special reference to **Fisher's, Laspeyres' and Paasche's methods**.
6. Explain the **tests of adequacy of Index Numbers**. Discuss Unit Test, Time Reversal Test and Factor Reversal Test.
7. Explain **Base Shifting, Splicing and Deflating of Index Numbers** and discuss their importance in statistical and economic analysis. (old Book pg no. 2.53 to2.59, New Book pg no. 8.34 to 8.38)

Long Practical Questions

8. Construct Ideal Index Number from the following data. Show that it satisfies Time Reversal Test. (Pg No. Old Book 2.35 to 2.38 and Exercise No.15, New Book Pg No. 8.22 to 8.26)

Commodity	Quantity 2019	Expenditure 2019	Quantity 2021	Expenditure 2021
P	10	100	12	120
Q	5	20	6	60
R	20	40	25	100
S	6	60	8	80

9. Compute Laspeyres', Paasche's, and Marshall-Edgeworth price index numbers from the data given below: (Old Book Pg No. 2.25 Example 19, New Book Pg no. 8.19 example 10)

Commodity	Base Year Price (p0)	Base Year Total Value (p0q0)	Current Year Price (p1)	Current Year Total Value (p1q1)
Rice	10	100	12	144
Wheat	8	96	10	120
Pulses	12	144	15	180
Oil	20	200	25	250

10. From the following data, calculate Fisher's Ideal Index Number and prove that it satisfies both the Time Reversal Test (TRT) and the Factor Reversal Test (FRT).
(old Book pg No. 2.40 Example 31, New Book pg no. 8.27, Illustration no.12)

Commodity	Base Year Price (p0)	Base Year Qty (q0)	Current Year Price (p1)	Current Year Qty (q1)
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

11. Construct the Consumer Price Index number for the year 2025 using (i) Aggregate Expenditure Method and (ii) Family Budget Method from the following information: (Old Book Pg.no. 2.56 to 2.59 all examples , New Book 8.36 to 8.39, all examples)

Item	Base Qty (2020)	Base Price (2020)	Current Price (2025)
Food	100 kg	₹20	₹28
Rent	1 House	₹1200	₹1500
Clothing	20 mtrs	₹50	₹75
Fuel	10 units	₹40	₹60

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Misc.	20 units	₹60	₹90

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1. From the following Chain Base Index (CBI) Numbers, convert them into Fixed Base Index (FBI) Numbers:

Year	2018	2019	2020	2021	2022	2023
Chain Base Index (CBI)	100	120	125	110	130	115

2. The following are index numbers of a business house with 2015 as base year. **Shift the base** to the year 2020 and rewrite the adjusted index series.

Year	2017	2018	2019	2020	2021	2022	2023
Old Index (Base 2015=100)	110	125	140	160	175	190	200

3. Calculate Cost of Living Index Number (Consumer Price Index) using the **Aggregative Expenditure Method**

Commodity	**Base Year Price (p0)**	**Base Year Quantity (q0)**	**Current Year Price (p1)**
A	100	8	120
B	25	20	35
C	10	50	15
D	20	15	25
E	50	10	65

4. Construct Price Index Numbers for the current year taking base year as 100 using:
   a) Laspeyres' Method
   b) Paasche's Method
   c) Bowley's Method
   d) Marshall-Edgeworth Method

Commodity	**p0**	**q0**	**p1**	**q1**
Food	**10**	**20**	**15**	**25**
Fuel	**8**	**10**	**12**	**15**
Clothing	**12**	**15**	**18**	**20**
Rent	**20**	**5**	**25**	**5**

5. Calculate the Price Index Number using the **Weighted Average of Price Relatives Method** (using Arithmetic Mean)

Commodity	**Weight (W)**	**Base Price (p0)**	**Current Price (p1)**
A	**40**	**16**	**20**
B	**25**	**40**	**60**
C	**5**	**2**	**3**
D	**20**	**5**	**7**
E	**10**	**2**	**4**

6. Compute the Cost-of-Living Index Number for the following data using the **Family Budget Method**:

Item	**Base Price (p0)**	**Current Price (p1)**	**Weight (W)**
Food	150	210	35
Rent	50	70	15
Clothing	100	130	20
Fuel & Light	20	25	10
Miscellaneous	60	75	20

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7. Calculate Price Index Number with :
   a) Laspyre's Method
   b) Paache's Method
   c) Bowley Method
   d) Fisher's Method

Commodity	Base Year (2010)		Current Year (2015)	
	Price	Quantity	Price	Quantity
A	2.5	8	5	6
B	10	4	13.5	5
C	30	2	51	3
D	20	1	27.8	1