

As per Choice Based Credit System (CBCS)

Spectrum
EDUCATION

ANALYTICAL SKILLS

(II-Degree / IV- Semester)
(Common to All)



Mr. K. Chitti Babu
Dr. V. Murali Krishna

Mr. S. Mohan Naidu
Dr. A. Parandhama

SPECTRUM

ANALYTICAL SKILLS

II-Degree / IV - Semester

As per Choice Based Credit System (CBCS)



Authors

Mr. K.Chitti Babu
Dept. of Mathematics
Government Degree College
Ramachandrapuram
East Godavari-533 255 AP

Mr. S. Mohan Naidu
Marri Laxman Reddy Institute of Technology
and Management(Autonomous)
Dundigal, Hyderabad - 500 043, TS

Dr. V. Murali Krishna
Assistant Proffessor
Sreenivasa Institute of Tech. and Management Studies
Dr.Visweswaraiah Road, Bangalore-Tirupathi
Bye-pass Road, Murukambattu, Chittoor, AP

Dr. A. Parandhama
Assistant Proffessor(SL)
Sree Vidyanikethan Engineering College
Sree Sainath Nagar, Tirupati, AP

 **SPECTRUM[®]**
COMPETITIVE SERIES
Direct your Destination...

All rights reserved. No part of this publication which is material protected by this copyright notice may be reproduced or transmitted or utilized or stored in any form or by any means now known or hereinafter invented, electronic, digital or mechanical, including photocopying, scanning, recording or by any information storage or retrieval system, without prior written permission from the **Publisher**.

Information contained in this book has been published by **StudentsHelpline Publishing House (P) Ltd.**, Hyderabad and has been obtained by its Authors from sources believed to be reliable and are correct to the best of their knowledge. However, the Publisher and its Authors shall in no event be liable for any errors, omissions or damages arising out of use of this information and specifically disclaim any implied warranties or merchantability or fitness for any particular use.

COPYRIGHT REGISTRATION DIARY NUMBER: L-75338/2018

Spectrum Competitive Series, Hyderabad

A Part of StudentsHelpline Publishing House (P) Ltd., Hyderabad
(An ISO 9001 : 2015 Certified Company)

Head Office

326/C, Level-5, Surneni Nilayam
Near B K Guda Park, S R Nagar, Hyderabad - 500 038, INDIA
P.No: +91 40 23710657, 238000657 Fax: +91 40 23810657

Reg. Off

5-68, Pedda Gorpada, Pakala, Tirupati, Chittoor - 517 112 AP, INDIA
mail: studentshelpline.in@gmail.com
www.studentshelpline.in

© Spectrum Competitive Series, Hyderabad

First Edition-2019

ISBN 978-81-927087-0-6

₹ 180/-

Printed at StudentsHelpline Group, S R Nagar, Hyderabad-38
Published by Surneni Mohan Naidu for Spectrum Competitive Series, Hyderabad - 38

II- Degree/ IV- Semester (CBCS)

ANALYTICAL SKILLS

UNIT - 1

Data Analysis: The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT - 2

Sequence and Series: Analogies of numbers and alphabets completion of blank spaces following the pattern in $A:b::C:d$ relationship odd thing out; Missing number in a sequence or a series.

UNIT - 3

Arithmetic Ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF).

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

UNIT - 4

Quantitative Aptitude: Averages, Ration and proportion, Problems on ages, Time-distance – speed.

UNIT - 5

Business Computations: Percentages, Profit & loss, Partnership, simple compound interest.

Detailed Contents

ANALYTICAL SKILLS

Unit-I: Data Analysis

1.0	Aims and objectives	1
1.1	Introduction	1
1.2	Data Analysis	1
1.3	The Data Given in a Table	3
1.3.1	Types of Tabular Format	4
1.4	Graph	16
1.4.1	Line Graphs	16
1.4.2	Bar Graph	17
1.4.3	General Rules for Drawing Graphs and Diagrams	17
1.5	Bar Diagram/Graph	19
1.5.1	Types of Bar Charts	19
1.6	Pie Chart (Circle Graphs)	29
1.7	Venn Diagram	38
1.8	Summary	47
1.9	Keywords	47
1.10	Review Questions	48
1.11	Multiple Choice Questions	51

Unit-2: Sequence and Series

2.0	Aims and objectives	59
2.1	Introduction	59
2.2	Analogies of numbers and alphabets completion of blank spaces following the pattern in A:b::C:d relationship	60
2.2.1	Analogy	60
2.2.1.1	Number Analogy	61
2.2.1.2	Letter/Alphabet Analogies	62
2.2.1.3	Word Analogy	66
2.3	Odd Thing Out	75

2.4	Missing number in a sequence (or) series	78
2.4.1	Sequence	78
2.4.2	Types of Sequence	79
2.4	Series	80
2.4.1	Types of Series	80
2.5	Summary	86
2.6	Keywords	87
2.7	Review Questions	87
2.8	Multiple Choice Questions	88
Unit-3: Arithmetic Ability		
3.0	Aims and objectives	91
3.1	Introduction	91
3.2	Arithmetic Ability	92
3.2.1	Algebraic Operations BODMAS	92
3.2.1.1	Terminologies	93
3.2.2	Fractions	100
3.2.2.1	Types of Fractions	100
3.2.2.2	Numerators and Denominators	102
3.2.2.3	Comparison of Fractions	103
3.2.2.4	Fractional Part of a Number	105
3.2.2.5	Different Fractional Parts of the Same Number	105
3.2.2.6	Addition and Subtraction of Decimals	107
3.2.2.7	Common Fractions Expressed in Recurring Decimals	108
3.2.3	Divisibility Rules	108
3.2.3.1	Divisibility Theorem	110
3.2.3.2	Remainder Theorem	110
3.2.3.3	Decimal Fractions	111
3.2.3.4	Addition and Subtraction of Decimal Fractions	111
3.2.3.4	Addition and Subtraction of Mixed Fraction	112
3.2.3.5	Multiplication of Decimals	113
3.2.3.6	Dividing a Decimal by a Decimal	114
3.2.4	LCM & GCD (HCF)	114
3.2.4.1	Relation Between LCM and HCF	115

3.2.4.2	Factors and Multiples	116
3.2.4.3	Least Common Multiple (L.C.M)	116
3.2.4.4	Greatest Common Divisor (GCD) or Highest Common Factor (HCF)	119
3.2.4.5	L.C.M and H.C.F. Product Rule	122
3.2.4.6	Co-prime (or) Relative Prime	122
3.2.4.7	LCM/HCF of Decimals	123
3.2.4.8	LCM and HCF Fractions	123
3.3	Date, Time and Arrangement Problems	126
3.3.1	Calendar Problems	126
3.3.2	Some Important for Year to Day Calculation	127
3.3.3	Clock Problems	136
3.3.4	Solved Problems	140
3.4	Blood Relations	145
3.4.1	Importance of Blood Relation	147
3.4.2	Understanding the Chart for One Generation to Next Generation	148
3.4.3	Tips for Identifying Blood Relation	148
3.5	Types of Blood Relations	148
3.5.1	Deciphering Jumbled up Descriptions	149
3.5.2	Relation Puzzles	150
3.5.3	Coded Relations	150
3.6	Solved Examples	152
3.7	Summary	155
3.8	Keywords	156
3.9	Review Questions	157
3.10	Multiple Choice Questions	158
Unit- 4: Quantitative Aptitude		
4.0	Aims and objectives	163
4.1	Introduction	163
4.2	Averages	163
4.2.1	Properties of Averages	164
4.2.2	Average of a Series	165
4.2.3	Central Value Meaning of Averages	166

4.2.4 Weighted Average	166
4.3 Ratio and Proportion	172
4.3.1 Types of Ratios	173
4.3.2 Properties of Ratio	175
4.3.3 Proportion	175
4.3.3.1 Types of Proportion	176
4.3.3.2 Different forms of Proportion	179
4.3.3.3 Properties of Proportions	179
4.4 Problems on Ages	185
4.5 Time - Distance - Speed	192
4.5.1 Boats and Streams	194
4.6 Summary	201
4.7 Keywords	201
4.8 Review Questions	201
4.9 Multiple Choice Questions	202
Unit-5: Business Computations	
5.0 Aims and objectives	207
5.1 Introduction	207
5.2 Percentages	207
5.2.1 Value of Percentage	210
5.3 Profit and Loss	217
5.3.1 Marked Price (List Price)	218
5.3.2 Discount	218
5.3.3 Some Important Points	219
5.4 Partnership	227
5.4.1 Types of Partners	227
5.4.2 Ratio of Division of Gains	228
5.5 Simple, Compound Interest	236
5.6 Summary	250
5.7 Review Questions	250
5.8 Multiple Choice Questions	251

Unit-1

Data Analysis

1.0 AIMS AND OBJECTIVES

After completion of this chapter we should be able to understand :

- Basic concepts of data analysis
- Simplify the problems on tables
- Different types of Bar graphs
- Importance of Pie-Chart and
- Solve the problems on Venn diagram.

1.1 INTRODUCTION

Data Analysis is a process of inspecting, cleaning, transforming and modeling data with the goal of discovering useful information, suggesting conclusions and supporting decision-making. Data analysis means to understand and organise a given data and make appropriate conclusion from it. Competitive examinations, today, consider data interpretation as their integral part. From this, data interpretation has become an important aspect of almost all competitive exams.

The data can be organized in a number of ways so that larger volume of data can be presented in a more compact and precise form. In this, the student or a candidate is provided with a graph or a Pie-chart (or) a bar diagram or a table, and questions based on it are asked to him/her, this tests his/her ability to analyse an data.

The data interpretation can be classified into various types. The head note specifies the unit of the measurement of the table. The description of the contents of the table is given by the title. It precisely defines the kind of data and the period for which they occurred.

An information contained in a various columns is defined by the heading of a column. In some cases, it also specifies the unit of measurement. To point out any exceptions in arriving at the data, foot notes are used.

1.2 DATA ANALYSIS

Data analysis have to compare the data of the given question. In this type of question, mostly two values have different codes (i.e., quantity₁ & quantity₂ or x & y) and after the calculation of exact value, one can easily compare the values of there two quantities. This topic is related to all the

topics of arithmetic, algebra and mensuration. Data interpretation question are based on the information given in the table and graphs.

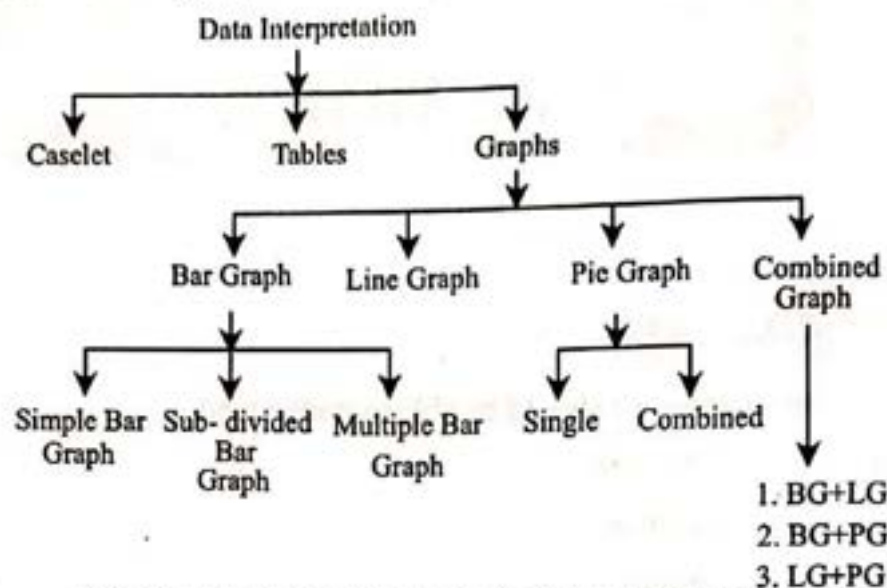


Figure 1.1: Classification of Data Interpretation

Caselets are generally known as mathematical puzzle. In the caselet problem, informations about one (or) more things are given. Using this we have to solve the problems based on it.

To solve the problems based on percentages, averages and ratios. Then the formulas for solving problems are

1. **Percentages:** Percentage is a ratio with base of 100. Percentage calculation is the most important aspect in the representation as well as in the interpretation of the data. Based on formulas we have to calculate percentage values.

$$\text{Percentage Increase} = \frac{\text{Final Value} - \text{Initial Value}}{\text{Initial Value}} \times 100$$

$$\text{Percentage Decrease} = \frac{\text{Initial Value} - \text{Final Value}}{\text{Initial Value}} \times 100$$

2. **Ratio:** Ratios can be expressed as fractions, decimals or even as percentages. It is defined as the reduced form of values of quantities to lowest integers for the purpose of comparison between the value of quantities. It is the result of value of one quantity divided by another.

$$\text{Ratio} = \frac{\text{Quantity I}}{\text{Quantity II}}$$

3. **Average:** It is defined as the central values of all the quantities taken into consideration. It is the result of sum of values of all the quantities divided by the number of quantities. Average is always between the highest and the lowest value among the values of all the quantities. By using the formula we have to calculate averages,

$$\text{Average} = \frac{\text{Sum of values of quantities}}{\text{Number of quantities}}$$

1.3 THE DATA GIVEN IN A TABLE

Definition: The data is collected by the person and are arranged in a systematic way in a table is called as "tabular form". If you are doing a table, we assume the Horizontal lines are called rows and Vertical lines are called columns.

A table is one of the easiest way for summarising data. A statistical table is the logical listing of related Quantitative data in vertical columns and horizontal rows of numbers with sufficient explanatory and qualifying words, phrases and statements in the form of titles, heading and notes to make clear the meaning of data.

$$(i) \text{ Average} = \frac{\text{Sum of all items}}{\text{Total number of items}} \quad \dots (1)$$

$$(ii) \% \text{ change (increase or decrease)} = \left| \frac{\text{Final value} - \text{Initial value}}{\text{Initial value}} \right| \quad \dots (2)$$

(a) **Collection of Data:** Data is also called as information, it can be classified into two types. They are,

1. Primary data and
2. Secondary data

1. **Primary Data:** Data collected expressly for a specific purpose are called "Primary data". Primary data refers to the first hand data gathered by the researcher himself.

Example: Data collected by a particular person (or) organization from the primary source for his own use, collection of data about the population by censuses and surveys.

2. **Secondary Data:** Data collected and published by one organization and subsequently used by other organizations are called "Secondary data". Secondary data means data collected by someone else earlier.

Example: Newspapers and periodicals; publications of trade associations; research papers published by university departments, U.G.C. or research bureaus; official publications of central, state, local and foreign governments.

An collection expenses of primary data are more than secondary data. Secondary data should be used with care. Various methods of collection of primary data are:

- (i) Direct personal investigation (interview/observation)
- (ii) Indirect oral investigation
- (iii) Data from local agents and correspondents
- (iv) Mailed questionnaires
- (v) Questionnaires to be filled in by enumerators
- (vi) Results of experiments.

Data collected in this manner are called 'raw data'. These are generally voluminous and have to be arranged properly before use.

(b) **Essential Parts of a Table**

The statistical table can be classified into different parts. They are,

Analytical Skills

26. A man gains 20% by selling an article for a certain price. If he sells it at the double price, the percentage profit will be []
(a) 180% (b) 140% (c) 120% (d) 160%
27. If the cost price of 12 articles is equal to the selling price of 8 articles, the gain percent is []
(a) 25% (b) 35% (c) 40% (d) 50%
28. A man purchases 90 articles and sells 40 articles at a gain of 10% and 50 articles at a gain of 20%. If he sold all of them at a uniform profit of 15% then he would have got Rs 40 less. The cost price of each article is []
(a) Rs 80 (b) Rs 75 (c) Rs 90 (d) Rs 64
29. When a producer allows 36% commission on the retail price of his product, he earns a profit of 8.8%. what would be his profit percent if the commission is reduced by 24%? []
(a) 43.8 (b) 46.4 (c) 49.6 (d) 44.8
30. If a man reduces the selling price of an article from Rs 400 to Rs.380, his loss increases by 2%. The cost price of the article is []
(a) 1000 (b) 1200 (c) 15000 (d) 750
31. A,B and C started a business by investing Rs 125000 Rs 150000 and Rs 175000. Find the share of B out of an annual profit of Rs 93,600 []
(a) 38200 (b) 34200 (c) 31200 (d) 36200
32. X and Y started a business by investing Rs 4000 and Rs 5000. Find the X's share out of a total profit of Rs 1800 []
(a) 1200 (b) 1800 (c) 2000 (d) 2200
33. Anil and suresh are partners in a business. Anil invests Rs 35000 for 8 months and suresh invests Rs 42000 for 10 months. Out of a profit of Rs 31,570, Anil's share is []
(a) 12628 (b) 13546 (c) 12126 (d) 13986
34. P and Q started a business by investing money in the reatio of 5:6. R joined them after few months by sharing an amount equal to Q's share. At the end of year 20% profit was earned which was equal to Rs 98000. How much money was invested by R? []
(a) 240000 (b) 260000 (c) 210000 (d) 230000
35. A and B enters into a partnership with their capitals in the ratio 5 : 6. At the end of 8 months A withdraws his capital. If they recieve their shares profits in the ratio 5:9, find out how long B's capital was invested in the business? []
(a) 18 months (b) 14 months (c) 15 months (d) 12 months

36. Mr. Giridhar spends 50% of his monthly income on household items and out of the remaining he spends 50% on transport, 25% on environment, 10% on sports and remaining amount of Rs. 900 is saved. What is Mr. Giridhar's monthly income? []
 (a) Rs. 6000 (b) Rs. 12000 (c) Rs. 9000 (d) None of these
37. A person gave 20% of his income to his elder son, 30% of the remaining to the younger son and 10% of the balance he denoted to a trust. If he is left with Rs. 10,080. His income (in rupees) []
 (a) 50,000 (b) 40,000 (c) 30,000 (d) 20,00
38. Babu purchased a pencil and sold it at a gain of 10%. If he had bought it at 6% less and sold it for Rs.5 less, the profit would have been 15%. Find the C.P. of the pencil. []
 (a) 452 (b) 461 (c) 263.16 (d) 462
39. What will be the amount if a sum of Rs. 5000 is placed at compound interest for 3 years while rate of interest for the first, second and third years is 2, 3 and 4 per cent, respectively? []
 (a) Rs. 5643.12 (b) Rs. 5463.12 (c) Rs. 6413.12 (d) None of these
40. The effective annual rate or interest equivalent to 8% p.a. interest compounded half yearly is []
 (a) 8.4% (b) 8.8% (c) 8.16% (d) None of these
41. By selling 33 metres of cloth, Rajini has a profit from 11 metres of cloth. Find the gain %. []
 (a) 50 (b) 33.5 (c) 32.5 (d) 33.3
42. Three partners partnered for 14 months, 8 months and 7 months respectively. Find the ratio of their investments, if they shared a profit in the ratio 5 : 7 : 8. []
 (a) 11 : 19 : 37 (b) 17 : 25 : 57 (c) 15 : 33 : 68 (d) 20 : 35 : 64
43. sneha and murthi started a joint firm. sheha's investment was four times the inevestment of murthi and time period of murthi is twice the time period of sneha. If sneha got Rs 2000 as profit then thir total profit is : []
 (a) Rs 1000 (b) Rs 3500 (c) Rs 4000 (d) None
44. The difference between the compound interest and simple interest for the amount Rs. 5000 in 2 years is Rs. 32. The rate of interest is []
 (a) 5% (b) 8% (c) 10% (d) 12%
45. The value of a machine depreciates every year at the rate of 10% on its value at the beginning of that year. If the present value of the machine is Rs. 7290, its worth 3 years ago was : []
 (a) Rs. 9471 (b) Rs. 8000 (c) Rs. 10000 (d) Rs. 7508.70

Answers

1. b	2. c	3. b	4. b	5. a	6. a
7. d	8. b	9. c	10. d	11. a	12. a
13. b	14. c	15. a	16. c	17. d	18. d
19. b	20. d	21. a	22. c	23. d	24. a
25. d	26. b	27. d	28. a	29. c	30. a
31. c	32. b	33. a	34. c	35. d	36. b
37. d	38. c	39. b	40. c	41. a	42. d
43. d	44. b	45. c			

ANALYTICAL SKILLS

Mr. K. Chitti Babu
Mr. S. Mohan Naidu
Dr. V. Murali Krishna
Dr. A. Parandhama



COMMUNICATION AND SOFT SKILLS - I Dr. A. Parandhama ISBN: 978-81-927087-7-5 Price ₹ 163/-	Computer Fundamentals and Office Tools Dr. A. Parandhama ISBN: 978-93-83470-14-3 Price ₹ 174/-	LEADERSHIP EDUCATION Dr. A. Parandhama ISBN: 978-81-9335675-5-4 Price ₹ 163/-	BUSINESS ORGANIZATION AND MANAGEMENT Dr. A. Parandhama ISBN: 978-93-83470-05-2 Price ₹ 172/-	Business Organization and Management Dr. A. Parandhama ISBN: 978-81-927087-1-3 Price ₹ 172/-
ANALYTICAL SKILLS Dr. A. Parandhama ISBN: 978-81-927087-0-6 Price ₹ 180/-	Environmental Studies Prof. S. Sankar Nath ISBN: 978-93-88096-00-3 Price ₹ 138/-	LEADERSHIP EDUCATION Dr. A. Parandhama ISBN: 978-93-88096-01-0 Price ₹ 199/-	Business Organization and Management Dr. A. Parandhama ISBN: 978-93-88096-04-1 Price ₹ 224/-	Business Organization and Management Dr. A. Parandhama ISBN: 978-93-83640-78-8 Price ₹ 352/-
DATABASE MANAGEMENT SYSTEM Dr. A. Parandhama ISBN: 978-93-83640-88-1 Price ₹ 234/-	Database Management System Dr. A. Parandhama ISBN: 978-93-88096-05-8 Price ₹ 199/-	Database Management System Dr. A. Parandhama ISBN: 978-93-88096-02-7 Price ₹ 199/-	Database Management System Dr. A. Parandhama ISBN: 978-93-88096-03-4 Price ₹ 199/-	Database Management System Dr. A. Parandhama ISBN: 978-81-927087-9-9 Price ₹ 172/-

SPECTRUM
COMPETITIVE SERIES
Direct your Destination...



Join Spectrum

For Students & Shopkeepers Queries @ 9392575657



180/-

ISBN 978-81-927087-0-6



9 788192 708706

www.spectrumpublications.in

www.studentshelpline.org

www.spectrumbookworld.com