NEW HORIZON
COLLEGE OF ENGINEERING
New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

DEPARTMENT OF HRD

QUANTITATIVE APTITUDE MASTERCLASS:

ADVANCED TECHNIQUES FOR CAMPUS PLACEMENTS

FOREWORD

We are pleased to present to you this "Quantitative Aptitude Masterclass: Advanced Techniques for Campus Placements" workbook, designed to help students excel in quantitative aptitude and secure successful placements in today's competitive job market. As campus placements have become a crucial stepping stone into the professional world, employers increasingly value candidates with strong quantitative aptitude skills, which reflect their analytical thinking and problem-solving abilities.

This masterclass book covers a wide range of essential quantitative aptitude topics including percentages, simplifications, profit and loss, interest calculations, ratios, and more. The chapters are carefully structured, starting from the basics and gradually introducing advanced techniques to ensure a thorough understanding of each concept.

This book emphasizes the practical applications of quantitative aptitude in various industries, such as finance, business, and engineering, making the book relevant and engaging for students. By delving into real-world scenarios, candidates can appreciate how quantitative aptitude plays a crucial role in decision-making and problem-solving.

Throughout the book, students will find numerous examples, detailed solutions, and practice exercises to solidify their learning. The author encourages consistent practice, recognizing its significance in mastering aptitude problem-solving. This approach fosters not only proficiency in quantitative aptitude but also cultivates valuable critical thinking skills that extend beyond academics.

Moreover, the book highlights that quantitative aptitude is more than just memorizing formulae; it involves developing a strategic approach to problem-solving and honing mathematical intuition. Furthermore, the book motivates students to embrace challenges, persist in their learning journey, and witness remarkable progress in their aptitude-solving abilities. With its practical approach and insightful content, this book promises to be an invaluable resource for anyone seeking to enhance their quantitative aptitude skills and pave the way for a bright and fulfilling career.

This Workbook is the outcome of the sincere efforts by the HRD department.

Dr. Jayachandran. M
Aptitude Trainer
NHCE

Prof. Gurucharan Singh
Sr. Executive Director – Training & Placements
NHCE

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PART-1: QUANTITATIVE APTITUDE

MODULE 1

PERCENTAGES

This module covers the concept of percentages, a fundamental topic in quantitative aptitude. Understanding percentages is essential for solving various aptitude problems, as they frequently appear in areas like profit and loss, discounts, and interest calculations. Being proficient in percentages allows candidates to interpret data and make informed decisions based on the information presented in a percentage format.

PERCENTAGE EQUIVALENT OF FRACTIONS:

Group:1

$100\% = 1$	$14.2857\% = \frac{1}{7}$
$50\% = \frac{1}{2}$	$12.5\% = \frac{1}{8}$
$33.33\% = \frac{1}{3}$	$11.11\% = \frac{1}{9}$
$25\% = \frac{1}{4}$	$10\% = \frac{1}{10}$
$20\% = \frac{1}{5}$	$9.09\% = \frac{1}{11}$
$16.66\% = \frac{1}{6}$	$8.33\% = \frac{1}{12}$

Group:2 **(Cyclic Numbers – 142857)**

$14.2857\% = 14\frac{2}{7}\% = \frac{1}{7}$

$28.5714\% = 28\frac{4}{7}\% = \frac{2}{7}$

$42.8571\% = 42\frac{6}{7}\% = \frac{3}{7}$

$57.1428\% = 57\frac{1}{7}\% = \frac{4}{7}$

$71.4285\% = 71\frac{3}{7}\% = \frac{5}{7}$

$85.7142\% = 85\frac{5}{7}\% = \frac{6}{7}$

Group:3

$12.5\% = \frac{1}{8}$	$62.5\% = \frac{5}{8}$
$25\% = \frac{2}{8}$	$75\% = \frac{6}{8}$
$37.5\% = \frac{3}{8}$	$87.5\% = \frac{7}{8}$
$50\% = \frac{4}{8}$	

Group:4

$\mathbf{11.11\% = 11\frac{1}{9}\% = \frac{1}{9}}$ $\mathbf{55.55\% = 55\frac{5}{9}\% = \frac{5}{9}}$

$\mathbf{22.22\% = 22\frac{2}{9}\% = \frac{2}{9}}$ $\mathbf{66.66\% = 66\frac{6}{9}\% = \frac{6}{9}}$

$\mathbf{33.33\% = 33\frac{3}{9}\% = \frac{3}{9}}$ $\mathbf{77.77\% = 77\frac{7}{9}\% = \frac{7}{9}}$

$\mathbf{44.44\% = 44\frac{4}{9}\% = \frac{4}{9}}$ $\mathbf{88.88\% = 88\frac{8}{9}\% = \frac{8}{9}}$

Group:5

$\mathbf{9.09\% = 9\frac{1}{11}\% = \frac{1}{11}}$ $\mathbf{45.45\% = 45\frac{5}{11}\% = \frac{5}{11}}$

$\mathbf{18.18\% = 18\frac{2}{11}\% = \frac{2}{11}}$ $\mathbf{54.54\% = 54\frac{6}{11}\% = \frac{6}{11}}$

$\mathbf{27.27\% = 27\frac{3}{11}\% = \frac{3}{11}}$ $\mathbf{63.63\% = 63\frac{7}{11}\% = \frac{7}{11}}$

$\mathbf{36.36\% = 36\frac{4}{11}\% = \frac{4}{11}}$ $\mathbf{72.72\% = 72\frac{8}{11}\% = \frac{8}{11}}$

Ex-1: $57\frac{1}{7}\%$ of 5600= ?

$\frac{4}{7} \times 5600 = \frac{4}{1} \times 800$ = **3200**

Ex-2: 62.5% of 4800= ?

$\frac{5}{8} \times 4800 = \frac{5}{1} \times 600$ = **3000**

Ex-3: 63% of 1600= ?

$(50\% + 10\% + 3\%) \times 1600 = (800 + 160 + 48)$ = **1008**

Ex-4: 25% of 30% of 45%=?

$(\frac{1}{4} \times \frac{3}{10} \times \frac{9}{20}) = (\frac{27}{800})$=**0.03375**

Ex-5: 60% of ? = 360

$\frac{60}{100} \times ? = 360$

$\frac{60}{100} \times 600 = 360$

600

Ex-6: ?% of 900 = 720

$\mathbf{\frac{?}{100} \times 900 = 720}$

$\mathbf{\frac{80}{100} \times 900 = 720}$

80%

Ex-7: A's income is 60% of B's income. If B's income is Rs. 15,000, then what is A's income?

9000

Ex-8: If the milk to water ratio in a mixture is 2:3, then what is the percentage of milk in the mixture?

$2/5 \times 100 = 40\%$

Model-1: X% *of* Y = Y% *of* X

Ex-1: 73% of 142 – 42% of 73= ?

142% of 73 – 42% of 73

100% of 73

73

Model-2: Net % change / Effective % change = $a + b + \frac{ab}{100}$

Ex-1: The shopkeeper announced a discount of 20% and hence his sales went up by 20%. What is the net increase/decrease in the price?

Net % change = $-20 + 20 + \frac{-20 \times 20}{100}$

= -4% (4% decrease)

Ex-2: The price of a commodity increases first by 20% and then by 10%. What is the net increase in the price?

Net % change = $20 + 10 + \frac{20 \times 10}{100}$

= +32% (32% increase)

Ex-3: On decreasing the price of a fan by 30 percent, its sales increases by 40 percent. What will be the percentage decrease in its revenue?

Net % change = $-30 + 40 + \frac{-30 \times 40}{100}$

= -2% (2% decrease)

Ex-4: A retailer offers two successive discounts of 20% and 30%. What is the net decrease in the price?

Net % change = $-20 - 30 + \frac{-20\times-30}{100}$

= -44% (44% decrease)

Ex-5: The price of a commodity is first increased by 40% and then reduced by 20%. What is the net increase or decrease in the price?

Net % change = $40 - 20 + \frac{40\times-20}{100}$

= 12% (12% increase)

Ex-6: The revenue of a shop in the month of march was 40000. In month of April, the shopkeeper announced a discount of 20% and hence his sales went up by 20%. What will be the revenue in month of April?

%Change = $-20 + 20 + \frac{-20\times20}{100}$

-4% (decrease)

$R_{(April)}$ = 40,000 – 4% of 40,000

$R_{(April)}$ = 40,000 – 1600

38,400

Model-3: X is what % more/less than Y?

Ex-1: If A's salary is 25% more than B, then B is how much percentage less than A?

25% = $\frac{1}{4}$

We need to reduce the fraction by increasing the denominator by 1

$$\frac{\mathbf{1}}{(\mathbf{4+1})} = \frac{\mathbf{1}}{\mathbf{5}} = \mathbf{20\%}$$

Ex-2: The sales of company A is 40% less than company B, then sale of company B is how much percentage more than A?

40% = $\frac{4}{10}$

We need to increase the fraction by decreasing the denominator by 4

$$\frac{\mathbf{4}}{(\mathbf{10-4})} = \frac{\mathbf{4}}{\mathbf{6}} = \frac{\mathbf{2}}{\mathbf{3}} = \mathbf{66.66\%}$$

Ex-3: The price of petrol increases by 50%. By how much %, its consumption should be reduced so as to keep the expenditure same?

$\frac{1}{(2+1)} = \frac{1}{3}$ **= 33.33%**

Ex-4: If the price of petrol has increased from Rs. 40 per litre to Rs. 60 per litre, by how much percent a person has to decrease his consumption so that his expenditure remains same.

$\frac{1}{(2+1)} = \frac{1}{3}$ **= 33.33%**

Ex-5: Due to a 20% fall in the price of potato, one can buy 3kg of potato more by investing ₹240. What is the original price of potato per kg?

20% = $\frac{1}{5}$

25% = $\frac{1}{4}$

Difference between consumption (5 - 4) = 1 unit

⇒ 1 unit → 3 kg

⇒ 4 unit → (3 × 4) = 12 kg

Now, the original price of potato is $\frac{240}{12}$ = ₹20 /kg

Model-4: Percentage of Percentage [X% of Y% *of* K = ($\frac{xy}{100}$)% *of* K]

Ex-1: The price of a car is Rs. 5,00,000. It was insured to 90% of its price. The car get damaged completely in an accident and the insurance company paid only 80% of the insurance. What is the difference between the price of the car and the amount received?

Trick-1

Price of the car = 100%

Insurance received=80% of 90%=72%

Diff = 100% - 72% = 28%

100% = 5,00,000

28% = ?

1,40,000

Trick-2

80% of 90% of 5,00,000

72% of 5,00,000 = 3,60,000

Difference=<u>1,40,000</u>

<u>Trick-3</u>

90% of 5,00,000 = 4,50,000

80% of 4,50,000 = 3,60,000

Difference=<u>1,40,000</u>

Ex-2: In a college election between two students 10% of the votes cast are invalid. The winner gets 70% of the valid votes and defeats the loser by 1800 votes. how many votes were totally cast?

Total votes = 100%

Invalid votes = 10%

Valid votes = 100% - 10% = 90%

Winner = 70% of 90% = 63%

Looser = Valid votes - Winner = 90% - 63% = 27%

Majority = 63% - 27% = 36% = 1800

36% = 1800

100% = ?

<u>5000</u>

<u>Model-5</u> New value = X $\pm$ P% *of X*

Ex-1: Harish spent 40% in machinery, 25% in building, 15% in raw materials and 5% in furniture. If he has Rs. 1305 left. Then how much money did he had initially?

Initial Amount = 100%

Spent = 85%

Remaining = 15%

15% = 1305

100% = ?

<u>Rs. 8700</u>

Ex-2: Gaurav spends 40% of the amount he received from his father on hostel expenses, 20% on books and stationery and 50% of the remaining on transport. He saves Rs 450 which is half the remaining amount after spending on hostel expenses, books etc. and transport. How much money did he get from his father ?

Total Amount = 100%

HE & B&S = 40%+20% = 60%

Remaining Amount = 40%

Transport = 50% of 40% = 20%

Savings = $\frac{1}{2}$ of 20% = 10%

10% ➔ 450

100% ➔ ?

4500

Model-6: %change (%inc/dec) = $\frac{Final\ value\ -\ Initial\ Value}{Initial\ Value} \times 100$

Ex-1: A person spends 80% of his income. If his income is increased by 20% and his expenditure is increased by 10%, then his savings will increase by:

	Income	Expenditure	Savings
Before	100	80	20
After	120	88	32

$$\%change = \frac{32-20}{20} \times 100 = \frac{3}{5} \times 100$$

∴ His savings are increased by 60%

Ex-2: The profit made by a company in the present year is Rs.1500000. Two years ago the profit made by the same company was Rs. 24,00,000. what is the percentage change in the profit made by the company?

$\%change = \frac{F-I}{I} \times 100$

$\%change = \frac{15-24}{24} = \frac{-9}{24} = \frac{-3}{8}$

-37.5% (decrease)

Model-7: X is what % of Y? $\frac{x}{y} \times 100$

Ex-1: In an examination, Ramesh scored 30% less than Suresh and Mahesh scored 20% less than Suresh. Ramesh's score is what percent of Mahesh's score?

Assume Suresh score = 100%

R = 100% - 30% = 70%

M = 100% - 20% = 80%

$\frac{R}{M} \times 100 = \frac{70\%}{80\%} \times 100 = \frac{7}{8} \times 100$

87.5%

Practice Problems in Percentages

1) 33.33% of 16.66% 14.28% of 126=?

a) 26 b)16 c)1 d)6

2) 28% of 450 + 45% of 280=?

a) 242 b)252 c)262 d)272

3) 16.66% of x is y and y% of 30 is 21 then, what % of x is 42?

a) 5 b)10 c)15 d)20

4) If x% of y is 100 and y% of z is 200 then, find the relation between x & z.

a) Z=x b) Z=2x c) Z=3x d) Z=5x

5) Price of an article after reducing 20% is Rs. 240 then what is its initial value?

a) 240 b)400 c)340 d)300

6) After 25% increase, the price of an article is 250. What is its price if it is 25% decreased instead?

a) 250 b)200 c)175 d)150

7) In a village election, only two candidates contested and 80% of registered cast their votes. The winner got 900 votes more than his opponent. If loser had got 30% more votes, there would have been a tie between them. Find the number of registered voters in the village?

a) 3900 b)4875 c)3785 d)3875

8) If the numerator of a fraction is increased by 20% and denominator reduced by 10% and the resulting fraction is $\frac{16}{21}$. What is the original fraction?

a) 2/7 b)3/7 c)4/7 d)5/7

9) A housewife saved Rs. 2.50 in buying an item on sale. If she spent Rs. 25 for the item, approximately how much percent she saved in the transaction?

a)8% b)9% c)10% d)11%

10) Raman's salary was decreased by 50% and subsequently increased by 50%. How much percent does he loss?

a)25% b)35% c)67% d)89%

MODULE 2

SIMPLIFICATIONS

Simplifications involve solving complex mathematical expressions by applying various arithmetic operations. Mastering simplifications is crucial because it forms the foundation for solving more intricate problems and saves time during exams. By efficiently simplifying calculations, candidates can approach other aptitude problems with confidence and accuracy.

Model-1: Square / Cube Root

Ex-1: $\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12}}}}}}$ **= ?**

Hint: $\sqrt[2]{x} = (x)^{\frac{1}{2}}$ **&** $(2^6 = 64)$

$12^{\frac{63}{64}}$

Ex-2: $\sqrt{9\sqrt{9\sqrt{9\sqrt{9\ldots\infty}}}}$ **= ?**

Hint: $\sqrt{x\sqrt{x\sqrt{x\ldots\infty}}} = x$

9

Ex-3: $\sqrt{4600 + \sqrt{540 + \sqrt{1280 + \sqrt{250 + \sqrt{36}}}}}$ **= ?**

Sol: $\sqrt{36} = 6;\ \sqrt{256} = 16;\ \sqrt{1296} = 36;\ \sqrt{576} = 24;\ \sqrt{4624} = 68$

68

Ex-4: $\sqrt{72 + \sqrt{72 + \sqrt{72 + \sqrt{72 + \sqrt{72 + \cdots\infty}}}}}$ **= ?**

Hint: + means $H \times D$; - means $L \times D$

$\underset{L}{8} \times \underset{H}{9}$ and the difference between 8&9 is 1

9 × 1= <u>9</u>

<u>Model-2: Percentage Concept</u>

Ex-1: 35% of 580 + 70% of ? = 441

203 + 70% of ? = 441

70% of ? = 441 - 203

70% of ? = 238

<u>340</u>

Ex-2: 20% of 160 + 30% of 420 + 500 = ?

<u>Hint:</u> **(% × 100) = 100% = 1**

20% of 160 + 30% of 420 + 500

32 + 126 + 500

<u>658</u>

Ex-3: 63% of 5700 + 84% of 7600

<u>Hint:</u> **(% × 100) = 100% = 1 ; (a+b)(a-b) = a^2 - b^2**

63% of 5700 + 84% of 7600

(63 × 57) + (84 × 76)

3600 - 9 + 6400 – 16

10000 – 25 **= <u>9975</u>**

Ex-4: 20.75% of 9600 + 35% of 8200 = ?

<u>Hint:</u> **X% of Y = a×X% of Y/a ;**

Here, *First part* ×÷ *by* 4 *and the second part* ×÷ *by* 2

(83 × 24) + (7 × 41)

1992 + 287 = ***<u>2279</u>***

Ex-5: $(15)^2 - 180.01 + \sqrt{170} - 25\%\ of\ 249.89 =$?

a)-5 b)5 c)-10 d)10

Hint: ***approximate value***

$225 - 180 + 13 - (\frac{1}{4} \times 250)$

$238 - 180 - 62.5$

-4.5 ≅ -5

Ex-6: $45^2 + 21^2 = ?^2 + 257$

a)51 b)49 c)45 d)47

Hint: ***Digit Sum Method***

$45^2 + 21^2 = ?^2 + 257$

$9 + 9 = ?^2 + 5$

$9 = ?^2 + 5$

$?^2 = 4$

$? = 2$

To find appropriate answer from answer options whose sum is equal to 2.

Then, the answer becomes **47.**

Ex-7: 54% of 7865 + 17% of 532 – 39% of 4269

a)2071.35 b)2420.76 c)2672.63 d)2570.36

Hint: ***Digit Sum Method***

54% of 7865 + 17% of 532 – 39% of 4269

$9 \times 8 + 8 \times 1 - 3 \times 3$

$0 + 8 - 9$

8

To find appropriate answer from answer options whose sum is equal to 2.

Then, the answer becomes **2672.63**

Ex-8: 24% of 5760 + 76% of 3760 =?

Hint: $\mathbf{P_1\% + P_2\% = 100\%}$

24% of (3760+2000) + 76% of 3760

(24+ 76)% of 3760 + 24% of (2000)

100% of 3760 + 24% of (2000)

3760 + 480 = **4240**

Model-3: Fractions

Ex-1: $16\frac{2}{3}$% of 216 + $14\frac{2}{7}$% of 343 = ?

Hint: $16\frac{2}{3}\% = \frac{50}{3}\% = \frac{50}{300} = \frac{1}{6}$ & $14\frac{2}{7}\% = \frac{1}{7}\%$

$\frac{1}{6} \times 216 + \frac{1}{7} \times 343$

36 + 49 = **85**

Ex-2: $66\frac{2}{3}$% of 360 + $28\frac{4}{7}$% of 420 = ?

Hint: $66\frac{2}{3}\% = \frac{200}{3}\% = \frac{200}{300} = \frac{2}{3}$ & $28\frac{4}{7}\% = \frac{2}{7}$

$\frac{2}{3} \times 360 + \frac{2}{7} \times 420$

240 + 120 = **360**

Ex-3: $214\frac{2}{7}$% of 14 = ?

Method-1

200% + $14\frac{2}{7}$% of 14

$2 + \frac{1}{7}$ of 14

$\frac{15}{7} \times 14 =$ **30**

Method-2

200% of 14 = 28

$\frac{1}{7}$ of 14 = 2

28+2=**30**

Ex-4: $166\frac{2}{3}$% of 720 + $157\frac{1}{7}$% of 630 = ?

Hint: **Split the fraction**

$\left(100 + 66\frac{2}{3}\right)\% \times 720 + \left(100 + 57\frac{1}{7}\right)\% \times 630$

$\left(1 + \frac{2}{3}\right) \times 720 + \left(1 + \frac{4}{7}\right) \times 630$

$$\left(\frac{5}{3}\right) \times 720 \quad + \quad \left(\frac{11}{7}\right) \times 630$$

$$1200 \quad + \quad 990$$

$$\underline{2190}$$

Practice Problems in Simplifications

1) $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}} = ?$

a) $7^{\frac{32}{31}}$ b) $7^{\frac{64}{63}}$ c) $7^{\frac{31}{32}}$ d) $7^{\frac{63}{64}}$

2) $\sqrt{90-\sqrt{90-\sqrt{90-\sqrt{90-\sqrt{90-\cdots\infty}}}}} = ?$

a) 8 b) 9 c) 10 d) 9 or 10

3) 40% of 650 + 80% of 720 - 600 = ?

a) 362 b) 236 c) 248 d) 368

4) 12.25% of 4800 + 13.5% of 5200 = ?

a) 1590 b) 1490 c) 1390 d) 1290

5) 32.25% of 1600 + 18.2% of 3000 = $?^2$ + 38

a) 32 b) 38 c) 42 d) 48

6) $(15)^2 - 179.89 + \sqrt{169.01} - 25\% \; of \; 250.01 = ?$

a)-5 b)5 c)-10 d)10

7) 1.4% of 650 + 3.2% of 580

a) 27.66 b) 25.66 c) 29.66 d) 31.18

8) 33% of 4520 + 67% of 3210 =?

a) 3693.3 b) 3963.3 c) 3452.2 d) 3642.3

9) 37.5% **of 488 +** $6\frac{2}{3}\%$ **of 450 = ?**

a) 213 b) 241 c) 254 d) 265

10) $22\frac{2}{9}\%$ **of 729 +** $63\frac{7}{11}\%$ **of 121 +** $85\frac{5}{7}\%$ **of 35 = ?**

a) 269 b) 296 c) 295 d) 289

MODULE 3

AVERAGES

The concept of averages deals with finding the central value of a given set of numbers. Understanding averages is significant as it helps in interpreting and summarizing data, making predictions, and solving problems related to average age, average score, etc. This skill proves useful in various real-life scenarios, and employers often assess candidates' proficiency in averages during campus placements.

Model-1: Consecutive Numbers

- **The average of any number series or group is always between its smallest and the largest value.**

Ex-1: A,B,C,D are four consecutive odd numbers and their average is 42. Find

a) **The smallest number.**

b) **The largest number**

c) **The product of B & D**

Sol:

A	B		C	D
39	41	***42***	43	45

a) **39**

b) **45**

c) **1845**

Ex-2: The average of 54 consecutive even numbers is 93. Find the smallest number, largest number.

No of gaps is 53

Smallest number = 93-53 = **40**

Largest number = 93+53 = **146**

Model-2: Non-Consecutive Numbers

Ex-1: The average of 57, 49, 53, Y, 62 is 56, then find Y.

57 49 53 Y 62

Compare these numbers with 56,

+1 -7 -3 Y-56 +6

Add all the values,

Y=56+3

Y=59

Model-3: Basic Concept

- **Avg** = $\frac{Sum\ of\ observation}{Total\ no.\ of\ observations}$

Ex-1: The average age of A, B, and C is 26 years. If the average age of A & C is 29 years, what is the age of B in years?

$\frac{A+B+C}{3} = 26 \Rightarrow A+B+C = 78 \ldots\ldots(1)$

$\frac{A+C}{2} = 29 \quad \Rightarrow A+C = 58 \ldots\ldots(2)$

B = 20

Ex-2: The average age of 7 numbers is 5. If the average of first six these is 4, what is the seventh number?

$\mathbf{Total_{(7\ numbers)} = 7 \times 5 = 35}$

$\mathbf{Total_{(6\ numbers)} = 6 \times 4 = 24}$

***Seventh Number* = 11**

Ex-3: Average of 11 observations is 50. If average of first 5 observations is 47 and that of last 5 observations is 52 then find the 6th number.

$Sum_{(11)} = 11 \times 50 = 550$

$Sum_{(first\ 5)} = 5 \times 47 = 235$

$Sum_{(last\ 5)} = 5 \times 52 = 260$

$\boldsymbol{Weight\ of\ 6^{th} = 550 - (235 + 260)}$**=55**

Ex-4: The average age of 10 numbers is 7. what will be new average if each of the number is multiplied by 8?

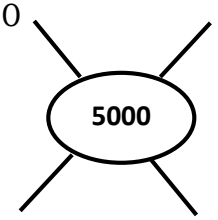
$8 \times 7 =$**56**

Model-4: Allegation Method:

Ex-1: The average salary of all the staff in an office of a corporate house is Rs.5,000. The average salary of the officers is Rs.14,000 and that of the rest is Rs.4,000. If the total number of staffs is 500, the number of officers is,

Officer Rest staff

14000 4000



1000 9000

1 : 9

10 ➔ 500

1 ➔ ?

50

Model-5: True / False Concept

- **Avg** = $\frac{Sum\ of\ observation}{No.\ of\ observations}$

Ex-1: The mean of marks scored by 100 students was found to be 40, later on, it was discovered that a score of 53 was misread as 83. find the correct mean.

Total score = 100 × 40 = 4000

Actual total scores = 4000-83 + 53 = 3970

$Actual\ mean = \frac{3970}{100}$ **= 39.7**

Model-6: Including/Excluding Concept

- **Avg ± Change × New count = New person**

  (Inc/Dec) (incl/excl) (weight/mark)

Ex-1: The mean weight of a class of 35 students is 45 kg. If the weight of the teacher be included, the mean weight increases by 500g. Find the weight of the teacher.

45 + 0.5 × 36 =?

63 kg

Ex-2: Average weight of a group of 9 students is 43 kg. When a new student joins the group, the average weight of the group becomes 45 kg. What is the weight (in kg) of the new student?

$43 + 2 \times 10 = ?$

63

Ex-3: Average marks of group of 19 students is 76. When marks of one student is excluded then average is increased by 2. Calculate the marks of the student.

$76 - 2 \times 18 = ?$

40

Ex-4: Average weight of m boys is 43 kg if weight of their teacher who weighs 63 kg is also included then average becomes 45 kg. Find the value of m.

$\mathbf{43 + 2 \times (m + 1) = 63}$

$\boldsymbol{m = 9}$

Ex-5: The batting average of Sachin in 15 innings is 55. The difference between the runs of his best and worst innings is 65. Excluding the best and the worst innings the average of 13 innings played by Sachin is 50. Calculate Sachin's best score.

Hint: Avg $= \frac{Sum\ of\ obs}{Total\ no.\ of\ obs}$

$Total\ score\ of\ Sachin\ in\ 15\ innings = 15 \times 55 = 825$

$Total\ score\ of\ Sachin\ in\ 13\ innings = 13 \times 50 = 650$

$B + W = 175 \ldots (1)$

$B - W = 65 \ldots (2)$

$\boldsymbol{B = 120}$

Model-7: Replacement Concept

Ex-1: The average weight of 10 members in a family decreases by 2.5 kg when a new member comes in place of one of them weighing 70kg. Find the weight of new member.

$70 - 2.5 \times 10$

45

Ex-2: The Average age of 8 men is increased by 2 years, when two of them whose ages 21 and 23 years replaced by two new men. The average age of the two new men is:

$\frac{1}{2}(44 + 2 \times 8)$

30

Model-8: Average Speed Concept

- $\boldsymbol{Avg\ Speed\ = \frac{Total\ distance\ covered}{Total\ time\ taken}}$

Ex-1: A person covers 9km at a speed of 3km/hr, 25km at a speed of 5km/hr, 30km at a speed of 10km/hr. Find the average speed of entire journey.

$$Avg\ speed = \frac{9 + 25 + 30}{\frac{9}{3} + \frac{25}{5} + \frac{30}{10}} = \frac{64}{3 + 5 + 3}$$

$\boldsymbol{\frac{64}{11}\ or\ 5\frac{9}{11}\ or\ 5.82\ km/hr}$

Ex-2: A man goes to certain place at a speed of 30km/hr and return to original place at a speed of 20km/hr. Find out the average speed during the entire journey.

Hint: Avg Speed = $\frac{2XY}{X+Y}$ km/hr

$\frac{2 \times 30 \times 20}{30 + 20}$

24 km/hr

Practice Problems in Averages

1. The average of 6 consecutive numbers is 36.5. Find the smallest number.

2. The average of 10 consecutive even numbers is 105. Find the second largest number.

3. The average of 6 consecutive even numbers is 29. Find the average of next 7 consecutive even numbers.

4. The mean of 5 numbers is 28. If one of the numbers is excluded, the mean gets reduced by 2. Find the excluded number.

5. The average age of 24 boys and the teacher is 15 years. When the teacher's age is excluded, the average decreases by 1. What is the age of the teacher?

6. The average weight of 8 members in a family increases by 2.5 kg when a new member comes in place of one of them weighting 40kg. Find the weight if new member.

7. Average of 25 observations is 18. If average of first 13 observations is 16 and that of last 11 observations is 20 then find the 14^{th} number.

8. In a class of 45 students, the average age of the first 10 students is 15 years and that of the next 15 students is 18 years, and that of the remaining students is 19.5 years. Hence, the overall average age is.

9. A person's salary is always 6/5 times his previous month salary. His average salary for 4 months was Rs. 1342. What was his first month's salary (in Rs)?

10. The average age of a group of 5 friends is 33. If Rani is replaced by Raju, the average age of the group becomes 31.8. What is the age difference between Raju and Rani?

MODULE-4

RATIO & PROPORTION

Ratios and proportions are essential tools in comparing quantities and establishing relationships between them. This chapter equips candidates with the ability to solve problems involving mixing different ingredients, finding the right mixture, and understanding proportions in business and trade scenarios. Proficiency in this topic demonstrates the candidate's ability to make accurate calculations and assess proportions effectively, which is valuable in various professional fields.

Model-1: Basic Concept

Ex-1: 30% of A = 50% of B. Find A:B.

3A = 5B

$\frac{A}{B} = \frac{5}{3}$

A : B = 5 : 3

Ex-2: 6% of A = 12% of B = 20% of C. Find A:B:C.

3A = 6B = 10C

$\frac{3A}{30} = \frac{6B}{30} = \frac{10C}{30}$

$\frac{A}{10} = \frac{B}{5} = \frac{C}{3}$

A : B : C = 10 : 5 : 3

Ex-3: If P : Q = 8 : 15 and Q : R = 3 : 2, then find P:Q:R.

P : Q = 8 : 15

Q : R = 3 : 2

P : Q : R = 24:45:30

Ex-4: If P:Q = 2:3, Q:R = 4:5, and R:S = 2:3 then find P:Q:R:S.

P : Q = 2 : 3

Q : R = 4 : 5

P : Q : R = 8 : 12 : 15

R : S = 2 : 3

P:Q:R:S = 16:24:30:45

Ex-5: u : v = 4 : 7 and v : w = 9 : 7. If u = 72, then what is the value of w?

u : v = 4 : 7

v : w = 9 : 7

---

u : v : w = 36 : 63 : 49

36➔72

49➔?

w=98

Ex-6: If P:Q = 8:15 and Q:R = 5:8, and R:S = 4:5, then find P : S.

Using balancing technique, we can solve this problem as follows,

P : Q = 8 : 15

(×3) Q : R = 15 : 24

(×6) R : S = 24 : 30

P : S = 8 : 30

Model-2: Combined Ratio

Ex-1: The ratio of two numbers is 14:25. If the difference between them is 264, then which is the smaller of the two numbers?

11→ 264

14→ X

X = 336

Ex-2: A, B, C and D receive wages in the ratio of 3 : 5 : 8 : 12. If the difference between the wages of A and B is Rs. 200, then what is the difference between the wages of C and D?.

2→ 200

4→ X

X = 400

Ex-3: Of the three numbers, the ratio of 1st and 2nd is 8:9 and that of 2nd and 3rd is 3:4. If the product of the 1st and 3rd number is 2400, then the 2nd number is,

$1^{st} : 2^{nd} = 8x : 9x$

$2^{nd} : 3^{rd} = 9x : 12x$ (×3)

$1^{st} \times 3^{rd} = 8x \times 12x = 96x^2$

$96x^2 = 2400$

9x= ?

9X = 45

Model-3: Distribution of Amount

Ex-1: A profit of Rs. 8000 is to be distributed among A, B, and C in the ratio 5:2:3 respectively. What is the difference between the shares of A and B.

A : B : C

5 : 2 : 3 →10

10→ 8000

3→ X

X = 2400

Ex-2: A sum of money is divided among A, B, C, & D in the ratio 3:5:8:9. If the share of D is Rs. 1872 more than the share of A. Then what is the total amount of money of B and C.

A : B : C : D

3 : 5 : 8 : 9

D-A = 1872

B+C = ?

6→ 1872

13→ X

X = 4056

Model-4: Percentage Change

Ex-1: Seats for electronics, mechanical, and civil in a college are in the ratio 5:7:8. There is a proposal to increase these seats by 40%, 50%, and 75% respectively. What will be the ratio of increased seats?

E : M : C

50 : 70 : 80

20 : 35 : 60 (%inc)

---

70 : 105 : 140

2 : 3 : 4

Ex-2: If A is 25% less than B, then what will be the value of (2B - A)/A ?

A : B = 3 : 4

$\therefore \frac{2B-A}{A} = \frac{(8-3)}{3} = \frac{5}{3}$

Model-5: Including/Excluding concept

Ex-1 The total number of students in the school was 660. The ratio between boys and girls was 13:9. After some days, 30 girls joined the school and some boys left the school and the new ratio between boys and girls become 6:5. The number of boys who left the school is,

Boys : Girls = 13 : 9

Boys = $\frac{13}{22} \times 660 = 390$

Girls = 660 – 390 = 270

After some days,

Boys : Girls = 390-x : 300 = 6 : 5

$$\frac{390-x}{300} = \frac{6}{5}$$

x=30

Model-6: Mixture and Alligation

Ex-1: A mixture contains milk and water in a ratio of 9:11, when 6 liters of milk and 6 liters of water are added to the mixture the ratio becomes 11:13. Find the initial quantity of milk.

Milk : Water

9 : 11

11 : 13 (6lM, 6lW added)

Change in Milk value = (11-9) = 2

2➔ 6 liters

9➔ ? liters

27 liters

Model-7: Income & Expenditure

Ex-1: The ratio of incomes of A and B is 5 : 7 and the ratio of their savings is 2 : 3. If A and B spend ₹35,400 and ₹48,600, respectively, then what is the difference (in₹) between the incomes of B and A?

	A	:	B
I/C	5	:	7
Sav	2	:	3

Exp 35400 : 48600

Take difference between cross multiplication of income and savings, and compare with difference between cross multiplication of in saving and expenditure.

1 ➔ 9000

2 ➔ ?

18000

Ex-2: The ratio of monthly incomes of Ram and Shyam is 9:8 and then monthly expenditures are in the ratio of 7:6. If each of them saves Rs. 8000 per month, find the sum of their monthly incomes.

R : S

I/C 9 : 8

Exp 7 : 6

Sav 2 : 2

Here, the vertical ratios are same and horizontal ratios are same. Hence subtract the income and expenditure ratio. (special case)

2 ➔ 8000

17 ➔ ?

68000

Model-8: Partnership

Ex-1: A starts some business with ₹ 50000. After 3 months B joins him with ₹ 70000. At the end of the year, in what ratio should they share the profit?

A : B

50000×12 : 70000×9

20 : 21

Ex-2 A, B, and C together start a business. Three times the investment of A equal four times the investment of B and the capital of B is twice that of C. The ratio of shares of each in the profit.

A : B = 4 : 3

B : C = 2 : 1

A : B : C = 8 : 6 : 3

Ex-3: Sachin and Sehwag together have ₹950. By taking ₹ 250 from Sehwag, Sachin will have the same amount as Sehwag already had. Find the ratio of the sums that Sehwag and Sachin had initially.

Sachin (X) Sehwag

X+250 = 950-X

Sachin had initially, X = 350

Sehwag had initially is = 600

350:600 = 7:12

12:7

Model-9: Ages

Ex-1: The ages of A & B are in the ratio of 7:4 after 5 years the ratio of their ages becomes 11:7. what is the age of A?

A:B = 7:4 ; After 5 years, A:B = 11:7 ; A=?

28

Ex-2: The ratio of ages of Omni and Pappu is 4:5. After 5 years, their ages will be in ratio 21:25. Find the difference between their ages (in years).

Omni : Pappu

4 : 5 (ages)

21 : 25 (after 5yrs)

Difference = 4

16 : 20 (ages ×4)

Difference of ages = 20-16 = 4

Model-10: Train Fare

Ex-1: The ratio of first-class fare to second class fare is 3:1. No. of tickets booked of first class to second class is in ratio 2:3. Total fare collected was Rs. 1800. Find fare collected from the passengers of second class.

	I-class	:	II-class
Price	3	:	1
Sale	2	:	3
	6	:	3

$\frac{3}{9} \times 1800 = 600$

9→ 1800

3→ ?

600

Model-11: Coins

Ex-1: A bag contains a certain number of coins Rs.1, 50 paise, and 25 paise in a ratio of 7:8:4. If there is Rs. 360 in the bag then calculate a number of coins of 25 paise.

	No. of coins	Total Value
Rs. 1 =	7	7
50 Ps =	8	4 (1/2)
25 Ps =	4	1 (1/4)

		12

12 → 360

4 → ?

120

Ex-2: A bag has ₹ 785 in the denomination of ₹ 2, ₹ 5 and ₹ 10 coins. The coins are in the ratio of 6 : 9 : 10. How many coins of ₹ 5 are in the bag?.

	No. of coins	Total Value
Rs. 2 =	6	12
Rs. 5 =	9	45
Rs. 10 =	10	100

		157

157➔785

9➔ ?

45

Ex-3: A man has 25 paise, 50 paise and 1 Rupee coins. There are 220 coins in all and the total amount is 160. If there are thrice as many 1 Rupee coins as there are 25 paise coins, then what is the number of 50 paise coins?

a) 60 b) 120 c) 40 d) 80

Sol:

3x+?+x=220

From the answer options, x should be less than 60 so that the equation is balanced. Let us take x=40.

Then, 120+?+40=220

?=60

Model-12: Diamond

Ex-1: The price of a piece of diamond varies according to the square of its weight. When he breaks the diamond into four pieces of different weights in the ratio 2:3:4:5, he incurs a loss of Rs. 28400. Calculate the price of an original piece of diamond.

Weight 2 : 3 : 4 : 5 ➔ 14 (i.e, sum)

Price($=w^2$) 4 : 9 : 16 : 25 ➔ 196 (i.e, 14^2)

The sum of price = 4+9+16+25 = 54

Loss = 196-54 = 142

142 ➔ 28400

196 ➔ ?

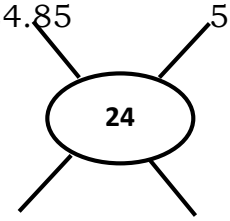
39200

Model-13: Averages

Ex-1: The cricketer whose bowling average is 24.85 runs/wicket, takes 5 wickets for 52 runs and thereby decreases his average by 0.85. The number of wickets taken by him till the last match was,

Before After

24.85 52/5=10.4



13.6 0.85

Before : After = 272 : 17

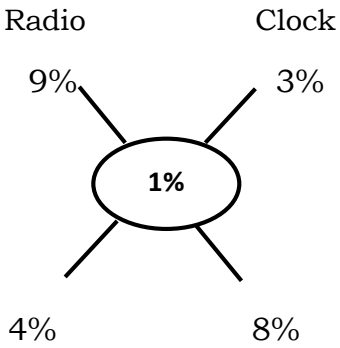
17 ➔ 5

289 ➔ ?

85

Model-14: Profit/Loss

Ex-1: A man purchased one radio and one clock is Rs.2160. He sold the radio at 9% profit and clock on 3% loss. In overall business he earn profit of 1% then calculate CP of the clock.



Radio : Clock = 4% : 8%

Radio : Clock = 1 : 2

$\frac{2}{3} \times 2160 = 1440$

Model-15: Simple/Compound Interest

Ex-1: A man borrowed a sum of Rs. 30000 a part of it on SI @12% pa and remaining on SI @10% pa respectively. If at the end of 2 years, he paid in all Rs. 36480 to settle the loan amount. What was the amount borrowed at 12% pa?

SI of 2 years =36480-30000 = 6480

SI of 1 year = 3240

Sum = 30000

A(12%) = 3600

B(10%) = 3000

SI = 3240

A:B =240 : 360

A:B = 2 : 3

$\frac{2}{5} \times (30000) = 12000$

Practice Problems in Ratio & Proportion

1. $\frac{3}{4}$of A = 0.5 of B = 40% of C. Find A:B:C

2. If A:B = $\frac{1}{3}$: $\frac{2}{5}$ and B:C = $\frac{2}{3}$:$\frac{3}{7}$. Find A:B:C

3. The ratio of three numbers is 3:4:5 and the sum of their squares is 1250. The sum of the numbers is,

a)30 b)50 c)60 d)90

4. A sum of money is distributed among A, B, C, D in the proportion of 5:2:4:3. If C gets Rs. 1000 more than D, what is B's share in rupees?

a)500 b)1500 c)2000 d)2400

5. Rahul spends 60% of his monthly salary on rent, EMI, and miscellaneous expenses in the ratio of 2:1:3. If he spends a total of Rs. 16050 on rent and EMI together. How much is his monthly salary?

a)30000 b)45000 c)53500 d)62300

6. The ratio of number of boys and girls in a college is 7:8. If the percentage increase in the number of boys and girls be 20% and 10% respectively. What will be the new ratio?

a)8:9 b)17:18 c)21:22 d)2:1

7. A box contains 280 coins of Rs.1, 50 paise, and 25 paise. The value of each kind of coin are in the ratio of 8:4:3. Then calculate number of coins of 50 paise.

a)80 b)60 c)10 d)50

8. The bowling average of cricketer was 12.4 runs. He improves his bowling average by 0.2 runs when he takes 5 wickets for 26 runs in his last match. The number of wickets taken by him before the last match was,

a) 35 b) 175 c) 150 d) 70

9. Arun and Badri together have Rs. 1210. If 4/15 of Arun's amount is equal to 2/5 of Badri's amount, how much amount does Badri have?

a) Rs. 460 b) Rs. 484 c) 550 d) 664

10. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

a) 2:5 b) 3:5 c) 4:5 d) 6:7

MODULE-5

PROFIT & LOSS

This module revolves around understanding the principles of profit and loss, which are crucial in business and financial settings. Candidates who can grasp these concepts can analyze business transactions, calculate profit or loss percentages, and negotiate effectively during placements or in business scenarios. Employers seek candidates who possess sound knowledge of profit and loss to ensure their ability to handle financial aspects of the job.

Basic Formulas

Profit (Gain) = SP – CP

%Profit = $\frac{Profit}{CP} \times 100$

Loss = CP – SP

%Loss = $\frac{Loss}{CP} \times 100$

Discount = MP – SP

%Discount = $\frac{Discount}{MP} \times 100$

$\frac{MP}{CP} = \frac{100+P\%}{100-D\%}$

Let's assume the cost price is Rs. 100 and the selling price is Rs. 110. Using the profit formula, we can calculate the profit, which is Rs. 10. Therefore, the profit percentage is 10%. The values are illustrated as follows:

+10%
CP ----------> SP
100 10 110

Similarly, the loss percentage is illustrated as follows:

-10%
CP ----------> SP
100 10 90

Note: Profit and Loss is always calculated on C.P (Cost Price) CP=100 %

Let's assume the cost price is Rs. 800, the marked price is Rs. 1000, and the selling price is Rs. 900. Using the profit formula, we can calculate the profit, which is Rs. 100. Therefore, the profit percentage is 12.5%. Similarly, the

discount and discount percentage are Rs. 100 and 10% respectively. The values are illustrated as follows:

CP ----------> MP ----------> SP
800 1000 900
----------->
Discount(-10%)
---------->
Profit (12.5%)

Example:

Find the marked price, selling price, and discount values for a 15% discount.

%D = 15% = $\frac{3}{20} = \frac{Discount}{MP}$

CP ----------> MP ----------> SP
20 17
----------->
3

Ans: MP=20; Discount=3; & SP=17

Model-1: Profit Percentage

Ex-1: A person buys a watch for Rs. 200 and sells it for Rs. 225. Find his gain percent?

X%
CP ----------> SP
200 25 225

P% = $\frac{25}{200} = \frac{1}{8} = 12.5\%$

Ex-2: If the cost price is 25% of selling price, then what is the profit percentage?

X%

CP ----------> SP

25 75 100

%P = $\frac{75}{25}$ = 300%

Ex-3: By selling a cell phone for Rs.2400, a shopkeeper make a profit of 25%. Then his profit percentage, if he had sold it for 2040 is,

100% 25% 125% X%
CP----------> SP
2400 2040

125 % → 2400

X % → 2040

X% = 106.25%

P% = 6.25%

Ex-4: A shopkeeper observed that after selling 33 articles he earns a profit of SP of 11 articles. Calculate his profit percent.

Profit = SP – CP

SP – Profit = CP

$(33 \times SP) - (11 \times SP) = 33 \times CP$

$\frac{SP}{CP} = \frac{3}{2}$

CP ----------> SP
2 Profit 3
Profit=1

P% = $\frac{1}{2}$ = 50%

Ex-5: Samanth bought a microwave oven and paid 10% less than the original price. He sold it with 30% profit on the price he had paid. What percentage of profit did samanth earn on the original price?

X + Y + $\frac{XY}{100}$

-10 + 30 + $\frac{(-10)(30)}{100}$

17%

Model-2: Loss Percentage

Ex-1: A person buys a book for Rs.500 and sells it for Rs.300. What will be his loss percent?

X%
CP ----------> SP
500 200 300

Loss% = $\frac{200}{500}$ = 40%

Ex-2: A fair price shopkeeper takes 10% profit on his goods. He lost 20% goods during theft. His loss percent is:

X + Y + $\frac{XY}{100}$

10 + (-20) + $\frac{(10)(-20)}{100}$

-12%

Ex-3: Rahim incurs loss SP of 6 hens after selling 144 hens. Calculate his loss %.

CP ----------> SP
150 Loss 144
Loss=6

L% = $\frac{6}{150} = \frac{1}{25}$ = 4%

Model-3: Profit/Loss Percentage

Ex-1: A gold ring is sold for Rs. 16000 at a loss of 20%. Find the cost price of gold ring.

100% -20% 80%
CP ----------> SP
X 16000
100 % → X

80 % → 16000

X = 20,000

Ex-2: The owner of the cellphone charges his customer 28% more than the cost price. If the customer paid Rs.8960 for the cellphone, what was the cost price of the cellphone?

100% 28% 128%
CP ----------> SP
X 8960
100 % → X

128 % → 8960

X = 7000

Ex-3: By selling an article for Rs.720, a man loses 10%. At what price should he sell it to gain 5%?

100% -10% 90% 105%

CP ----------> SP

5% 720 X

90 % → 720

105% → X

X = 840

Ex-4: If cost price of 350 articles is equal to the selling price of 300 articles then calculate profit/loss percent in this kind of business.

350×CP = 300×SP

$\frac{CP}{SP} = \frac{300}{350} = \frac{6}{7}$

CP ----------> SP

6 1 7

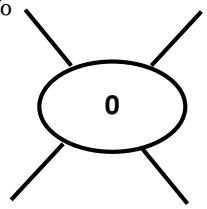
%Profit = $\frac{1}{6} = 16.66\%$

Model-4: Overall Profit / Loss

Ex-1: A man purchased one TV and one A.C. in Rs.51000. He sold the TV at 10% profit and A.C. on 7% loss. Calculate CP of TV if in overall business neither he gets profit nor loss.

TV AC

10% 7%



7% 10%

TV : AC = 7% : 10%

$\frac{7}{17} \times 51000 = ?$

21000

Ex-2: A shopkeeper sells one transistor for Rs.840 at a gain of 20% and another for Rs.960 at a loss of 4%. His total gain/loss percent is:

SP_1 120% → 840

CP_1 100% → 700

SP_2 96% → 960

CP_2 100% → 1000

CP = 1700

SP = 1800

P%
CP ----------> SP
1700 100 1800
Profit = 100

%Profit = $\frac{100}{1700} \times 100 = 5\frac{15}{17}\%$

Ex-3: Peter started a retail business by investing Rs. 25000. After eight months Sam joined him with a capital of Rs. 30,000. After 2 years they earned a profit of Rs. 18000. What was the share of Peter in the profit?

P:S = (25000 × 24) : (30000 × 16)

P:S = 5 : 4

∴ Peter's share = $\frac{5}{9}$ × 18000 = <u>Rs. 10,000</u>

<u>Model-5: Discounts</u>

Ex-1: A book is marked 80% above cost price and sold at 40% discount, if difference between discount given and profit earned is Rs.460.8, then find M.R.P of book.

+80% -40%
CP ----------> MP ----------> SP
100% 180% 108%
----------> Discount (72%)
----------> Profit (8%)

64 % → 460.8

180 % → ?

<u>1296</u>

Ex-2: A shopkeeper fixes the MP of an item 35% above its CP. The percentage of discount allowed to gain 8% is,

Let us assume CP is 100,

+35%
CP ---------> MP ----------> SP
100 135 108
----------->
Discount
---------->
Profit (8%)

Discount = 135-108 = 27

%Discount = $\frac{27}{135} \times 100 = \frac{1}{5}$

20%

Ex-3: The cost price of an article was 800 and it is sold at a discount of 10% and at a profit of 12.5%. What is the marked price?

CP ----------> MP ----------> SP
800
---------->
Discount(-10%)
---------->
Profit (12.5%)

SP = 800 + (12.5% of CP) =800+100 = 900

MP-(10% of MP) = 900

Then, **MP = 1000**

Ex-4: Two successive discounts of 40% and 20%, respectively, on the marked price of an article are equal to single discount of Rs 988. The marked price (in Rs) of the article is:

CP ----------> MP ----------> SP
?
40% 20%
---------->
Discount=988

$\%D = -40 - 20 + \frac{40 \times 20}{100} = -52\%$

52% = 988

100% =?

Marked price of an article is Rs.1900.

Ex-5: A shopkeeper earns a profit of 25 percent on selling a radio at 15 percent discount on the Printed price. Finds the ratio of the Printed price and the cost price of the radio.

$$\frac{MP}{CP}=\frac{100+25\%}{100-15\%}=\frac{125}{85}=\frac{25}{17}$$

MP:CP = 25:17

Ex-6: A merchant gain 20% after giving a discount of 10%. If shopkeeper would not allow any kind of discount then what will be his profit%.

(+20%)
CP ----------> MP ---------> SP
100 (-10%)
----------> Discount
----------> Profit% =?

$$\frac{MP}{CP}=\frac{100+P\%}{100-D\%}=\frac{120}{90}=\frac{4}{3}$$

$$\frac{SP}{CP}=\frac{4}{3}$$

Profit = 1

P% = $\frac{1}{3}$ = <u>33.33%</u>

Ex-7: A shopkeeper marked up the price of an article by 40%. He gained a profit of Rs.304 on selling the article, if he gave a discount of 15%. Find the selling price of an article.

40% -15%
CP --------> MP ---------> SP
100 140 119
----------> Discount
----------> Profit=19

19 % → 304

119 % → ?

<u>1904</u>

Ex-8: The difference between a discount of 35% and two successive discounts of 20% on a certain bill was Rs.22. Find the amount of the bill.

$X + Y + \frac{XY}{100}$

$20 + (20) + \frac{(20)(20)}{100}$

Net discount=36%

Diff = 36-35 = 1%

1 % → 22

100 % → ?

2200

Model-6: Dishonest Shopkeeper

Ex-1: A dishonest shopkeeper professes to sell pulses at the cost price, but he uses a false weight of 960 gm for a kg, Find his gain.

SP = 1000

CP = 960 (False weight)

Gain = 40

G% $= \frac{40}{960} \times 100 = \frac{1}{24}\% = 4\frac{1}{6}\%$

Ex-2: A shopkeeper sells products at 10% loss on cost price but uses 2gm instead 4gm. What is his total profit percentage?

SP = 900

CP = 500

Profit = 400

Profit% $= \frac{400}{500} \times 100 = 80\ \%$

Ex-3: A dishonest merchant sells goods at a 12.5% loss on the cost price, but uses 28g weight instead of 36g. What is his percentage profit or loss?

CP:SP = 8 : 7

CP:SP = 28:36 = 7 : 9

CP:SP = 56: 72 = 8:9

Profit% $= \frac{1}{8} \times 100 =$ **12.5 %**

Ex-4: A dishonest shopkeeper sells sugar at Rs. 20 per kg which he bought at Rs. 15 per kg. Also, he gives 850 gm instead of 1000 gm. His actual profit or loss percentage is:

CP:SP = 15 : 20

CP:SP = 850*15 : 20*1000 = 7 : 9

CP:SP = 51: 80

Profit% = $\frac{29}{51} \times 100$ = <u>56.86 %</u>

Ex-5: Mahesh marks up his goods by 40% and gives a discount of 10%. Apart from this, he uses a faulty balance also, which reads 1000gm for 800gm. What is his net profit percentage?

+40% -10%

CP ----------> MP ----------> SP

1000 1400 1260

SP = 1260

CP = 800

Profit = 460

Profit% = $\frac{460}{800} \times 100$ = <u>57.5 %</u>

Ex-6: A merchant gained 14 (2/7)% due to use of faulty weight. If the customer purchased 2kg item then how much he actually got?

$\%P = 14\frac{2}{7} = \frac{1}{7} = \frac{P}{CP}$

Profit = 1

CP = 7

SP = 7+1=8

8 → $2000gm$

7 → $?\,gm$

<u>1750 gm</u>

<u>Model-7: More/less loss</u>

Ex-1: The profit earned by selling an article for Rs.730 is double the loss incurred when the same article is sold for Rs.250. At what price should article be sold to make 20% profit?

Profit = 1

Loss = 2

S.P = ?

Profit% = 20%

(1+2) 3 → 480 (diff b/w S.P)

1 → 160

(C.P) 100% → 410 (250+160)

120% → ?

492

Ex-2: The profit earned by selling an article for Rs.1271 is 11.11% more than the loss incurred by selling the article for Rs.891. At what price should article be sold to earn 20% profit?

11.11% = 1/9

L=9

P=10

(9+10) 19 → 380 (diff b/w S.P)

9 → 180

(C.P) 100% → 1071 (891+180)

120% → ?

1285.2

Practice Problems in Profit & Loss

1) A loses of 20% by selling a radio for Rs.768. What percent will he gain by selling it for Rs. 1020?

a) 106.25 b)6.25 c)62.5 d) 60.25

2) By selling a cycle for Rs. 4860, a student loses 19%. Find the cost price.

a)6000 b)8000 c)10000 d)12000

3) A calculator is brought for Rs.350 and sold at a gain of 15%. What will bet the selling price of calculator (in Rs).

a)402.5 b)400.5 c)410.5 d)420.5

4) Angel got profit of 10% on selling an article in Rs.220, to get the profit of 30%, she should sell the article in how many rupees?

a)106.25 b)6.25 c)62.5 d)60.25

5) A man buys an article for 10% less than its value and sells it for 10% more than its value. His gain or loss percent is:

a) No profit, no loss b) More than 20% profit

c) Less than 20% profit d) 20% profit

6) A man purchased one radio and one clock is Rs.2160. He sold the radio at 9% profit and clock on 3% loss. In overall business he earn profit of 1% then calculate CP of the clock.

a)1440 b) 720 c) 1200 d) 1420

7) The profit earned by selling an article for Rs.950 is double the loss incurred when the same article is sold for Rs.650. At what price should article be sold to make 25% profit?

a)420.5 b)540.5 c)710.5 d)937.5

8) The profit earned by selling an article for Rs.1060 is 20% more than the loss incurred by selling the article for Rs.950. At what price should article be sold to earn 20% profit?

a)1500 b)1400 c)1300 d)1200

9) A shopkeeper sells wheat at a profit of 20%, but at the time of selling, uses a weight which is 20% less than the actual weight. What is his total profit percentage?

a)30% b)50% c)25% d)70%

10) If cost price of 350 articles is equal to the selling price of 300 articles then calculate profit/loss percent in this kind of business.

a) 12.5% b)16.66% c) 25% d) 33.33%

MODULE-6

SIMPLE INTEREST

Simple interest is an essential concept for understanding the basics of loans, investments, and financial planning. This chapter explores how to calculate simple interest over time and its significance in various financial transactions. A strong grasp of simple interest aids candidates in tackling more complex interest-related problems and making informed decisions about loans and investments.

Basics of Simple Interest:

100% SI%
P ----------> A
(T×R)

A = SI + P

$SI\% = \frac{SI}{P}$

Ex: Find Principal, Simple interest, and Amount for the interest rate of 20%.

$20\% = \frac{1}{5} = \frac{Simple\ Interest}{Principal}$

P=5

A=5+1=6

SI = (A - P)=1

Let us assume SI = 10%

- SI for 2yrs = 20%
- SI for 3yrs = 30%

Model-1: Rate of SI

A certain sum of money becomes thrice of itself in 20 years, at a certain rate, calculate the rate of interest.

100 200 300
P ----------> A
20yrs

SI = T × R

$\%R = \frac{200}{20}$

%R = 10%

Model-2: Variable Rate of SI

Ex-1: Mohan lends out a sum to Ramesh @ 6% pa SI rate in such a way that rate of interest increases by 0.5% after end of every year. Calculate the lent sum, if after 4 years Mohan receives Rs. 1080 as interest.

6%, 6.5%, 7%, 7.5%

100% 27%

P ----------> A

X 1080

27 % → 1080

100 % → ?

X = 4000

Ex-2: Riya invested a certain sum in a scheme in which rate of interest is 5% for first 2 years. It is 7% for next 3 years and beyond the 5 years it is 8%. If after 10 years, Riya received Rs. 85500 as amount, then what was the invested sum?

2*5%, 3*7%, 5*8%

100% 71% 171%

P ----------> A

X 85500

171 % → 85500

100 % → ?

X = 50000

Model-3: Time of Interest

Ex-1: A certain sum of money becomes 4 times itself in 15 years, at a certain rate, calculate the time in which the same sum will become 10 times of itself at a same rate of interest.

100 300 400

P ----------> A

15 yrs

100 900 1000
P ----------> A
? yrs
By comparing values,

300 → 900

15 → ?

45

Model-4: Amount

Ex-1: If the SI on certain sum of money @ $11\frac{1}{9}\%$ per annum for 7 years is Rs. 3400 less than principal, find the amount.

SI%=$11\frac{1}{9}\%=\frac{1}{9}=\frac{SI}{P}$

$SI_{(1yr)}$ = 1

P = 9

$SI_{(7yr)}$ = 7

P ----------> A

9 7 16

D=9-7=2

2→ 3400

16→ ?

27200

Model-5: SI Investments with variable rates

Ex-1: Mahesh invested Rs. 3400 in two schemes A and B in which rate of interest are 10% and 12% pa respectively. If after 1 year he received Rs. 360 as interest from both schemes, then calculate the sum invested in scheme A.

Investment=3400

A=10%=340

B =12%=408

Interest=360

A : B = 48 : 20

A : B = 12 : 5

$\frac{12}{17} \times 3400 = 2400$

Ex-2: A man lends out Rs. 9500 to two persons A and B at the rate of 4% and 6% pa respectively. If after 5 years he received Rs. 11500 from both persons, then calculate the sum lent to person A.

SI of 5 years =11500-9500 = 2000

SI of 1 year = 400

Amount=9500

A=4%=380

B =6%=570

SI=400

A : B = 170 : 20

A : B = 17 : 2

$\frac{17}{19} \times 9500 = 8500$

Model-6: SI Investments with variable Rates/Time

Ex-1: Rs.10400 is invested in 2 parts in such a way that the SI from first part @10% pa for 5 years is equal to the SI on second part @ 8% pa for 10 years. Find the sum invested @10%.

10% for 5yrs = 50%

8% for 10yrs = 80%

$P_1 \times 50\% = P_2 \times 80\%$

$\frac{P_1}{P_2} = \frac{8}{5}$

13 → 10400

8 → ?

6400

Ex-2: Rs.12600 is invested in 3 parts in such a way that the SI on first part @2% pa for 3 years is equal to the SI on second part @3% pa for 4 years is equal to the SI on third part @4% pa for 5 years are equal. Find SI on first part.

$P_1 \times 6\% = P_2 \times 12\% = P_3 \times 20\%$

$\frac{3P_1}{30} = \frac{6P_2}{30} = \frac{10P_3}{30}$

$\frac{P_1}{10} = \frac{P_2}{5} = \frac{P_3}{3}$

10 : 5 : 3

18→ 12600

10→ 7000

7000 × 6%= **420**

Ex-3: Ganesh invested equal amount of money in two different firms which gives 15% pa simple interest for 3.5 years and 5 years respectively. If the difference between their invest is Rs. 225, the amount invested by Ganesh is

$Diff = 1.5 \times 15\% = 22.5\%$

22.5% → 225

100% → ?

***X* = 1000**

Ex-4: The SI on Rs.4000 in 3 years @ x% pa equals the SI on Rs.5000 @ 12% pa in 2 years. What is the value of X?

$\frac{4k \times 3 \times X}{100} = \frac{5k \times 2 \times 12}{100}$

***X* = 10%**

Practice Problems in Simple Interest

1) Find the principal amount which amounts to Rs. 11200 at 10% per annum for 4 years being simple interest annually.

a)6000 b)8000 c)9000 d)7000

2) If 20000 is given as loan for a period of 3 years with interest rates 5%, 7%, and 9% for the 1st, 2nd, and 3rd years respectively. What is the total amount that needs to be paid at the end.

a)24000 b)24200 c)25400 d)26000

3) Ramesh invested a certain sum at a certain SI rate. After 11 years he received 2.43 times of his investment. What was the rate of interest.

a)5% b)10% c)15% d)20%

4) A certain sum of money becomes 2.3 times itself in 9 years, at a certain SI rate, calculate the time in which the same sum will become 6.2 times of itself at a same rate of interest.

a)40yrs b)45 yrs c)26yrs d)36yrs

5) A man borrowed a total sum of Rs. 30000 a part of it on SI @12% pa and remaining on SI @10% pa respectively. If at the end of 2 years, he paid in all Rs. 36480 to settle the loan amount. What was the amount borrowed at 12% pa.

a)6500 b)7500 c)8500 d)1000

6) If the SI on certain sum of money @ $6\frac{2}{3}\%$ per annum for 4 years is Rs. 4400 less than principal, find the principal.

a)6500 b)8500 c)6000 d)7500

7) A man lent a certain sum at a certain rate of interest for 8 years. If the rate of interest was 1.5% less then it would get Rs. 960 less than initial interest. What was the lent sum?

a)1000 b)8500 c)8000 d)7000

8) A man invested Rs. 1,25,000 in the bank account of his two sons whose ages are 12 years and 14 years, in such a way that they will get equal amounts at an age of 18 years. If rate of interest was 5% pa then calculate the sum invested for younger son.

a)35000 b)40000 c)56000 d)60000

9) A sum of Rs. 12500 amounts to Rs. 15500 in 4 years at the rate of simple interest. What is the rate of interest?

a) 3% b) 4% c) 5% d) 6%

10) The sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:

a) Rs. 650 b) Rs. 690 c) Rs. 698 d) Rs. 700

MODULE-7

COMPOUND INTEREST

Building upon the concept of simple interest, compound interest delves into the impact of interest on the initial amount over multiple periods. This is a crucial topic as compound interest is prevalent in the financial sector and plays a significant role in determining returns on investments, loans, and savings accounts. A thorough understanding of compound interest empowers candidates to evaluate financial choices wisely and showcases their financial acumen to potential employers.

Basics of Compound Interest:

100% CI%

P ----------> A

(T×R)

CI% $= \frac{CI}{P}$

A=P+CI

Let us assume CI is 10%, then

- CI for 2 yrs = 21% $(X + Y + \frac{XY}{100})$
- CI for 3 yrs = 33.1% $(X + Y + \frac{XY}{100})$

Ex: Find the Principal, Amount, and Compound Interest for the interest rate of 20%.

20% = $\frac{1}{5} = \frac{Compound\ Interest}{Principal}$

P=5

A=5+1=6

CI = (A - P)

Model-1: Time and Rate are given

Ex-1: If R=12.5% pa, T=3yrs, CI=1085 rupees. Then calculate the principal and Amount in rupees.

12.5% = $\frac{1}{8}$

P=8

A=8+1=9

For 3 years

P=8×8×8= 512

A=9×9×9= 729

CI = (A - P) = 217

CI= 217 × 5 = 1085

P= 512 × 5 = 2560

A= 729 × 5 = 3645

CI

P ----------> A

2560 1085 3645

Ex-2: If R=$16\frac{2}{3}$% pa, T=3yrs, P=6480 rupees. Then calculate the CI and Amount in rupees.

$16\frac{2}{3}\% = \frac{1}{6}$

P=6

A=6+1=7

For 3 years,

P=6×6×6= 216

A=7×7×7= 343

CI = (A - P) = 127

P= 216× 30 = 6480

CI= 127× 30 = 3810

A= 343× 30 = 10290

CI

P ----------> A

6480 3810 10290

Model-2: Time is given in Months/Days

Ex-1 Calculate the compound interest on a sum of Rs. 10,000 at 8% per annum for 2(5/8) years nearest to a rupee.

10000
800 (8% of 10,000)

10800
864 (8% of 10,800)

11664
583.2 ($\frac{5}{8}\times 8\%$ ➔ 5% of 11664)

Then the sum of interest rates 800, 864, and 583.2 is **2247.2**

Ex-2 Find the compound interest on Rs 10000 for 1 year and 73 days at the rate of 10%?

10000
1000 (10% of 10,000)

11000
220 ($\frac{73}{365}=\frac{1}{5}$ ➔ $\frac{1}{5}\times 10\%$ ➔2% of 11000)

Then the sum of interest rates 1000 and 220 is **1220**

Ex-3 If R=20% pa, T=1yr73days, CI=1550 rupees. Then calculate the principal.

20% = $\frac{1}{5}$

P=5

A=5+1=6

For $1+(\frac{73}{365})=1+(\frac{1}{5})$

CI = $5+(\frac{6}{5}) = \frac{31}{5}$

P = 5×5 = 25

CI=$\frac{31}{5}\times 250 = 1550$

P=$25\times 250 = 6250$

Model-3: Interest is compounded yearly

Ex-1: A sum amount of Rs. 9680 in 2 years at 10% pa compounded annually. Find the principal amount.

Trick-1:

X + Y + $\frac{XY}{100}$

$10 + (10) + \frac{(10)(10)}{100}$

21%

100% 21% 121%
P ----------> A
X 9680

121 % → 9680

100 % → X

X = 8000

Trick-2:

CI

P ----------> A

? 2y@10% 9680

Let us assume P=8000, then

8000
800 (10% of 8,000)

8800
880 (10% of 8,800)

9680

Thus the principle **Rs. 8000** becomes the Amount Rs. 9680.

Ex-2: Find compound interest on ₹8000 at 20% per annum for 3 years, compounded annually.

Trick-1:

20%, 20%, 20%

$X + Y + \frac{XY}{100}$

$20 + 20 + \frac{(20)(20)}{100} = 44\%$

$44 + 20 + \frac{(44)(20)}{100} = 72.8\%$

100% 72.8%
P ----------> A
8000 X

100 % → 8000

72.8 % → ?

5824

Trick-2:

8000
1600 (20% of 8,000)

9600
1920 (20% of 9600)

11520
2304 (20% of 11520)

Then the sum of interest rates 1600, 1920, and 2304 is **5824**

Model-4: Variable Rate of CI

Ex-1: Find the amount of ₹ 8000 for 2 years compounded annually and the rates being 9% per annum during the first year and 10% per annum during the second year.

Trick-1:

$X + Y + \frac{XY}{100}$

$(9) + (10) + \frac{(9)(10)}{100}$

19.9%

100% 19.9% 119.9%
P ----------> A
8000 X

100 % → 8000

119.9 % → X

X = 9592

Trick-2:

8000
720 (9% of 8,000)

8720
872 (10% of 8,720)

9592

Ex-2: An amount of ₹ 10000 is taken as loan by Rahul at compound interest 5% pa for 1st year, 10% for 2nd year, and 20% for 3rd year. What is the total interest to be paid by him after 3 years?

Trick-1

5%, 10%, 20%

$X + Y + \frac{XY}{100}$

$5 + 10 + \frac{(5)(10)}{100} = 15.5\%$

$20 + 15.5 + \frac{(20)(15.5)}{100} = 38.6\%$

100% 38.6%

P ----------> A

10000 X

100 % → 10000

38.6 % → X

X = 3860

Trick-2

10000
500 (5% of 8,000)

10500
1050 (10% of 8,000)

11550
2310 (20% of 8,000)

Then the sum of interest rates 500, 1050, and 2310 is **3860**

Model-5: Interest is Compounded Half-Yearly/Quarterly

Ex-1: If R=20% pa, T=1.5 yrs, CI=6620 rupees. Then calculate the principal and difference between CI&SI. Interest is compounded half yearly.

For half yearly with Time 1.5 yrs,

Trick-1:

T=3 yrs

$R=10\% = \frac{1}{10}$

P=10

A=10+1=11

For 3 years,

P = 10×10×10= 1000

A =11×11×11=1331

CI= (A - P) = 331

CI-SI = 10+10+11=31

CI=331 × 20 = 6620

P=1000 × 20 = $20k$

CI-SI=31 × 20 = 620

Trick-2:

3000
300 (10% of 3000)

3300
330 (10% of 3300)

3630
363 (10% of 3630)

Then the sum of interest rates 300, 330, and 363 is **993**

Model-6: CI with Growing Principal

Ex-1: A sum of money placed at compound interest Doubles itself in 4 years in how many years will it amount to 8 times?

$(2)^{\frac{1}{4}} = (8)^{\frac{1}{t_2}}$

$\frac{1}{4} = \frac{3}{t_2}$

t_2= 12 years

Ex-2: A sum of money amount to ₹ 25000 in 6 years and ₹ 27000 in 7 years. Find the rate of interest.

$$R\% = \frac{27000 - 25000}{25000} \times 100$$

$R\% = 8\%\ pa$

Note: Applicable for two consecutive years only

Ex-3: A sum becomes Rs.4500 in 2years and Rs.6750 in 4years when compounded annually. Find the principal.

$$\frac{4500 \times 4500}{6750} = 3000$$

Ex-4: The difference between CI and SI on certain sum of money is Rs. 980. if the rate of interest is 7% pa. and t = 2 years. find the sum of money.

$$P = \frac{D \times (100)^2}{R^2}$$

$$P = Rs.\ 200000$$

Note: Applicable for t = 2 yrs only

Model-7: Difference of CI & SI

Ex-1: If R=$16\frac{2}{3}$% pa, T=2yrs, difference between CI&SI=40 rupees. Then calculate the CI, principal, and Amount.

Trick-1:

$16\frac{2}{3}\% = \frac{1}{6}$

P=6

A=6+1=7

For 2 years

P=6× 6= 36

A=7× 7= 49

CI=(A-P)=13

CI= 13 × 40 = 520

P = 36 × 40 = 1440

A = 49 × 40 = 1960

CI-SI=40

P ----------> A

1440 520 1960

Trick-2:

$$P = \frac{D \times (100)^2}{R^2}$$

$$P = Rs.\ 1440$$

Note: Applicable for t = 2 yrs only

Ex-2: The difference between CI and SI on some amount for 3years and 2years are in ratio of 19:6. what is the rate of interest?

The ratio between difference of CI & SI for 3years and 2years:

$$\%R + 3 = \frac{19}{6}$$

$$\%R = \frac{19}{6} - 3$$

$$\%\boldsymbol{R} = \frac{\mathbf{1}}{\mathbf{6}} = \frac{\mathbf{50}}{\mathbf{3}} = \mathbf{16}\frac{\mathbf{2}}{\mathbf{3}}\%$$

Model-8: Comparison of CI & SI

Ex-1: Find the compound interest at the rate of 7% pa compounded annually for two years on the principal that yields a simple interest of Rs. 3000 for 3 years at 5% p.a.

SI% = 15%

P ----------> A

3000

X + Y + $\frac{XY}{100}$

7 + (7) + $\frac{(7)(7)}{100}$

14.49%

CI% = 14.49%

P ----------> A

X

15 % → 3000

14.49% → X

CI = 2898

Ex-2: Simple interest on a certain sum at a certain rate of interest is RS.700 for 3years 6months while compound interest on the same sum at same rate of interest for 2 years is Rs.425. Calculate rate of interest.

$SI_{(2y)}$ =400

$CI_{(2y)}$ =425

Diff = 425-400 = 25

$\%R = \frac{25}{400} \times 100 = 6.25\%$ ***per 2 years***

$\%\boldsymbol{R = 12.5\%}$ **pa**

Ex-3: Ajay invested a certain sum in scheme A, which offers simple interest at the rate of 8% per annum for 4 years. He also invested Rs. 2000 in scheme B, which offers compound interest @ 20% pa for 2 years. If interest earned from scheme A is a 7/11 of the interest earned from scheme B, what is sum invested in scheme A?

$20 + 20 + \frac{(20)(20)}{100} = 44\%$

$32\%\ of\ P_A = \frac{7}{11} \times 44\%\ of\ 2000$

$\boldsymbol{P_A = Rs.\ 1750}$

Practice Problems in Compound Interest

1. If R=12.5% pa, T=3yrs, A=14580 rupees. Then calculate the principal and CI in rupees.

2. If R=$16\frac{2}{3}$% pa, T=2yrs, CI=52 rupees. Then calculate the principal and amount in rupees.

3. If R=20% pa, T=14months, CI=480 rupees. Then calculate the principal.

4. Manish deposited some money in a bank at the rate of 6% pa for 2 years at compound interest. How much money was deposited if he gets Rs. 11236 on maturity.

a)8000 b)9000 c)10000 d)12000

5. Find compound interest on ₹ 8000 at 6% per annum for 2 years, compounded annually.

a)825.20 b)900.60 c)950.40 d)988.80

6. What will be the compound interest on Rs. 5000 for 3 years at the rate of 10% pa?

a)9200 b)6502 c)5824 d)8050

7. If R=$11\frac{1}{9}$% pa, T=2yrs, difference between CI&SI=63 rupees. Then calculate the CI, principal, and Amount.

8. If R=20% pa, T=9months, CI=6620 rupees, and difference between CI&SI is 183. Then calculate the principal and difference between CI & SI. Interest is compounded quarterly.

9. Rs. 10000 are invested for 2 years @ 5% pa. Find the difference between CI and SI.

a)75 b)50 c)25 d)10

10. If the CI on certain sum at 4% for 2 years is Rs.2448. Find simple interest on the same sum at the same rate for the same period.

MODULE-8

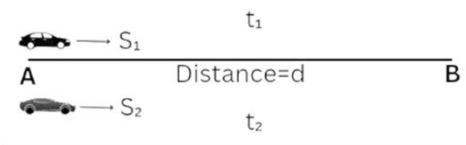
SPEED, DISTANCE, & TIME

This chapter deals with problems related to the relationship between speed, distance, and time, which are common in aptitude assessments and relevant in fields like logistics and transportation. Mastering this topic is crucial as it enables candidates to solve problems related to travel time, relative speed, and average speed, showcasing their analytical and problem-solving skills during campus placements.

Basic Concepts of Speed, Distance, & Time:

$$\boldsymbol{Speed = \frac{Distance}{Time}}$$

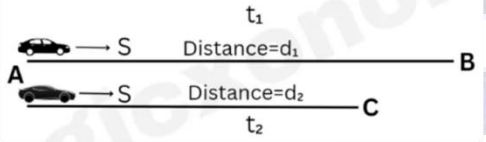
Case 1: Distance is Constant



$$\textbf{Speed} \propto \frac{\textbf{1}}{\textbf{Time}}$$

$$\frac{S_1}{S_2} = \frac{T_2}{T_1}$$

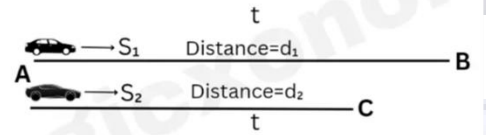
Case 2: Speed is Constant



$$\textbf{Distance} \propto \textbf{Time}$$

$$\frac{D_1}{D_2} = \frac{T_1}{T_2}$$

Case 3: Time is Constant



$$\textbf{Speed} \propto \textbf{Distance}$$

$$\frac{S_1}{S_2} = \frac{D_1}{D_2}$$

Average Speed:

$\frac{2XY}{X+Y}$ **km/hr** [when the distance is constant]

$\frac{X+Y}{2}$ **km/hr** [when the time taken is constant]

Relative Speed:

$\mathbf{X \pm Y}$ [Opposite direction **+** & Same direction **-**]

$$\Delta T = \frac{D_1}{S_1} - \frac{D_2}{S_2}$$

$$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$$

Model-1: Time Taken

Ex-1: Running at 4/7th of his usual speed, a man covers a certain distance in 28 minutes. Calculate the time taken by the man to cover the same distance, running at his usual speed.

$\frac{S_1}{S_2} = \frac{T_2}{T_1}$

	Usual	:	Current
Speed	7	:	4
Time	4	:	7

7→ 28

4→ ?

16 minutes

Ex-2: Two runners started running simultaneously from opposite ends of a bridge. But a slower runner takes 5sec more than a fast runner to cross the bridge. If the speed of the fast runner is double the slower one. Then find the time taken by a slow runner to cross the bridge.

$\frac{S_1}{S_2} = \frac{T_2}{T_1}$

	Slower	:	Faster
Speed	1	:	2
Time	2	:	1

$Diff = (2 - 1) = 1$

1→ 5 sec

2→ ?

10 seconds.

Ex-3: Walking at the rate of 4km/hr a man covers a certain distance in 2hr 45 min. Running at a speed of 16.5km/hr a man will cover the same distance in:

$2 + \frac{45}{60} = \frac{11}{4}$hr

$distace = Speed \times time = 4 \times \frac{11}{4}$

$T = \frac{distance}{speed}$

$T = \frac{11}{16.5}\ hour$

$T = \frac{11}{16.5} \times 60 = \frac{11}{165} \times 600$

T = 40 minutes

Ex-4: If a car runs at 45km/hr, it reaches its destination late by 10min but if it runs at 60km/hr it is late by 4min. What is the correct time for the journey?

$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$

$10min = \frac{10}{60} hr$

$Speed = \frac{Distance}{Time}$

$D = \frac{45 \times 60}{(60-45)} \times \frac{(10-4)}{60} = 18km$

$T = \frac{18}{45} \times 60 = 24min$	$T = \frac{18}{60} \times 60 = 18min$
$T_{actual} = (24 - 10)$	$T_{actual} = (18 - 4)$
14 minutes	***14 minutes***

Model-2: Distance Covered

Ex-1: Sachin can cover a distance in 1hr 24min by covering 2/3 of the distance at 4km/hr and rest at 5km/hr. The total distance is.

$1 + \frac{24}{60} = \frac{7}{5}$hr

$Speed = \frac{Distance}{Time}$

Let us take total distance is 3x

$T \Rightarrow \frac{2x}{4} + \frac{x}{5} = \frac{7}{5}$

$\frac{14x}{20} = \frac{7}{5}$

$x = 2$

Total Distance = 3x = 3×2 = 6 km

Ex-2: A man goes to his office at 30kmph and reaches 15 minutes late. The next day, he goes at 45kmph and reaches 5 minutes earlier. Calculate the distance between home to office.

$20min = \frac{20}{60} = \frac{1}{3}hr$

$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$

Time difference is 20min

$D = \frac{30 \times 45}{(45 - 30)} \times \frac{1}{3}$

$\underline{D = 30\ km}$

Ex-3: Ram goes to his school at the rate of 15kmph and reaches 15 minutes late. The next day, he goes 20kmph and reaches 5 minutes before. Calculate the distance between his home to school.

$20min = \frac{20}{60} = \frac{1}{3}hr$

$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$

Time difference is 20min

$D = \frac{15 \times 20}{(20 - 15)} \times \frac{1}{3}$

$\underline{D = 20\ km}$

Model-3: Usual Speed Concept

Ex-1: Due to bad weather conditions, an aircraft reduce its speed by 200kmph and reaches 30minutes late on a flight of 1200km. Calculate the usual speed of the aircraft.

$30min = \frac{30}{60} = \frac{1}{2}hr$

$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$

Time difference is 30min, and usual speed is S

$D = \frac{S \times (S - 200)}{(200)} \times \frac{1}{2} = 1200$

$S(S - 200) = 480000$

$800 \times 600 = 480000$

S = 800 km/h

Ex-2: A man covers a certain distance on a scooter and travels 3km/h faster (than the usual speed) he could have taken 40min less, but if he decreased his speed by 2km/h then he became 40min late. Find the distance.

$40min = \frac{40}{60} = \frac{2}{3}hr$

$D = \frac{S_1 S_2}{S_2 - S_1} \times \Delta T$

Time difference is 40min, and usual speed is S

$D = \frac{S \times (S+3)}{(3)} \times \frac{2}{3} = \frac{S \times (S-2)}{(2)} \times \frac{2}{3}$

$2S + 6 = 3S - 6$

S = 12 km/h

$D = \frac{12 \times (12+3)}{(3)} \times \frac{2}{3}$

D = 40 km

Model-4: Average Speed Concept

Ex-1: Rahul goes to his office at 20kmph and reaches at 10AM. The next day he goes at 30kmph and reaches at 8AM, but he wants to reach 9AM. What must be his speed?

8AM 9AM 10AM

Avg Speed = $\frac{2XY}{X+Y}$ km/hr

S = $\frac{2\times20\times30}{20+30}$

24 km/hrs

Ex-2: A person travels from A to B at a speed of $2\frac{3}{4}km/hr$ and comes back from B to A at a speed of $1\frac{1}{3}km/hr$. Find his average speed for the whole journey.

Avg Speed = $\frac{2XY}{X+Y}$ km/hr

$S = \frac{2\times\frac{11}{4}\times\frac{4}{3}}{\frac{11}{4}+\frac{4}{3}} = \frac{88}{49}\ km/hr$

$\frac{88}{49}\times\frac{5}{18}\ m/s$

$\approx \mathbf{0.5\ m/s}$

Ex-3: A thief noticed by a policeman from a distance of 200m. The thief starts running and the policeman chases him. The thief and the policeman run at the rate of 10km/hr and 11km/hr respectively. The distance between them after 6min will be,

Trick-1:

$Speed = \frac{Distance}{Time}$

Relative ***Speed***

- Opposite direction +
- Same direction –

Related speed = $(11 - 10) = 1 km/hr$

$D_{(6\text{min})} = \frac{1000}{60}\times 6 = 100$

D = 200 - 100 = 100 meters

Trick-2:

1min 6min

P ---------- → ----------→

1100/6 1100 meters

1min 6min

<------> T ---------- → ----------→

200m (1000/6) 1000 meters

Distance = 1200 - 1100 = **100 meters**

Note: Solve the above problem in 12 min and conclude your result.

Model-6: Meeting Point

Ex-1: Two trains started from station with 60km/hr and 75km/hr at 6:30AM and 7:00AM respectively. Find the distance from station A to the point where both train will meet.

Trick-1:

$$Speed = \frac{Distance}{Time}$$

Relative ***Speed***

- Opposite direction +
- Same direction –

$$T = \frac{30}{(75-60)} = 2hour$$

$$D = 75 \times 2$$

D = 150 km

Trick-2:

6:30 7:30 8:30 9:00

T1 ----------→ ----------→----------→

60km 120km 150km

7:00 8:00 9:00

T2 ----------→ ----------→

75km 150km

Ex-2: The distance between Mohan and Sohan is 500m. They started walking towards each other @ the rate of 10km/hr and 15km/hr respectively at 7AM. Find at what time they will meet and also find the distance from origin of Mohan to the meeting point.

$$Speed = \frac{Distance}{Time}$$

Relative ***Speed***

- Opposite direction +
- Same direction –

$$T = \frac{500}{(10+15)} \times \frac{18}{5}$$

T = 72 sec

$D = 10 \times 72 \times \frac{5}{18}$

D = 200 meters

Model-7: Forward/Backward Problems

Ex-1: An insect moves forward by 4cm in 1sec and in next second it moves backward by 2cm. Calculate the time taken by insect to cover distance of 20cm.

2cm → 2sec (f&b)

Then,

16cm → 16sec (f&b)

4cm → 1sec (f only)

20cm → 17sec

Model-8: Cart Problems

Ex-1: The circumference of the front wheel of a cart is 40ft long and that of the back wheel is 48ft long. What is the distance travelled by the cart, when the front wheel has done five more revolutions than the rear wheel?

$n \times 48 = (n + 5) \times 40$

$8n = 200$

$n = 25$ revolutions

$D = 25 \times 48$

1200 *ft*

Practice Problems in Speed, Distance, & Time

1. Running with 3/5th of his usual speed, a train reaches 40 minutes late at its destination. Calculate time taken by the train to cover the same distance, running with his usual speed.

a) 1 hr b) 1hr 40 min c) 1hr 20 min d) 1hr 30 min

2. Ramu goes to his school with 24km/hr and returns to his home 30km/hr. If he takes 1h 48min in overall journey, then calculate distance between his home to school.

a) 15 km b) 26 km c) 20 km d) 24 km

3. A boy goes to his school with 25km/hr and reaches 10 min late. Next day, he goes with 30 km/hr and reaches 5min late. Calculate distance between his school to home.

a) 12.5 km b) 25 km c) 37.5 km d) 50 km

4. A drives at the rate of 45km/hr and reaches its destination 4 min late. If speed is 60km/hr and reaches 5min early. Calculate the distance travelled by A.

a) 12.5 km b) 20 km c) 27 km d) 50 km

5. Pankaj travels from Gurugram to Jaipur by his car at a constant speed. If his speed was increased by 10km/hr, he would have taken one hour less to cover the distance. He would have taken further 45min lesser if the speed was further increased by 10km/hr. Find the distance between Gurugram and Jaipur.

a) 540 km b) 420 km c) 800 km d) 650 km

6. If a man had walk 20km/hr faster. He would have save 1hr in distance of 600km. Find his usual speed.

a) 80 km/h b) 100 km/h c) 120 km/h d) 50 km/h

7. Riya goes to her school at a speed of 40km/hr and return to original place at a speed of 60km/hr. Calculate the average speed during the entire journey.

a) 24 km/hrs b) 25 km/hrs c) 37.5 km/hrs d) 48 km/hrs

8. The distance between two stations A and B is 800km. Train X starts from A and moves towards B at 40km/hr and another train Y starts from B and moves towards A at 60km/h. How far A will they cross each other?

a) 380km b) 320km c) 300km d) 600km

9. In climbing a round pole of 80meters height, a monkey climbs 5 meters in a minute and slips 2 meters in the alternate minute. How much time would the monkey take to get to the top of the pole?

a) 17 min b) 50 min c) 51 min d) 40 min

10. A motor car does a journey in 10 hrs, the first half at 21 kmph and the second half at 24 kmph. Find the distance.

a) 200 km b) 224 km c) 240 km d) 208 km

MODULE-9

TRAIN BASED PROBLEMS

Trains provide an excellent context for understanding relative motion and calculating the time taken for trains to cross each other or travel a certain distance. This chapter's importance lies in its practical applications, particularly for candidates seeking roles in the transportation and logistics industries. Employers value candidates who can handle train-based problems efficiently, as it reflects their ability to analyze complex situations.

Basic Concepts of Train Problems

$$Speed = \frac{Distance}{Time}$$

$$D = S \times T$$

Unit Converters:

- $\frac{Km}{hr} \times \frac{5}{18}\ m/sec$
- $\frac{m}{sec} \times \frac{18}{5}\ km/hr$

0 Length object:

- **Ex: Pole, Tree, Boy, & Girl.**

Length object

- **Ex: Platform, bridge, tunnel, & Train**

Model-1: Speed of the Train

- $Speed = \frac{Distance}{Time}$

Ex-1: A man sees a train passing over a bridge of length 1km. The length of the train is half of the length of the bridge. If the train passes the bridge in 2 minutes then find the speed of the train.

Relative ***Speed***

- Opposite direction +
- Same direction -

$$S = \frac{1.5}{2} \times 60 = 45km/hr$$

Model-2: Platform Problems

Ex-1: A 300 meters long train crosses a platform in 54 seconds while it crosses a signal pole in 18 seconds. What is the length of the platform?

$L_{pole} + L_{platform} = 54\ sec$

$18 \quad + \quad 36 \quad = 54\ sec$

$18 \rightarrow 300$

$36 \rightarrow ?$

X=600 m

Ex-2: A train of length 250 meters, passes a 350-meter length platform in 50 seconds. What time will this train to take pass a platform of 230 meter length?

$L_{train} + L_{platform} = 50\ sec$

$250 \quad + \quad 350 \quad = 600\ meter$

$600 \rightarrow 50$

$480 \rightarrow ?$

40 sec

Ex-3: A train crosses a bridge of length 150 meter in 15 seconds and a man standing on it in 9 seconds. What time will this train take to pass a platform of 450 meters length?

$L_{man} + L_{bridge} = 15\ sec$

$9 \quad + \quad 6 \quad = 15\ sec$

$D \propto T$

$150 \rightarrow 6$ sec

$450 \rightarrow 18$ sec

$L_{man} + L_{platform}$

$9 \quad + \quad 18 =$ ***27 sec***

Model-3: Relative Speed

Ex-1: 180m long Train A crosses Train B of 120m in length which is running in the opposite direction in $5\frac{5}{11} sec.$ If speed of the train B is 20% more than that of train A, then find the time taken by both trains to cross each other, when are they running in the same direction?

$\frac{S_1}{S_2} = \frac{T_2}{T_1}$

Let's take speed of train A is 100kmph, train B is 120kmph,

$S_A : S_B = 100 : 120 = 5:6$

Relative ***Speed***

- Opposite direction = (6+5) = 11
- Same direction = (6-5) = 1

	Opposite	:	Same
Speed	11	:	1
Time	1	:	11

We know that, $5\frac{5}{11} = \frac{60}{11}$

1 → $\frac{60}{11}\ sec$

11→ ?

60 sec

Model-4: Train Accident Problems

Ex-1: A train after travelling for 50km met with an accident and then proceeds at ¾ of its former speed and arrives at its destination 35 minutes late. Had the accident occurred 24km farther, it would have reached the destination only 25 minutes late. What is the speed of the train?

$\frac{S_1}{S_2} = \frac{T_2}{T_1}$

$S = \frac{3}{4} = \frac{Distance}{Time}$

	Usual	:	Reduced
Speed	4	:	3
Time	3	:	4

1→ 10 min

3→ 30 min

S = $\frac{24}{30} \times 60$

S=48km/hr

Ex-2: A train met with an accident 3 hours after starting, which detains it for 1 hour, after which it proceeds at 75% of its original speed. It arrives at the destination 4 hours late. Had the accident taken place 150 km further along the railway line, the train would have arrived only 2 hours late. Find the original speed of the train.

$\frac{S_1}{S_2} = \frac{T_2}{T_1}$

S=75% = $\frac{3}{4}$

	Usual	:	Reduced
Speed	4	:	3
Time	3	:	4

1→ 2 hr

3→ 6 hr

S = $\frac{150}{6}$

S=25km/hr

Practice Problems in Trains

1. A train running at the speed of 82 km/hr crosses a pole in 14 seconds. What is the length of the train?

a)318m b)322m c)319m d)322m

2. Two trains running in opposite directions cross a man standing on the platform in 32 seconds and 25 seconds respectively and they cross each other in 28 seconds. The ratio of their speeds is:

a)2:3 b)1:4 c)3:2 d)3:4

3. A 350 metres long train running at the speed of 200 kmph crosses another train running in opposite direction at the speed of 100 kmph in 15 seconds. What is the length of the other train?

a)900m b)950m c)825m d)925m

4. Two trains, each 550 m long, moving in opposite directions, cross each other in 15 seconds. If one is moving twice as fast the other, then the speed of the faster train is:

a)166km/hr b)168km/hr c)165km/hr d)160km/hr

5. A 450 meter long train crosses a platform in 50 seconds while it crosses a signal pole in 21 seconds. What is the length of the platform?

a)623m b)621m c)620m d)625m

6. A train moves past a telegraph post and a bridge 342 m long in 10 seconds and 20 seconds respectively. What is the speed of the train?

a)95km/hr b)98km/hr c)99km/hr d)100km/hr

7. A boy runs opposite to that of a train at a speed of 25 km/hr. If the relative speed between the train and the boy running in the opposite direction is 60 km/hr. What is the length of the train, if it takes 90 seconds to cross the boy, when he is at rest?

a)194.4m b)192.2m c)192.6m d)191.8m

8. Two trains of length 145 meters and 175 meters are running on parallel tracks. When they run in the same direction the faster train crosses the slower train in 80 seconds and when they run in opposite direction they cross each other in 20 seconds. What is the speed of each train?

a)13m/s, 5m/s b)14m/s, 8m/s c)10m/s, 6m/s d)18m/s, 9m/s

9. A jogger running at 15 km/hr alongside a railway track 280 metres ahead of the engine of a 180 metres long train running at 65 km/hr in the same direction. In how much time will the train pass the jogger?

a)33.12sec b)34.56sec c)35.15sec d)32.89sec

10. A goods train runs at the speed of 54 kmph and crosses a 240 m long platform in 30 seconds. What is the length of the goods train?

a)150m b)200m c)250m d)300m

MODULE-10

BOATS & STREAMS PROBLEMS

Boat and stream problems involve calculating the speed of boats in still or moving water. This topic is essential for candidates aspiring to work in the marine or water transportation sectors. It demonstrates the candidate's aptitude for understanding the dynamics of boats and streams, making it an essential skill for those seeking relevant placements.

Basic Concepts of Boat & Stream

- **Upstream = U-V**
- **Downstream= U+V**
- **Speed of the boat in still water (U)=** $\frac{Downstream + Upstream}{2}$
- **Speed of stream (V) =** $\frac{Downstream - Upstream}{2}$

Avg speed of boat = $\frac{Downstream \times Upstream}{Speed\ of\ the\ boat\ in\ still\ water}$

Model-1: Distance Calculation

Ex-1: A man can row 7km/hr in still water. If the river is running at 3km/hr, it takes 6hrs more in upstream than to go down stream for the same distance. How far is the place?

$U = 7$; $V = 3$

	Up	:	Down
Speed	4	:	10
Time	10	:	4

Diff = (10-4) = 6

6→ 6 hrs

4→ 4 hrs

$\boldsymbol{D = 10 \times 4 = 40\ km}$

Ex-2: A man can row 6km/hr in still water. If the speed of the current 2km/hr, it takes 3hrs more in upstream than in the down stream for the same distance. The distance is,

$U = 6$; $V = 2$

	Up	:	Down

Speed 4 : 8

Time 8 : 4

Diff = (8-4) = 4

4→ 3 hrs

$\boldsymbol{D = 8 \times 3 = 24\ km}$

Model-2: Time Taken

Ex-1: The speed of the motor boat is that of the current of water as 36:5. The boat goes along with the current in 5hrs 10min. It will come back in,

$U = 36$; $V = 5$

Up : Down

Speed 31 : 41

Time 41 : 31

5h 10min$= 5 + \frac{10}{60} = \frac{31}{6}$

$31 \times \frac{1}{6} = \frac{31}{6}$

$41 \times \frac{1}{6} = \frac{41}{6}$

T=$\boldsymbol{\frac{41}{6} = 6 + \frac{5}{6} = 6h\ 50min}$

Ex-2: A speed of a man in still water is 6km/hr and the speed of the stream is 1.5km/hr. A man rows to a place at a distance of 22.5km and comes back to the starting point. Find the total time taken by him.

$U = 6km/h$; $V = 1.5km/h$

Downstream= U+V

Upstream = U-V

$T = \frac{22.5}{6+1.5} + \frac{22.5}{6-1.5}$

(down) (up)

T = 3 + 5

T = 8 hours

Model-3: Speed of boat/stream

Ex-1: A boat running upstream takes 8hours 48min to cover a certain distance, while it takes 4hours to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current?

8h 48min$= 5 + \frac{48}{60} = \frac{44}{5}$

	Up	:	Down
Time	$\frac{44}{5}$	:	4
Speed	4	:	$\frac{44}{5}$
Speed	5	:	11

	U	:	V
Speed	$\frac{11+5}{2}$	:	$\frac{11-5}{2}$
Speed	**8**	**:**	**3**

Ex-2: A man can row at a speed of 7.5km/hr in still water. If he takes 4 times as long to row a distance upstream as to row the same distance downstream, then the speed of stream (km/hr) is,

	Up	:	Down
Time	4	:	1
Speed	1	:	4

	U	:	V
Speed	$\frac{4+1}{2}$	:	$\frac{4-1}{2}$
Speed	2.5	:	1.5

S ⇒ **2.5** → 7.5 km/hr

1.5 → ?

4.5 km/hr

Ex-3: A, B, & C are situated at the bank of river which is flowing at a constant rate. B is at an equal distance with A and C. Rahul takes 10hours

to swim from A to B and B to A. Also, he takes 4h to swim from A to C. What is the ratio of speed of Rahul is still water and speed of stream?

	Up	:	Down
Time	8	:	2
Time	4	:	1
Speed	1	:	4

	U	:	V
Speed	$\frac{4+1}{2}$	:	$\frac{4-1}{2}$
Speed	**5**	**:**	**3**

Ex-4: A boat running upstream covers a distance of 28km in 7hours while covering the distance downstream it takes 4hours. What is the speed of the boat in still water?

S $= \frac{D}{T} = \frac{28}{7} = 4$

$Upstream = 4km/h$

S $= \frac{D}{T} = \frac{28}{4} = 7$

Down$stream = 7km/h$

Speed of the boat in still water (U)= $\frac{Downstream + Upstream}{2}$

= $\frac{4+7}{2}$ = 5.5 km/h

Ex-5: A motorboat can travel at 10km/hr in still water. It travelled 91km downstream in a river and then returned, talking altogether 20hrs. Find the rate of flow of the river.

$U = 10km/h$; $D = 91km$

S $= \frac{D}{T}$

$T \Rightarrow \frac{91}{10+V} + \frac{91}{10-V} = 20$

(down) (up)

V = 3 km/hr

Model-4: Meeting Point

Ex-1: Two boats A and B start towards each other from two places, 150km apart. Speed of the boat A & B in still water are 16km/h and 14km/hr respectively. If A proceeds downstream and B up the stream, then when they will meet?

$U_A = 16km/h$; $U_B = 14km/h$

$S = \frac{D}{T}$

$T = \frac{150}{16 + 14}$

T = 5 hours

Practice Problems in Boats & Streams

1. A boat covers 900 meters in 300 seconds against the stream and returns downstream in 3 minutes. What is the speed of the boat in still water?

a)4 m/s b)5 m/s c)1 m/s d)3 m/s

2. The speed of a ship in still water in 20 km/hr and the rate of current is 15 km/hr. The distance travelled downstream in 4 minutes is:

a)2.33 km/hr b)3.23 km/hr c)2 km/hr d)3 km/hr

3. Find the ratio of the speed of the boat and the stream if Rakesh takes twice as long to row a distance in favour of the stream as to row the same distance against the stream.

a)1:2 b)3:1 c)2:1 d)1:1

4. What is the speed of the stream, if the speed of the boat against the stream is 6 km/hr and the speed of a boat in still water is 10km/hr?

a)4 km/hr b)2 km/hr c)10 km/hr d)5 km/hr

5. A man can row a boat upto 30 km down a river in 3 hours with the stream and can return back in 5 hours. What is the speed of the stream?

a)4 km/hr b)2 km/hr c)6 km/hr d)5 km/hr

6. A man sail a boat to a place which is 24 km far. He reaches that place and comes back in 7 hours. He finds that he can sail a boat 3 km downstream in the same time as 2 km upstream. Find out the rate of the stream?

a)1.43 km/hr b)2 km/hr c)6 km/hr d)5 km/hr

7. Rahul can sail a boat 3 quarters of kilometer upstream in 11(1/4) minutes and downstream in 7(1/2) minutes. Find out the speed of Rahul in still water?

a)9 km/hr b)5 km/hr c)4 km/hr d)3 km/hr

8. A boat moves upstream at the rate of 10 kms in 20 mins and downstream at the rate of 10 kms in 15 minutes. The speed of the current is?

a) 10 kmph b) 5 kmph c) 15 kmph d) 20 kmph

9. If the speed of a swimmer in still water is 9km/h find the downstream speed of the swimmer, when the river is flowing with the speed of 6km/h.

a) 15km/h b) 18km/h c) 3km/h d) 12km/h

10. A motorboat covers a certain distance downstream in 30 minutes, while it comes back in 45 minutes. If the speed of the stream is 5km/hr, what is the speed of the boat in still water?

a) 10kmph b) 25kmph c) 15kmph d) 20kmph

MODULE-11

DISCOUNTS

Understanding discounts is vital for handling pricing, sales, and marketing aspects of businesses. This chapter covers different types of discounts and helps candidates calculate the final price of products after applying discounts. Being proficient in discounts showcases the candidate's ability to handle financial transactions and assess potential revenue in a business setting.

Basic Concepts of Discounts

Ex-1:

CP ----------> MP ----------> SP
600 1000 700
---------->
%D = ?

Discount = MP – SP = 300

$$\%\text{Discount} = \frac{Discount}{MP} \times 100$$

$$= \frac{300}{1000} \times 100 = 30\%$$

Ex-2:

-70% -30%
100----------> 30 ----------> 21
MP SP
---------->
%D = ?

$$X + Y + \frac{XY}{100}$$

$$-70 - 30 + \frac{(-70)(-30)}{100}$$

(-100+21) = **-79%**

Ex-3:

-30% -20%
MP----------> ---------->SP
---------->
%D = ?

MP : SP

%D = 30% = $\frac{3}{10}$ ➔ 10 : 7

%D = 20% = $\frac{1}{5}$ ➔ 5 : 4

---

50 : 28

Difference = 50-28 = 22

$\%\boldsymbol{D} = \frac{\mathbf{22}}{\mathbf{50}} \times \mathbf{100} = \mathbf{44}\%$

Ex-4: Find MP:SP for the given discount percentages.

a) D=30% b) D=10% c) D=12.5% d) $14\frac{2}{7}$%

Sol:

a) %D = 30% = $\frac{3}{10} = \frac{Discount}{MP}$

Discount=3

MP=10

SP=7

MP : SP = 10 : 7

MP : SP

%D = 10% = $\frac{1}{10}$ ➔ 10 : 9

%D = 12.5% = $\frac{1}{8}$ ➔ 8 : 7

%D = $14\frac{2}{7}$% = $\frac{1}{7}$ ➔ 7 : 6

Ex-5: Represent the following in percentages.

a) Buy 3 get 1 free b) Buy 4 get 1 free c) Buy 1 get 1 free

Sol:

Buy 3 get 1 free,

$\frac{1}{4}$ = 25%

Buy 4 get 1 free,

$\frac{1}{5}$ = 20%

Buy 1 get 1 free,

$\frac{1}{2}$ = 50%

Model-1: Successive Discounts

Ex-1: A single discount equivalent to three successive discounts of 5%, 10%, and 20% is,

		MP : SP
5% = $\frac{1}{20}$	➔	20 : 19
10% = $\frac{1}{10}$	➔	10 : 9
20% = $\frac{1}{5}$	➔	5 : 4
		1000 : 684

$$\%D = \frac{316}{1000} \times 100 = 31.6\%$$

Ex-2: MP of an article is Rs. 6400. At what price it will be sold after giving 3 successive discounts of 12.5%, 10%, and 25%?

		MP : SP
12.5% = $\frac{1}{8}$	➔	8 : 7
10% = $\frac{1}{10}$	➔	10 : 9
25% = $\frac{1}{4}$	➔	4 : 3
		320 : 189

320 → 6400

189 → ?

3780

Model-2: Buy X and Get Y Free

Ex-1: A shopkeeper sells an article for Rs. 780 after allowing a discount on $14\frac{2}{7}$% but he gives 3 articles free on the purchasing of 13 articles. Calculate the MP of the article.

MP : SP

$14\frac{2}{7}\% = \frac{1}{7}$ ➔ 7 : 6

$\frac{3}{16}$ ➔ 16 : 13

---

112 : 78

78 → 780

112 → ?

1120

Ex-2: A shopkeeper allows a 10% discount on his articles while he gives 1 article free on purchasing 7 articles. If he sold the article for Rs. 315, then calculate the MP of the articles.

MP : SP

$10\% = \frac{1}{10}$ ➔ 10 : 9

$\frac{1}{8}$ ➔ 8 : 7

---

80 : 63

63 → 315

80 → ?

400

Ex-3: Abhay marks up his goods by 40% and allows a 20% discount. He gives 1 article free on the purchase of 15 articles. In this way what is his gain %?

MP : SP

$20\% = \frac{1}{5}$ ➔ 5 : 4

$\frac{1}{16}$ ➔ 16 : 15

---

80 : 60 [or 4:3]

Difference = 4-3 = 1

$\%\boldsymbol{D} = \frac{\mathbf{1}}{\mathbf{4}} \times \mathbf{100} = \mathbf{25}\%$

CP +40% MP -25% SP
100----------> 140 ----------> 105
---------->
%P = 5%

Model-3: Profit After Allowing Discount

Ex-1: Mahesh earns 20% profit after allowing a discount of 20%. If he allowed only a 10% discount, then what will be his profit%?

+20%
CP ----------> MP -----> SP
100 -20%

$\frac{MP}{CP}=\frac{100+P\%}{100-D\%}=\frac{120}{80}=\frac{3}{2}$

-10%
CP ----------> MP ---------> SP
200 300 270
---------->
Profit=70

%P = $\frac{70}{200}\times 100 = 35\%$

Ex-2: The marked price of an article is Rs. 480. if the shopkeeper allows a discount of 10% and gains 8%. If no discount is allowed, so find his profit %.

+8%
CP ----------> MP -----> SP
100 -10%

$\frac{MP}{CP}=\frac{100+P\%}{100-D\%}=\frac{108}{90}=\frac{6}{5}$

0%
CP ----------> MP ---------> SP
5 6 6
---------->
Profit=1

%P = $\frac{1}{5}\times 100 = 20\%$

Ex-3: A merchant fixes the sale price of his goods at 15% above the cost price. He sells his goods at 12% less than the fixed price. His percentage of profit is,

+15% -12%

CP ----------> MP ----------> SP

100 115 101.2

---------->

%Profit = 1.2%

Ex-4: What is the percentage profit in selling an article at a discount of 20% which was earlier being sold at a 40% profit?

CP ----------> MP ----------> SP
100 ***140*** 140
---------->
%Profit = 40%

-20%
CP ----------> MP ----------> SP
100 140 **112**
---------->
%Profit = 12%

Model-4: True Discount

Ex-1: If the difference between one discount of 30% and two successive discounts of 20% and 10% is 170, then calculate the marked price of an article.

$X + Y + \frac{XY}{100}$

$-20 - 10 + \frac{(-20)(-10)}{100}$

(-30+3) = -28% (*i.e, - represents discount*)

Diff = 30 – 28 = 2%

Let us take Marked price is Rs. 100.

2%
MP ----------> SP
100

2 → 170
100 → ?
8500

Model-5: Difference between %profit & %Discount

Ex-1: A merchant observed that he earn a profit of SP of 7kg sugar after selling 21kg sugar and the profit earned on 8kg sugar is equal to the discount given on 16kg sugar. Calculate difference between his profit% and discount% is,

Profit = 7 × SP

(21×SP) – (21× CP) = 7 × SP

14 ×SP = 21 × CP

$\frac{SP}{CP} = \frac{3}{2}$

CP ----------> MP --------> SP
20 30
---------->
P=10 & %P =50%

8P = 16 D

$\frac{P}{D} = \frac{2}{1}$

P:D = 2 : 1

D=5
CP ----------> MP ----------> SP
20 35 %D=14.28% 30
---------->
P=10

Practice Problems in Discounts

1. The successive discount of 30% and 40% is given on holiday package. If the price of the package is 10000. What is final price of the package?

2. A shopkeeper is selling a phone at 15000 Rs but he is offering two schemes

Scheme A: Buy it at one time discount of 30%

Scheme B: Buy it at two successive discounts of 15% and 15%

Help the customer to find the best scheme.

3. In a shop a dress was on a discount. The discount on the printed price of the dress are 20% and 12% and 5 % respectively, what is the total percentage of actual discount given on the dress?

4. In a shop a dress was on a discounts. The discount on the printed price of the dress are 5% and 10% and 15 % respectively. The marked price of the dress is 1500. Then calculate overall discount and selling price of the dress?

5. A man gave his property at three successive discounts of 20%, 10% and 10%. If the price of a property was Rs. 500000 and sales tax on it is 15% of its sale price, then how much a buyer will have to pay for it?

MODULE-12

AGES

Problems related to ages involve determining the present or future ages of individuals based on given information about their past ages and time elapsed. This chapter's significance lies in its practical applicability, as age-related problems often arise in social and economic contexts. Candidates proficient in solving age-related problems display excellent logical reasoning and mathematical skills, making them attractive candidates for placements in various fields.

Model-1: Ratio of Present and Future Ages

Ex-1: The ratio of ages of Omni and Pappu is 4:5. After 5 years, their ages will be in ratio 21:25. Find the difference between their ages (in years).

	Omni	:	Pappu
ages	4	:	5
Difference = 1			
after 5yrs	21	:	25
Difference = 4			
1 × ? = 4			
ages ×4	16	:	20

Difference of ages = 20-16 = 4

Ex-2: The ratio between the present age of Sumit and Prakash is 2:3, where Sumit is 6 years younger than Prakash then find the ratio of their ages 6 years hence?

	Sumit	:	Prakash
ages	2	:	3
Difference = 1 ➔ 6 years			
ages	12	:	18
after 6yrs	18	:	24
after 6yrs	**3**	**:**	**4**

Model-2: Ratio of Past and Present Ages

Ex-1: The average age of Rahul, Satish, and Abhi is 32 years and the ratio of the ages 10 years ago was 2:4:5 respectively. Find the present age of Rahul.

R : S : A Sum

Ages$_{(10yrs\ ago)}$ 2 : 4 : 5 ➔ 11

Avg $\frac{11}{3}$ ➔ 22 yrs (32-10 yrs)

11 ➔ 66 yrs

2 ➔ ? yrs

$R_{(10yrs\ ago)}$ = 12 years

$R_{(present\ age)}$ = 12+10 = 22 yrs

Model-3: Ratio and Sum of Ages

Ex-1: The present ages of three persons are in ratio of 4:7:9. Eight years ago, the sum of their ages was 56. Find their present ages (in years).

A : B : C Sum

Present ages 4 : 7 : 9 ➔ 20

Sum of present ages= 56+3×8 = 80

20 ➔ 80 years

4 ➔ ? years

7 ➔ ? years

9 ➔ ? years

Present ages of A = 16 years

Present ages of B = 28 years

Present ages of C = 36 years

Ex-2: The ages of Ritu, Samta, and Neha are in ratio 5:6:7 and sum of their ages is 72. Find the ratio of 10 years ago Samta's age to Neha's age after 10 years.

R : S : N Sum

ages 5 : 6 : 7 ➔ 18

18 ➔ 72 yrs

1 ➔ 4 years

Then,

R: 5 ➔ 20 years

S: 6 ➔ 24 years

N: 7 ➔ 28 years

S : N

ages 24-10 : 28+10

ages 14 : 38

ages 7 : 19

Model-4: Ratio and Product of Ages

Ex-1: The present ages of Gita is 9/7 times to that of her marriage age. Present age of her child is 1/3 of her present age. If Gita was married 12 years ago then calculate present age of her child.

M_{age} : P_{age}

ages 7 : 9

Difference: 2 ➔ 12 years

P_{age} : 9 ➔ ? years

P_{age} = 54 years

P_{age} of child = $\frac{1}{3} \times 54 = 18$

Ex-2: Pushpa married 6 years ago. Her present age is $1\frac{1}{4}$ times of the age at the time of her marriage. Her son's age is $\frac{1}{10}th$ of her present age. What is the present age of her son?

Mage : Page

ages 4 : 5

Difference: 1 ➔ 6 years

P_{age} : 5 ➔ 30 years

P_{age} of son = $\frac{1}{10} \times 30 = 3$ years

Model-5: Percentage of Ages

Ex-1: The age of Akash 25% less than that of Veer. The age of Veer is 24 years more than the average age of his two sons whose total age is 40 years. Then find the difference of age of Akash and Veer.

A : V

ages 75 : 100

ages 3 : 4

Difference = 1

Sum of son's age = 40 years

Avg of son's age = $\frac{40}{2}$ = 20 years

Age of Veer = 20 + 24 = 44 years

4 ➔ 44 years

1 ➔ ? years

11 years

Ex-2: A man's age is 125% of what he was 10 years ago, but $83\frac{1}{3}$% of what he will be after 10 years. What is his present age?

125% = $\frac{5}{4}$

$83\frac{1}{3}$ % = $\frac{5}{6}$

2013 ------- 2023 ------- 2033

4 5 6

Difference: 1 ➔ 10 years

5 ➔ ? years

50 years

Practice Problems in Ages

1. Age of Umesh will be 4 times the age of Reena in 6 years from today. If ages of Umesh and Mahesh are 7 times and 6 times the age of Reena respectively, what is present age of Umesh?

a)64 yrs b)42 yrs c)40 yrs d)38 yrs

2. The average age of 10 students and their teacher is 15 years. The average age of the first seven students is 15 yr and that of the last three is 11 yr. What is the teacher's age?

a)33 yrs b)30 yrs c)24 yrs d)27 yrs

3. The present ages of Aman and Nina are 59 and 37 years, respectively. What was the ratio of the ages of Nina and Aman 13 years ago?

a)2:3 b)12:13 c)26:25 d)8:3

4. Average age of a family of 4 members was 19 years, 4 years back. Birth of a new child kept the average age of the family same even today. How old is the child today?

a)1 yrb)3 yrs c)4 yrs d)7 yrs

5. The present ages of A and B are 42 and 36 years, respectively. After K years, the ratio of ages of B to A will be 15:17. What is value of K?

6. The average age of a group of 4 friends is 36 years. The youngest friend amongst them is 6 years old. What was the average age of the group at the time of the birth of the youngest friend?

7. At present, the ratio between the ages of Amit and Dhiraj is 5 : 4. After 6 years, Amit's age will be 26 years. What is the age of Dhiraj at present?

8. The combined age of husband and wife on their 20th wedding anniversary was twice than it was at the time of wedding. If the husband is 3 years older than his wife. How old was he at the time of his marriage?

9. Neha's mother was four times her age 12 years ago. She will be twice as old as Neha 12 years from now. What is the present age of Neha's mother ?

10. Ramesh's age after 16 years will be 5 times his age 4 years back. What is the present age of Ramesh?

MODULE-13

TIME AND WORK

The module on "Time and Work" in quantitative aptitude deals with solving problems related to the time taken to complete a task when multiple individuals or machines work together. It involves calculating work rates, finding the total work done, and determining the time required to complete a task when different entities work at varying rates. This chapter is of paramount importance in solving aptitude problems because it mirrors real-life scenarios where teamwork and efficiency are essential. From project management to manufacturing processes, understanding "Time and Work" concepts enables individuals to optimize productivity, allocate resources effectively, and meet deadlines. Candidates who excel in this chapter demonstrate their ability to analyze complex work situations, making them attractive prospects for employers seeking candidates with strong problem-solving and organizational skills.

Basic concepts:

$$\boldsymbol{Efficiency(Rate\ of\ work)} = \frac{\boldsymbol{Total\ work}}{\boldsymbol{Total\ time\ taken}}$$

$$\boldsymbol{Efficiency} \propto \frac{\boldsymbol{1}}{\boldsymbol{Time\ taken}}$$

$$\frac{\boldsymbol{E_1}}{\boldsymbol{E_2}} = \frac{\boldsymbol{T_2}}{\boldsymbol{T_1}}$$

$$\boldsymbol{Total\ work = Efficiency \times Time\ taken}$$

$$\frac{\boldsymbol{Efficiency \times Time\ taken}}{\boldsymbol{Total\ work}} = \boldsymbol{1}$$

$$\frac{\boldsymbol{M_1D_1H_1}}{\boldsymbol{W_1}} = \frac{\boldsymbol{M_2D_2H_2}}{\boldsymbol{W_2}}$$

Model-1: Efficiency of a Person

Ex-1: A is 20% more efficient than B. If B alone can finish a piece of work in 30 days, then in how many days A alone can finish the same piece of work?

$A = 120\%\ B$

$$\frac{A}{B} = \frac{120}{100}$$

Efficiency: $A : B = 6 : 5$

Time: $A : B = 5 : 6$

B: 6 ➔ 30 days

A: 5 ➔ ? days

25 days

Ex-2: Efficiency of P is 3/4th of Q while Q can finish a piece of work in 2/3rd time than R. Calculate time taken by P to finish the same piece of work, if R can finish it in 18 days.

$P = \frac{3}{4}\ Q$

$\frac{P}{Q} = \frac{3}{4}$

Efficiency: $P : Q = 3 : 4$

Time: $P : Q = 4 : 3$

$Q : R = 2 : 3$

P:Q:R = 8:6:9

R: 9 ➔ 18 days

P: 8 ➔ ?

16 days

Model-2: Different Work Rates

Ex-1: Ram, Sham, and Mohan can finish a piece of work in 12, 15, and 20 days respectively. In how many days they together can finish it completely.

R= 12

$S = 15$

$M = 20$

Take LCM for Total work = 60

R = 12*5 = 60

S = 15*4 = 60

M = 20*3 = 60

Time $= \frac{60}{5+4+3}$ **= 5 days**

Ex-2: A, B, and C can finish a piece of work in 12, 15, and 20 days respectively. They started together but B left 3 days before the completion of the work. Calculate number of days in which the work is completed.

A= 12

$B = 15$

$C = 20$

Take LCM for Total work = 60

A= 12 *5 = 60

$B = 15$*4 = 60

$C = 20$*3 = 60

Time $= \frac{60+(3\times4)}{5+4+3}$ **= 6 days**

Note: before + ; after -

Model-3: Proportion Problems

Ex-1: 18 men, working 6 hours a day can make 20 toys in 10 days. Then calculate number of days in which 24 men working 9 hours a day can make 60 toys?

$$\frac{M_1D_1H_1}{W_1} = \frac{M_2D_2H_2}{W_2}$$

$$\frac{18 \times 10 \times 6}{20} = \frac{24 \times D \times 9}{60}$$

***D*= 15**

Ex-2: If 10 carpenters working 4 hours a day can make 320 chairs in 200 days, then number of chairs made by 16 carpenters in 32 days each working 6 hours a day.

$$\frac{10 \times 200 \times 4}{320} = \frac{16 \times 32 \times 6}{N}$$

***N*= 123**

Model-4: Work with Part-time Workers:

Ex-1: 12 men complete the work in 9 days. After they worked for 6 days, 6 more men joined then how many days required to complete the remaining work?

After 6 days

$12 \times (9 - 6) = 18 \times N$

N= 2 days

Ex-2: 400 men complete the work in 31 days. After they worked for 28 days, 280 left then how many days required to complete the remaining work?

After 28 days

$400 \times (31 - 28) = 120 \times N$

N= 10 days

Ex-3: 30 men can complete a work in 30 days. They start work together but after every 10 days, 5 men left the work. In how much time the work will be completed?

$\boldsymbol{Total\ work = 30 \times 30 = 900}$

30 men in 10 days ➔ $\mathbf{30 \times 10 = 300}$

25 men in 10 days ➔ $\mathbf{25 \times 10 = 250}$

20 men in 10 days ➔ $\mathbf{20 \times 10 = 200}$

15 men in 10 days ➔ $\mathbf{15 \times 10 = 150}$

---

40 days ***900***

Model-5 Work with Efficiency:

Ex-1: 6 men or 10 women can do a piece of work in 24 days. How long will 12 men and 20 women take to finish the work?

$6M \times 24 = 12M + 20W$

T: $\frac{6M \times 24}{12M + 20W} = \frac{6M \times 24}{12M + 12M}$ *(where, 6M=10W ➔ 12M=20W)*

6 days

Ex-2: 4 men and 6 women complete their work in 8 days. While 3 men and 7 women can complete the work in 10 days. In how many days 10 women will complete the work?

$(4M+6W) \times 8 = (3M + 7W) \times 10$

1M =11W

T: $\frac{((4\times11)W+6W)\times8}{10W} = 40days$

Ex-3: 12 men and 18 women can complete a work in 10 days, while 3 men and 18 women can complete the same work in 12 days. In how many days 2 men and 3 women will complete the work?

(12M+18W) ➔ 10 days -------> (1)

(3M+18W) ➔ 12 days -------> (2)

(2M+3W) ➔ ? days -------> (3)

Divided by 6 in left side and multiply by 6 in right side of equation-1, we get equation-3.

10*6 = 60 days

Ex-4: A and B can make a wall in 15 days and 20 days respectively. While C can destroy the completely build wall in a certain number of days. If they all start the work together then the wall is completed in 30 days. Calculate in how many days, C alone can destroy the completely build wall?

A= 15

$B = 20$

$A + B + C = 30$

Take LCM for Total work = 60

A: $15^{*4} = 60$

B: $20^{*3} = 60$

A+B+C: $30^{*2} = 60$

A+B+C = 2

4+3+C=2

C=-5

Time $= \frac{60}{5}$ **= 12 days**

Ex-5: 2 men can build a wall in 15 hours and 20 hours respectively, But if they work together, they use 280 less bricks per hour and build a wall in 12 hours. Find the number of bricks in the wall.

$M_1 = 15$

$M_2 = 20$

Take LCM for Total work = 60

A= 15 *4 = 60

$B = 20$*3 = 60

Efficiency: $M_1 + M_2 = 4+3 = 7$

Efficiency = $\frac{60}{12} = 5$

Difference = 2

2 ➔ 280

60 ➔ ?

8400

Practice Problems in Time & Work

1. Abhimanyu and Raju can together finish a work in 50 days. They worked together for 35 days and then Raju left. After another 21 days, Abhimanyu finished the remaining work. In how many days Abhimanyu alone can finish the work?

2. If 15 oxen or 20 cows can eat the grass of a field in 80 days, then in how many days will 6 oxen and 2 cows eat the same grass?

3. P can do a piece of work in 5 days of 8 hours each and Q can do in 4 days of 6 hours each. How long will they take do it working 5 hours a day?

4. 12 men can complete work in 6 days whereas 10 men and 21 women take 3 days to finish the same work in how many days can 12 women alone complete?

5. 49 pumps can empty a reservoir 6 $\frac{1}{2}$ days, working 8 hours a day. if 196 pumps are used for 5 hours each day , then the same work will completed in.

6. A, B and C can do a piece of work in 7 days, 14 days and 28 days respectively. How long will they taken, if all the three work together?

7. After working for 6 days, Ashok finds that only 1/3 rd of the work has been done. He employs Ravi who is 60% as efficient as Ashok. How many days more would Ravi take to complete the work?

8. Two pipes A & B can fill a tank in 24 minutes, and 32 minutes respectively. If both the pipes are opened simultaneously, after how much time pipe B should be closed so that the tank is full in 18 minutes?

9. A takes 6 hours to do the job. B also takes 6 hours to do the same job. How long should it take for both A and B, working together, to do the same job?

10. Dilip and Samrat can do a piece of work in 16 days and 24 days respectively. Samrat works alone for 15 days and leaves. In how many days can Dilip complete the remaining work?

PART 2:

COMPANY-SPECIFIC APTITUDE QUESTIONS

1. TCS NQT

Percentages:

1) Ridhima earns $7\frac{1}{7}$ % more salary than Rhythm who earns $6\frac{2}{3}$ % more salary than Ritika. If the sum of the salaries of all three is Rs. 1,34,800 then what is the salary of Ridhima?

2) Abhishek scored 38 out of 80 in theoretical physics. The full marks of the practical component is 50% of the theory counterpart. How much should he score at least in the practical component so as to pass the examination, if the overall percent required for doing so is 60?
a) 28 b) 27 c) 34 d) 30

3) 2000 candidates (male [M] and female [F]) appeared for a selection test which had two components, written test (WT) and interview (IV) and one had to qualify at the WT to go for IV. 20% and 30% respectively, of M and F had qualified at the WT. Thereafter, 10% and 12% respectively, of M and F qualified. What was the percentage of the females out of the total number of males that had finally qualified if the initial number of male and female candidates were equal?
a) 55.56% b) 180% c) 66.67% d) 18%

4) If a is the rate per cent corresponding to the fraction 24/25, and if 30 km is b% of 40 km, then what percentage (correct upto two decimal places) is b of a?
a) 0.781 b) 78.13 c) 7.81 d) 8.13

5) The population of a town increased by 5% annually and it's present population is 6,40,000. What will be the population in 2 years time?
a) 7,05,600 b) 7,04,600 c) 7,45,800 d) 7,44,800

6) The monthly income of Adit and Kavya is the same. Adit saved 23% of his monthly income and Kavya spends 37.5% of her monthly income. The expenditure of Adit is approximately how much percent less than the savings of Kavya?
a) 46.67% b) 66.74% c) 67.46% d) 74.66%

7) The length of a rectangle is increased by 331/3%. By what percent must the breadth be decreased so as to maintain its area the same?
a) 20% b) 30% c) 25% d) 24%

8) If x = 4, y = 3 and it is given that x and y are more than their reciprocals by X and Y percent, respectively, then by how much percent (correct up to two decimal places) is X more or less than Y?
a) More by 5.18% b) Less by 5.47% c) More by 5.47% d) Less by 5.18%

9) Rhythm spends 16 ⅔ % of her monthly income on food, 5 5/19 % on entertainment and 8 ⅓% on travelling. She saves the leftover money, which is Rs 15,900. Find the monthly income (in Rs.).

10) A metallic cuboid is processed by way of which its length, breadth and height increased by 10% and decreased by 8% and increased by 5% respectively. What is the percentage (Correct upto 2 decimal values) change in its volume?
a) Increases by 6.26% b) Increases by 1.20%

c) Decreases by 1.20% d) Decreases by 6.26%

11) The university gives 30% of relaxation in fees for those students who secured marks greater than 90%, relaxation of 20% in fees for those who secured 81 to 90% and relaxation of 10% to those who secured 70-80% marks in class. A total of 80 students are in the class. 5% students got 95% marks. 10% students got 90% marks and 20% got 80% marks. The rest of the students got less than 65% marks. If the total fees is Rs.1 lakh per annum, then what is the percentage of relaxation in fees?
a) 14.6% b) 15.7% c) 13.5% d) 16.8%

12) Two successive discounts are given on an article. The marked price of an article is ₹550 which is available at ₹451 if the first discount is 10%. What is the second discount?
a) 9.09% b) 8.09% c) 10.1% d) 11.09%

13) At an academic institution the break-up of holidays in 2016 was as under.
52 weekends
30 days of summer vacation which includes 4 weekends
Autumn and Winter Breaks of (10+10) days each inclusive of one weekend
14 holidays on special occasion out of which one was a Saturday and one Sunday
What was the percentage (correct up to two decimal places) of the number of holidays?
a) 45.90% b) 42.08% c) 42.19% d) 43.73%

Averages:

14) The average of 8 numbers – 231, 256, 343, x, 273, 179, 308, 162 is 252. Find the value of x
a) 261 b) 263 c) 264 d) 262

15) While tabulating the marks of 50 students, the marks obtained by a student got recorded as 56 in place of 65. By how much did the average marks become less due to this mistake?
a) 0.2 b) 0.3 c) 0.18 d) 0.25

16) The average speed of a vehicle during its journey from A to B was 48 km/h, and for B to A it was 54 km/h. What was its average speed (in km/h) for the entire journey?
a) 50.82 b) 50 c) 51 d) 51.34

17) The expenditure during the first 7 months of a year for milk consumption by a family is Rs 11,200, and during the last 5 months, it is Rs 8000. The average expenditure per month during the whole year is:
a) Rs 1610 b) Rs 1580 c) Rs 1600 d) Rs 1590

18) The average weight of a class was 60kg, and it became 60.2kg when one new student having weight of 65kg joined. What was the original number of students in the class?
a) 20 b) 24 c) 25 d) 22

19) The average age of the employees in company P is 20 years, and the average of those in both companies P and Q is 23 years. If the ratio of number of employees in company P and Q is 4 : 7, respectively, then what is the average age (years) of the employees in company Q?
a) 15 b) 17 c) 19 d) 21

20) In a class, the ratio of the number of boys to girls is 8:7 and the average weight of the boys is 20% less than the average weight of the girls. If the total weight of the class is 3417kg, then find the difference between the weight of all the girls and all the boys.
a) 143 b) 173 c) 163 d) 153

21) Out of nine persons, eight spent Rs. 30 on their meals, and the ninth spent Rs 30 more than the average of all nine. Find the total money spent on meals.
a) Rs 283.75 b) Rs. 303.75c) Rs. 273.75d) Rs. 293.75

22) The average value of eleven numbers is what percentage of half the sum of the said numbers?
a) 55% b) 18.18% c) 182.82% d) 550%

23) The average of a number and its reciprocal is 1. What is the value of the average of the fifth power and the reciprocal of the fifth power of the number?
a) 1 b) 1.5 c) 2.5 d) 2

24) The average physics marks of two sections I and II is 64. The average marks of section I is 61 and section II is _____. Find the ratio of the number of students in section II to section I.
a) 3 : 4 b) 3 : 5 c) 1 : 4 d) 3 : 2

25) For a group of eight students, the average marks secured in Mathematics by seven of them was 82, while the eighth had scored 14 less than the overall average marks. What was the total marks scored by eight students?
a) 616 b) 600 c) 640 d) 656

26) The first number is twice of the second number and one third of the third. If the average of all the numbers is 72, then find the average of the second and third number?
a) 60 b) 84 c) 96 d) 72

27) In a class, the average weight of urban students is 68 kg. Whereas the same for rural students is 54 kgs. The average weight of the entire class is 62.4 kg. What is the percentage of rural students in the class?
a) 40% b) 36% c) 35% d) 32%

28) Out of three numbers, the second is five times the first, and it is also twice the third. If the third number is raised by 8, then the average of three works out to be 31. What is the smallest number?
a) 15 b) 16 c) 10 d) 12

29) In a family of 10 adults and a few minors, the average consumption of flour is 12 kg. If the average consumption per adult and minor is 15 and 7 kg respectively. What is the number of minors?
a) 6 b) 7 c) 5 d) 8

30) The average weight of 6 people increases from 24 to 31.5 kg when one of them leaves the group and a new person joins in. If the weight of the person who joined is 60 kg, find the weight of the person who left the group?
a) 22.5 b) 37.5 c) 15 d) 30

Profit and Loss:

31) A whole seller sold a total of 90 air conditioners. Out of these he sold 2/5 parts of air conditioners at a profit of 2.5%, 50 air conditioners at the profit of 3.8% and sold the remaining air conditioners at a loss of 5%. If the aggregate profit of seller was Rs. 71,188, then what was the cost price of each air conditioner for the seller?
a) Rs. 28,220b) Rs. 29,670c) Rs. 27,380d) Rs. 26,260

32) If 10% profit of A is equal to 20% loss of B is equal to 15% loss of C, then what is the ratio of cost price of A,B, C?
a) 33:6:44 b) 44:6:33 c) 6:44:33 d) 6:33:44

33) A vehicle is purchased for Rs. x. Spent Rs. 3,000 on repairs, Rs. 2000 on transportation, Rs. 5,000 on insurance and Rs. 2,500 on a music system. The vehicle is sold at a 20% profit of Rs. 1,50,000. What is the value of x?
a) 1,12,500 b) 1,11,000 c) 1,10,500 d) 1,11,500

34) A farmer has 5 hectares of land and grows wheat on it. Given that the cost of sowing is 3 times the cost of seeds, the cost of labour is 150% higher than the cost of the sowing and the sum of all the other costs before selling the crop is 2 times the cost of labour. How many kg of wheat per hectare was produced if the farmer earned a profit of 150% (profit calculated on the total money spent in the agricultural process) and if it is given that the cost of seeds was rs. 7,000 and wheat sold by the farmer was at the rate of Rs. 18 per kg?
a) 4812.88 kg b) 5152.77 kg c) 5515.35 kg d) 5317.16 kg

35) Zahir bought a Oneplus 9 Pro phone, which has a marked price of rs. 52,000 at a discount of 2%. Then he changed his mind and wanted to buy iPhone 13 Pro Max, which has a market price of Rs. 1, 55, 000 and a discount of 7% on the marked price. At what minimum percentage profit must Zahir sell his Oneplus 9 Pro phone so that he can buy iPhone 13 Pro Max using the money he would receive from selling the old phone and Rs. 85,546 from his savings?
a) 9% b) 15% c) 6% d) 12%

36) A and B invested a sum of Rs. 3,00,000 in the ratio of 2:3 respectively. In the first 2 years, they got simple interest at the rate of 12% per annum. Then, the total amount was invested for next 2 years on compound interest at the rate of 15% per annum. What was the percentage profit of A and B?
a) A- 58.48%, B- 58.48% b) A- 70.25%, B- 60.25%
c) A- 60.25%, B-70.25% d) A- 63.99%, B- 63.99%

37) If the cost of an article is $7\frac{1}{7}$ % less than its selling price which is 12.5% less than its marked price, the discount offered is what percent of the profit gained.

38) Nitya divided an amount of Rs. 15750 among her four daughters Priya, Pooja, Ritu and Rina in ratio 9 : 3 : 4 : 5 respectively for investing. At the end of the year the percentage profit of Priya was equal to the percentage loss of Pooja and the percentage loss of Ritu was equal to the percentage loss of Rina. Calculate the overall profit or loss for Nitya at the end of the year if the percentage loss suffered by Pooja was 12% and percentage loss suffered by Ritu was 6%.
a) Profit of Rs. 165 b) Loss of Rs. 165
c) Loss of Rs. 135 d) Profit of Rs. 135

39) On an article x% commission is given on the retail price, cost price is Rs. 60. After selling, the shopkeeper gets 12% profit. If commission is reduced by y% then profit percentage is 68%. What is the value of x and y?
a) 40%, 30% b) 30%, 40% c) 40%, 20% d) 20%, 40%

40) Roohi sells her radio at Rs 1952 and bears a loss of 39%. She sold her phone for Rs 8,777 and gained a profit of 31%. She further sold her TV for Rs. 13,104 and bears a loss of 22%. Now she wanted to sell her LCD which has a cost price of Rs. 45, 872 so that she could attain overall no profit and no loss situation, then what percentage of profit does she needs to make by selling the LCD.
a) 5.25% b) 4.25% c) 3.25% d) 6.25%

41) A dealer purchases 15 kg rice at Rs 22 per kg, 12 kg rice at 25 per kg, 18 kg rice at 35 per kg and 8 kg rice at 45 per kg, He mixed al the four types and sold 28 kg at a price of Rs 28 per kg, at what rate he must sell the remaining rice to earn a profit of 15%
a) 35.15 per kg b) 38.65 per kg c) 43.16 per kg d) 40.35 per kg

42) Shyam purchases 20% extra quantity of milk than indicated and sells 20% less than edit and he claims to sell the milk at cost price. Ram wants to earn the same percentage of profit as Shyam without any dishonesty, so Ram sells milk at 39 per litre. What is the cost price of 1 litre of milk for Ram ?
a) 26 b) 23 c) 21 d) 28

43) A shopkeeper sold his 25%, 30% and 20% of the items at a profit of 10%, 20% and 30% respectively. The rest of the items are sold at cost price. What is the percentage of profit of all his sale?
a) 14.5% b) 12.5% c) 15.5% d) 13.5%

44) The marked price of a marker is $5\frac{5}{9}$% higher than it's cost price. A discount of $5\frac{5}{19}$ % is given on its marked price. Find the difference between cost price and selling price.
a) 5 b) 9 c) 2 d) 1

45) Rahul bought a watch which has Rs. 1,875 as a marked price at a 24% discount. Rahul sold the watch to Rohit earning a 28% profit. Rohit then decided to sell the watch and set the marked price at 25% higher than the cost price at which he bought the watch. Mohit bought the watch from Rohit at a 15% discount on the marked price. Mohit later marked up the price to 50% higher than the cost price at which he bought the watch and sold it to Rahul at some discount. If Rahul had to pay Rs. 28.5 extra than the initial price he paid, then at what percent discount Mohit sold the watch?
a) 35% b) 50% c) 45% d) 40%

46) A farmer purchased a Trolley and a Tractor for 8,00,000. He sold the Tractor at a profit of 30% and the Trolley at a loss of 10%, in this deal he got a profit of 3%. What is the ratio of the cost price of tractor and trolley.
a) 54:31 b) 27:13 c) 13:27 d) 13:54

Ratio and Proportion:

47) A sum of money has been distributed between P, Q, and R. P gets (0.3) of the sum, Q gets (0.2) of the remainder, R gets Rs. 1120. What is the sum (in Rs.)

a) 2800 b) 2000 c) 2500 d) 2400

48) 9 men, 7 women and 5 children are to distribute 2483 pens in three days. On the first day, all were present to distribute. On the second day, 3 men and 2 children were absent. On the third day, 3 women and 3 children were absent. The number of pens distributed by each man, woman and child in a single day is in the ratio of 5 : 3 : 2. Calculate the total pens distributed on the third day.
a) 793 b) 663 c) 973 d) 988

49) Previous Year's income of A, B and C are in the ratio of 7 : 9 : 6, respectively. There previous years and current years income ratios 3 : 5, 2: 3 and 4 : 5 respectively. If the sum of their current years 's income is Rs. 15,680., find the sum of A's previous year's income and it's current year's income.
a) 9,840 b) 9,640 c) 9,820 d) 9,730

50) A and B quote for a tender, Initially their quotation was in the ratio of 9:7. During Negotiation, A reduced his quotation lower than B by Rs 2,00,000. Now their quotation is in the ratio of 6:7. Determine the total amount reduced by A to get the work.
a) 9,00,000 b) 5,00,000 c) 8,00,000 d) 6,00,000

51) The salary of Ram and Sujatha are in the ratio of 4 : 3. The salary of Ram and Sujatha is increased by Rs. 3000 and the ratio changes to 9 : 8. Ram's salary after increase will be:
a) Rs. 4500 b) Rs. 8300 c) Rs. 5400 d) Rs. 3800

52) The ratio of milk and water in 60 litres of a mixture is 7:5. To increase the quality of milk, how much milk is to be added to make their ratio 7:2?
a) $52\frac{1}{2}$ litres b) $52\frac{1}{3}$ litres c) $50\frac{1}{2}$ liters d) $50\frac{1}{3}$ liters

53) The ratio of the number of girls to that of boys in the class is 9:11. If 11(1/9)% of the girls and 9 (1/11)% of the boys do not like mathematics, then find the percentage of students who like mathematics.
a) 50% b) 60% c) 70% d) 90%

54) One year ago the ratio of income between A and B was 3:5. The ratios of income for the previous year and the current year are 2:3 and 5:7. The sum of the income for the both is Rs. 12, 900. Then the current income of each is equal to
a) Rs. 7,200 ; Rs. 5,700 b) Rs. 3,600 ; Rs. 9,300
c) Rs. 8,100 ; Rs. 4,800 d) Rs. 5,400 ; Rs. 7,500

55) In a class, the ratio of boys and girls is 9:16. If the number of girls is 64% of the class, then the number of boys in the class is:
a) 10 b) 9 c) 16 d) 11

56) The ratio of the numbers of boys and girls in a school is 5:9, and the total number of students is 224. If 64 girls left the school and some boys joined, the ratio becomes 6:5. Find the number of boys who joined?
a) 15 b) 16 c) 13 d) 14

57) Nookaraju and Bhavana have their salaries in 7:3. As Bhavana is skilled, she got an increment of 5,000. But Nookaraju' performance is not up to mark and he got a

decrement of $1,000. If their present salaries are in ratio of 1:1, then Nookaraju's present salary is:
a) 8,500 b) 9,500 c) 15,000 d) 10,500

Time & Work:

58) Six students were given the task of ringing bells at the intervals of 10 seconds, 15 seconds, 30 seconds, 50 seconds, 1 minute and 1.25 minutes, respectively. If they ring bells together at 10 a.m., then how many times will they ring the bell together in the next 3 hours (including the bell rang at 10 a.m.)?
a) 37 times b) 31 times c) 35 times d) 33 times

59) Rocky is twice as efficient as Gani and takes 63 days less than Gani to dig a well. Find the time in which they can complete digging the well together.
a) 55 b) 45 c) 42 d) 52

60) A, B and C are employed to do a piece of work for Rs. 621. A and B together complete $\frac{18}{23}$ of the work, and B and C together complete $\frac{7}{23}$ of the work. What amount should be paid to C?
a) 271 b) 721 c) 172 d) 127

61) 26 men can complete a bridge in 8 days, 4 days after they started working, 12 more men joined them. How many days will they now take to complete the remaining work?
a) 2(19/38) b) 2(27/38) c) 2(23/38) d) 2(28/38)

62) In a computer game a builder can build a wall in 16 hours while a destroyer can demolish such a wall completely in 40 hours. Both the builder and the destroyer were initially set to work together on level ground. But after 24 hours, the destroyer was taken out. What was the total time taken to build the wall?
a) 26 hours 46 minutes b) 25 hours 6 minutes
c) 24 hours 16 minutes d) 25 hours 36 minutes

63) Raju and Ramesh working separately can complete a piece of work in 12 days and 16 days, respectively. If they work for a day alternately, with Raju starting, in how many days will the work be completed?
a) 13(2/3) days b) 14(2/3) days c) 11(2/9) days d) 12(5/9) days

64) There are three taps A, B and C in the tank. These taps can fill the tank in 10 hours, 20 hours and 25 hours respectively. At first, all three taps are opened simultaneously. After 2 hours, tap C is closed and A and B keep running. After 4 hours, tap B is also closed. The remaining tank is filled by Tap A alone. Find the percentage of the work done by Tap A itself.
a) 32% b) 75% c) 52% d) 72%

65) 12 women and 5 men together can complete a work in 9 days. It takes 81days for 1 man alone to complete the same work. In how many days can 1 woman alone complete the same work?
a) 324 days b) 243 days c) 234 days d) 223 days

66) Sangeetha can complete a work in 16days working 10hours per day. Sahithya can complete the same work in 18days working 8 hours per day. If both of them work together working 9 hours per day, in how many days can they complete the work?

a) 180/19days b) 150/19days c) 160/19days d) 170/19days

67) 5 men and women can earn Rs 2862 in 9 days and 9 men and 12 women can earn Rs 6000 in 8 days. In how many days can 7 men and 9 women earn Rs 11,991?
a) 21 days b) 19 days c) 20 days d) 17 days

68) If a road of 210 km can be constructed by 540 workmen in 28 days, how many workmen are required to build a road of 150 km in 18 days.
a) 600 b) 300 c) 650 d) 450

Speed, Distance, Time:

69) The speed of a train increases by 5km/hr after one hour, if the distance travelled by the train was 60km then what is the total distance covered in 16 hour?
a) 1640km b) 1650km c) 1480km d) 1560km

70) A man was walking at a speed of 3km per hour on a foggy day. A carriage passed him in the same direction. He could see the carriage for 2 mins for a distance of 100 metre. Find the speed of the carriage.(In km per hour)
a) 8 b) 7 c) 6 d) 5

71) A rabbit takes 9 jumps for every 5 jumps of a lion and fox takes 7 jumps for every 9 jumps of a rabbit. The distance covered by the lion in 3 jumps, the distance covered by the fox in 2 jumps and the distance covered by the rabbit in 5 jumps is equal. Find the ratio of their respective speed.
a) 25 : 75 : 135 b) 28 : 14 : 35 c) 50 : 105 : 54 d) 45 : 55 : 65

72) The wheel of a bike has a radius of 70cm. How many revolutions approximately per minute would the wheel make. If it is moving at a speed of 90km/h? (Use = 22/7)
a) 312 b) 341 c) 357 d) 325

73) A girl covered a definite distance at some speed. If she had moved 6km/h faster, She would have taken 45 minutes less. If she had moved 5 Km/h slower, she would have taken 45 minutes more. What is the distance in km?
a) 495 b) 462 c) 425 d) 518

74) A student walking at ¾ of its usual speed is late by 12 mins, Determine his usual time to cover the distance.
a) 36 b) 42 c) 24 d) 30

75) A person travels the first part of his journey at 120 kmph and the second part at 180 kmph and covers the total distance of 2160 km to his destination in 15 hours. How long did the first part of his journey last?
a) 8 hours b) 9 hours c) 7 hours d) 10 hours

76) A car has tyre has two punctures. The first puncture alone would have made the tyre flat in 7 min and the second alone would have done it in 4 min. If air leaks out at a constant rate, how long does it take both the punctures together to make it flat.
a) $4\frac{1}{11}$ b) $2\frac{6}{11}$ c) $3\frac{1}{11}$ d) $1\frac{6}{11}$

77) A car covers its half journey at a speed of 40 km per hour. Remaining half at a speed of 60 km per hour. Total journey of 12 hrs Find the distance traveled by the car in Km.

a) 432 b) 144 c) 576 d) 288

78) Two persons A and B are walking towards each other on a walking path that is 18km long. A is walking at the rate of 3.0 km/h and B at 4.2 km/h. After how much time will they meet each other?
a) 2 hours 30 minutes b) 1 hours 50 minutes
c) 2 hours 50 minutes d) 1 hour 30 minutes

79) A car starts at a speed of 30km/h. It increases its speed at the rate of 10km/h. The time taken by the car to cover a distance of 375km is:
a) 6 hours b) 5hours c) 6.5hours d) 5.5 hours

80) A and B run at a speed of 8km/h and 12km/h. If they run a circular track of length 6 km, determine the number of rounds after which B meets A.
a) 4 b) 3 c) 5 d) 2

81) A boy walking at a rate of 9km/h crosses a bridge in 32 minutes. What is the length of bridge in meters?
a) 4160 b) 4800 c) 4000 d) 4480

82) The speed of the bus increases by 3 kmph every one hour. If the distance travelled in first one hour is 42 km, then what was the total distance travelled in 12 hours?
a) 684 b) 682 c) 736 d) 702

83) Rohan started from home for his office 20 minutes late. But he maintains his speed at one and a half times more than usual and reaches his office on time. Determine his usual time (in minutes).
a) 50 b) 60 c) 40 d) 45

84) Four runners begin a race on a rectangular track of 500m length and 400m breath. The speed of the four runners is 9m/s, 6m/s, 5m/s and 4m/s respectively. If they begin the race at the same time from the same point, then after how much time will they meet again at the starting point?
a) 1800s b) 2800s c) 2400s d) 2000s

85) Mohan and Sohan start from P and Q, respectively. Mohan covers a distance from P to Q in 4 hours and Sohan covers a distance from Q to P in 6 hours. Determine the ratio of speed of Mohan and Sohan?
a) 3:2 b) 3:5 c) 2:3 d) 5:3

86) A person completes a journey in 12 hours. He travels the first half of the journey at the rate of 19km/h and the second half at the rate of 21 km/h. What is the total journey in km?
a) 217.8 b) 208.4 c) 239.4 d) 226.2

87) Aslam drives to his office, if he increases his average speed by 12%, then by what percentage (correct to two decimal places) will his time of travel decrease?
a) 10.34 b) 11.02 c) 10.71 d) 12.00

88) A policeman saw a thief from a distance of 100 metres. He started chasing him at a speed of 4 metres per second. On seeing the policeman, The thief started running at a

speed of 2 metres per second. Determine the distance run by the policeman to catch the thief. (In metres)
a) 100 b) 200 c) 250 d) 150

89) Two persons are moving towards each other in the opposite directions at 21 km/h and 17 km/h. The total distance between them is 19km. In how long will they meet?
a) 30 min b) 50 min c) 60 min d) 40 min

90) Two stations P and Q are 42 km apart. Rohit and mohit start from P to Q at the speed of 6km/h and 8km/h, respectively mohit reaches Q first and return to meet rohit at R. Determine the distance between P and R in km
a) 30 b) 36 c) 33 d) 27

91) The railway platform at a certain station is 248m long. In how many seconds it is cleared by the Express train which is 127 m long and travels at a speed of 150 km/h?
a) 9 b) 12 c) 8 d) 10

Compound Interest & Simple Interest:

92) From an amount of Rs. 154980, some amount is given to A at interest rate of 15% and the remaining amount is given to B at interest rate of 14%. If the amount is given at simple interest rate and gives a total profit of Rs. 22472.1 after one year. Find the percentage change in profit (approximately) if the interest rates of A's and B's gets interchanged.

93) If the compound interest on a sum for 2 years at 3% be Rs. 736.89, what would be the simple interest?
a) Rs. 726 b) Rs. 716 c) Rs. 720 d) Rs. 700

94) A sum of Rs. 800 is invested for 3 years at simple interest. The rate of interest for the 3 years is 6%, 8%, and 10% per annum. Find the total amount of interest earned at the end of 3 years.
a) Rs. 195 b) Rs. 192 c) Rs. 188 d) Rs. 185

95) A certain sum of money becomes Rs. 4,500 at a certain rate of compound interest of 4 years and Rs. 75000 in 8 years. Find the money?
a) Rs. 2900 b) Rs. 2500 c) Rs. 2700 d) Rs.2300

96) Calculate the compound interest on a sum of rs. 12,000 at 8% per annum for 2(5/8) years nearest to a rupee.
a) Rs. 2,712 b) Rs. 9,612 c) Rs. 2,698 d) Rs. 2,066

97) Equal amount has been deposited by Rhythm in two different schemes, M and N, which are offering same rate of interest that is $5\frac{5}{9}$. After 2 years, the interest received from scheme M is Rs. 880 less than the interest received from scheme N after 4 years. Find $9\frac{1}{11}$ of the amount deposited by rhythm in scheme M.
a) 654.55 b) 650 c) 655.4 d) 600

98) A sum of the money gives Rs. 300 as simple interest at a rate of 10% for 3 years. If the same sum is invested at 8% for 3 years, the compound interest will be:
a) Rs. 289.6 b) Rs. 1460. 3 c) Rs. 259.71 d) Rs. 312.5

99) Some amount out of Rs. 7000 was lent at 6% p.a, and the remaining at 4% p.a. If the total simple interest received on the amount of Rs. 7000 in 5 years was Rs. 1600, then find the amount that was lent at 6% p.a.
a) Rs. 5000 b) Rs. 3000 c) Rs. 2000 d) Rs. 4000

100) A man deposited some amount in a bank on compound interest for 4 years at the rate of 20% per annum. The difference between the amount accumulated after 4 years and the amount accumulated after 2 years is Rs. 12672. If the same principle amount is deposited at simple interest at rate of interest r% per annum for 4 years, then find the value of 'r', if the simple interest obtained by man is Rs. 4000.
a) 2 b) 5 c) 10 d) 15

101) A man deposit Rs. 600 for 3 years, 750 for 4 years at r% p.a. rate of simple interest (S.I.) and Rs. 1200 for 6 years at s% p.a. He got S.S. Rs. 1200 total from all deposits. Find the r + s if difference between r and s is equal to 5.
a) 10 b) 11 c) 12 d) 13

102) A man has Rs. 13, 600. He lends some parts of his money at the rate of 10% simple interest and some part at 7.5% yearly. After 3.5 years he earned Rs. 3808. Find the money given at 10% rate.
a) Rs. 2,420 b) Rs. 2,780 c) Rs. 2,720 d) Rs. 5,600

103) Find the compound interest on Rs. 3200 in 1.5 years at 5% per annum if interest is calculated half-yearly.
a) Rs. 344.05 b) Rs. 3446.05 c) Rs. 346.05 d) Rs. 246.05

104) The sum of money is loaned at compound interest for 2 years at 20% per annum. It would fetch Rs. 482 more, if the interest was payable half-yearly than if it were payable yearly, then the sum is:
a) 30000 b) 20000 c) 40000 d) 15000

105) A man invests in three separate schemes for 8 years, 12 years, 14 years at the rates of 8%, 10%, 12%, respectively, at simple interest. He got equal simple interest from each scheme. If the proportion in the principal amounts invested in the different schemes is x : y : z then x + y + z is equal to
a) 200 b) 201 c) 102 d) 210

106) The rate of interest on a sum of money is 4.5% per annum for the first two years, 6.25% per annum for the next four years and 8% per annum for the period beyond 6 years. If the simple interest accrued by the sum for a total period of 9 years is 5394, what is the sum?
a) 9000 b) 9900 c) 9500 d) 9300

107) How many years will a sum of ₹1,600 amount to ₹2,116 at 15% compound interest?
a) 4 b) 1 c) 3 d) 2

108) A person lent a personal loan at 8.5% per annum simple interest in 20 years, the interest amount to Rs. 6,300 more than the loan lent. What was the sum lent?
a) Rs 8,500 b) Rs 10,000 c) Rs 12,000 d) Rs 9,000

109) An amount of Rs. 1,800 with a simple rate of interest becomes Rs. 2, 340 in 6 years. If the rate of interest is increased by 2% then the amount becomes P then the value of P is?
a) 2556 b) 2656 c) 2665 d) 2565

110) Ramesh took a loan at simple interest of 6% with an increase of 0.5% in each subsequent year. If he paid an interest of Rs 4375 after 5 years, how much loan did he take?
a) Rs 13500 b) Rs 13000 c) Rs 12000 d) Rs 12500

111) A sum of money invested at simple interest amounts to ₹1,770 in 3 years and to ₹2,130 in 7 years. How much is the sum invested?
a) ₹1,600 b) ₹1,480 c) ₹1,740 d) ₹1.500

112) A person invested ⅔ of his capital at the rate of 6% and ⅕ at the rate of 10% and the remainder at the rate of 15%. If his actual income is 3,600 the capital will be:
a) Rs. 50000 b) Rs. 25000 c) Rs. 75000 d) Rs. 45000

113) A borrowed Rs. 12, 000 from a company at the rate of 12% per annum for 15 years. After a certain period of time the company introduced a scheme which induced the interest rate by 10% . At the end of 15 years, A paid Rs. 18,000 in total then after how much time (in years) did the company introduce the scheme?

114) A person invested certain money at the rate of 12.5% per annum compounded annually. If the compound interest of the 3rd year is Rs 10850. For what money was invested each year.
a) Rs. 26, 600 b) Rs. 25,500 c) Rs. 25,000 d) Rs. 25,600

115) A sum of money invested for 4years @ 5% simple interests amounted to ₹150 on maturity. What was the sum invested?
a) ₹120 b) ₹180 c) ₹176 d) ₹125

116) If simple interest is offered per year on a sum of money invested for five years, the amount of money payable on maturity after the five years' elapse is Rs. 2, 340. However, if the sum was invested for only two years, the amount payable on maturity would be 2016. What is the original sum invested?
a) Rs. 1750 b) Rs. 1800 c) Rs. 1600 d) Rs. 2000

117) A person distributed 72% of the money he had between Ram and Raj in the ratio of 5 : 7 respectively. Ram and Raj deposited the amount received in a scheme offering 8% and 10% simple interest, respectively, for 10 years. Find the amount in Rs left with the person if the sum of interests earned by Ram and Raj after 10 years is Rs 6,600.
a) 2800 b) 3000 c) 3500 d) 2000

118) What will be the compound interest earned on an amount of Rs. 16800 in $1\frac{3}{4}$ years at the rate of 6.25% per annum?
a) 1050 b) 2367 c) 1887 d) 9147

119) A person lends 35% of his sum of money at 12.5% per annum, 50% at the end of 10% per annum and the rest at 18% per annum rate of interest. What would be the annual rate (in approx), if the interest is calculated on the whole sum?

a) 13% b) 14.5% c) 13.5% d) 13.75%

Mixtures:

120) A container contains a 50 liter mixture of milk and water in ratio 7:3. Some amount of the mixture is taken out and replaced with the same amount of water. The ratio of milk and water becomes 14:9. Find the amount of mixture that was taken out.

a) $12\frac{1}{2}\ litre$ b) $20\ litre$ c) $16\frac{2}{3}\ litre$ d) $10\ litre$

121) A mixture contains alcohol and water in the ratio of 7 : 5. If 7 litres of water is added to the mixture, then the ratio becomes 9 : 7. Find the quantity of alcohol in the given mixture?

a) 15.75 b) 15.35 c) 15.55 d) 15.25

122) Three containers have a capacity of ratio of 7:5:1. All three have a ratio of water and milk 5:3, 4:3 and 7:4 respectively. We take 1/3 part of the first container, 1/2 of the second and 1/7 of the third container and mixed them into a new container. The percentage (approximately) of water in the new container is equal to:

A) 30% b) 59% c) 28% d) 32%

123) Akshay mixes three varieties of groundnuts with cost price at the rate of Rs. 55 per kg, Rs. 27 per kg, Rs. 34 per kg in the ratio of 2:4:3 by weight. Further in 27 kg of the above mixture, he mixes some kilograms of groundnuts with cost price at Rs. 39 per kg. If he sells the new mixture for a total of Rs 2,163 and earns 40% profit, then what is the amount of groundnut priced at Rs. 39 per kg in the new mixture?

a) 10kg b) 8kg c) 6 kg d) 15 kg

124) Three containers A, B and C are filled with milk part ¼ part of A is put into B. Now ⅓ part of B is put into C. Again 5/11 part of C is put into A. In the end, ¼ part of A is put into B again. Now the final amount of milk in each container is 6 litres. The initial quantity (in litres) of milk in each container, respectively is equal to:-

a) 4,5,9 b) 3,7,8 c) 3,6,9 d) 4,7,7

125) There are three types of alloys A, B and C. The ratio of Copper, Tin and Nickel in A, B and C is 16:3:1 ,15:3:2 and 14:5:1 respectively. If the amount of A, B, and C 10 kg, 15 kg and 50 kg are mixed together respectively. Then, the final ratio of Copper Tin and Nickel in mixture is equal to

a) 217 65 18 b) 217 65 81 c) 217 56 18 d) 127 65 18

Ages:

126) The ratio of present ages of P and Q is 5:9 and is the age of P, 5 year hence is 50% of age of R 10 year hence. If the age of Q 15 year ago was 75% of the age of R 10 year ago, then find the average of P, Q and R.

a) 50 b) 45 c) 60 d) 40

127) The present age of B is 2 years less than the average of present ages of A and C. After 13 years the age of A is 28 years more than the age of C and 8 years ago the age of C was 70% of the age of B, then find the difference between the age A and B.

a) 18 b) 16 c) 12 d) 14

128) Aarna's present age is 559 % more than Ravleen's present age. The age of Ravleen thirteen years ago was 1623 % of the age of Aarna is eleven years hence. Find the present age of Aarna.
a) 144 yrs b) 141 yrs c) 90 yrs d) 72 yrs

129) The ages of a father and a daughter are in the ratio 5:2. After 8 years the ratio becomes 7:4. Find the age of the daughter after 8 years?
a) 16 years b) 18 years c) 24 years d) 20 years

130) The average age of Ram and Mohan is 2 years more than the average age of Mohan and Jitesh. The average age of Jitesh and Ram is 12 years, which is 2 years less than the average age of Mohan and Jitesh. What is the age of Jitesh?
a) 12 years b) 8 years c) 10 years d) 14 years

131) The present ages of four persons are in the ratio 1:2:3:4. The average of their ages seven years ago was 28 years. What will be the average age (in years) of the youngest and the oldest among them, five years from now?
a) 32 b) 36 c) 35 d) 40

132) The average age of Raghu and Bagha is 60 years which is 15 years more than the average age of Bagha and Tanmay. The average age of raghu and tanmay is 65 years. Daya is 12.5% older than Bagha. What is the age of Daya?
a) 45 b) 35 c) 30 d) 40

Simplification

133) Simplify

$A = 5 \times 7 \div 7\ of\ 5 - 9\ \div 3\ of\ 3 \times (9 - 6) + 4 \times 5\ \div 8\ of\ 3\frac{1}{4}$

$B = 2\frac{3}{2} \div 4\frac{5}{4}\ of\ 3\frac{2}{3}$

$A \div B\ of\ A^{-1}$

a) $\frac{2021}{110}$ b) $\frac{1101}{129}$ c) $\frac{1408}{169}$ d) $\frac{196}{1408}$

134) Which of the following is the decimalised value of $\sqrt[4]{\frac{256}{6561}}$

a) $0.\bar{4}$ b) $0.\overline{225}$ c) 0.44 d) 2.25

135) Simplify

$$\left[\frac{1+\frac{3}{4}}{4-\frac{2}{3}} \div \frac{4+\frac{2}{3}}{4-\frac{2}{3}} - 4\frac{1}{2} of \left\{\frac{2\frac{1}{2}}{1\frac{1}{4}} + \frac{2}{3} of \frac{3\frac{1}{2}+1\frac{1}{2}}{3-\frac{1}{2}}\right\}\right] \times \left(\frac{-8}{117}\right)$$

136) What is the simplified value of $\left(\frac{0.1}{11\times1.3-1.5}\right)^{\overline{0.571428}}$

a) 0.03125 b) 0.015625 c) 0.08 d) 0.0625

137) What is the simplified value of $\frac{1}{27} + \frac{1}{216} - \frac{1}{8} + \frac{3^2+4^2}{300}$

a) $\frac{1}{288}$ b) 0 c) $\frac{1}{36}$ d) $\frac{1}{144}$

138) A passenger travels by car from Delhi to Chandigarh at the speed of 120 km/h, and returns to Delhi on the same route at the speed of 80 km/h. Another passenger

travels by train from Chandigarh to Kalka at the speed of 60 km/h in time t, and from Kalka to Solan at the speed of 40 kmh in time t. What is the average speed of the car and the train, respectively?
a) 96 km/h and 48 km/h b) 100 km/h and 48 km/h
c) 100 km/h and 50 km/hd) 96 km/h and 50 km/h

139) $\frac{1\frac{1}{6} \div 1\frac{1}{4} \, of \, 2\frac{5}{2} + \frac{3\frac{1}{2}}{1\frac{3}{4}}}{2\frac{3}{4} \div 5\frac{3}{4} \, of \, 1\frac{1}{2} - \frac{1\frac{1}{4}}{3\frac{1}{2}}}$

a) $-\frac{41124}{3375}$ b) $-\frac{6850}{2115}$ c) $-\frac{6854}{2110}$ d) $\frac{41124}{3375}$

Number System

140) $(0.125)^{th}$ part of a number exceeds $(0.1)^{th}$ part of it by 13.75. What is the number?
a) 495 b) 275 c) 110 d) 550

141) The sum of n observations is 11280 and their mean is 705. Find the value of n.
a) 15 b) 16 c) 14 d) 13

142) If $\frac{x}{y} = \frac{a^2+b^2}{a^2-b^2}$, consider a is the first number and b is the second number, AM = Arithmetic Mean, GM = Geometric Mean, HM = Harmonic Mean, then $\frac{x^2+y^2}{x^2-y^2}$=?
a) 1/HM b) 1/AM c) HM/GM d) GM/AM

143) Determine the smallest number 300 and 400 which when divided by 2, 3, 4, 5, 6 leaves the remainder 1, 2, 3, 4, 5 respectively?
a) 349 b) 329 c) 339 d) 359

144) A wall is of 10m 73cm in length and 6 m 67cm in height, Find the least number of square boxes of equal size required to paint the entire wall completely.
a) 851 b) 861 c) 855 d) 865

145) What is the maximum number of times that 8/9 can be subtracted from 8, so that the remainder is not less than 3.
a) 7 b) 5 c) 4 d) 6

146) What is the value of the reciprocal of $(12^3 + 1^3 - 10^3/64)^{\frac{1}{6}}$
a) 1/3 b) 3/2 c) 2/3 d) 3

147) The sum of the squares of two fractions is 1. It is given that one of them is 21/29. The sum and the product of the possible values of the other fractions are, respectively, s & p. What is the value of (s-p)?
a) 441/841 b) 400/441 c) 400/841 d) 100/441

148) The reciprocal of a fraction is more than itself by 21/240. How much is the difference between the possible values of the fraction more than 2?
a) 1/15 b) 1/16 c) 1/240 d) 1/256

149) Prerna was trying to find the number between 6000 and 8000 that are exactly divisible by 40,48,60 and 72 . How many maximum numbers can she find?

a) 2 b) 3 c) 5 d) 4

150) Find the range of the set of the values 215, 312, 227, 206, 209, 318, 321, 408
a) 202 b) 204 c) 205 d) 203

HCF LCM

151) An environmentalist began planting Khejri and Babul trees in the desert areas of Rajasthan. The HCF and LCM of the numbers of Khejri trees planted and the number of Babul Trees planted are 7 and 245, respectively. What is the difference between the number of Khejri and the number of Babul Trees if the number of Khejri trees planted is 49?
a) 14 b) 25 c) 18 d) 35

152) What will be the remainder when the square of the LCM of 4, 6, 12, and 15 is divided by the square of HCF of 51, 119 and 323?
a) 130 b) 136 c) 132 d) 134

153) The marks scored by Kiyara in Hindi, English, science and mathematics 6:8:9:10. If the LCM of her marks in the above stated subjects is 3600 then calculate the HCF of her marks.
a) 8 b) 12 c) 10 d) 15

154) What is the sum of LCM and HCF of 5/18, 35/9 and 15/63?
a) 1475/252 b) 1475/126 c) 625/252 d) 625/126

Area & Mensuration

155) If the area of the triangle with base 16cm is equal to the area of square with side 14cm, then what is the altitude of the triangle in cm?
a) 24.5 b) 28.0 c) 21.4 d) 26.2

156) Four cows are tethered at four corners of a square plot of side 28 meters such that the adjacent cows can just reach one another, this is a small circular pond of area 40m^2 at the center, which is the area that is left ungrazed.
a) 154m^2 b) 128m^2 c) 136m^2 d) 142m^2

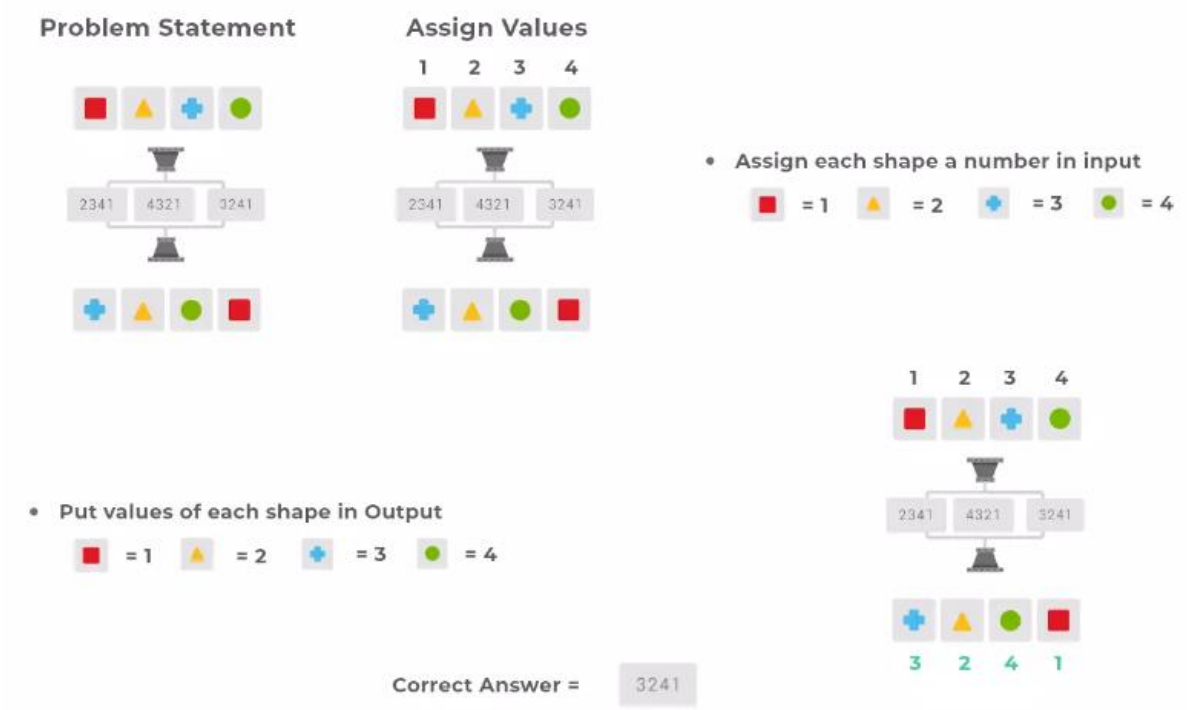
157) Two metallic right circular cones with heights of 4.9 cm and 4.7 cm and radii of their bases 2.4 cm each, have been melted together and recast into a sphere. What is the diameter of the sphere?
a) 5.6 cm b) 5.2 cm c) 4.8 cm d) 6.2 cm

158) Cone and sphere has the same radius of 18cm. If the cone and the sphere have the same volume, then what is the height (in cm) of the cone?
a) 66 b) 60 c) 54 d) 72

2. CAPGEMINI

GAMES BASED APTITUDE TEST

Question 1: Solving Grid



Question 2: Geo Sudo

Question 3: Geo Sudo

Question 4: Digit Challenge

Note: There can be multiple solutions

First we will try to solve it incorrectly

- 2 x 9 + 2 = 20 would be incorrect (We can only use any digit only once)
- 7 x 2 + 6 = 20
- 3 x 4 + 8 = 20
- 6 x 2 + 8 = 20
- many others.....

Note: Do not look at the solution below, solve on your own

Level 3 Problem !!!

- As you can see some digits are unavailable, viz. 3, 5, 8
- Division and multiplication have same priority, so you should solve left to right
- That is division will be done first and then multiplication
- There may multiple solutions to this question, you must solve it in 15 seconds ideally
- Below solution is hidden so you solve it on your own
- 9 / 6 * 4 = 6 i.e 1.5 * 4 = 6

Question 5: Motion

Note: There may be multiple solutions

Your job is to find, solution with min number of moves, check formula for calculation

Step 1 - Blue block up

Step 2 - Purple block up

Step 3 - Purple block left

Step 4 - Green block up

Step 5 - Green block left

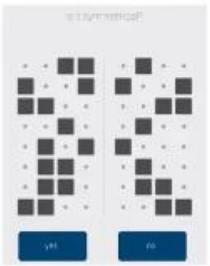
Step 6 - Ball right

Step 6 - Ball up

Question 6: Grid

Note: You get 3 seconds, for remembering dot position, then it moves to symmetry

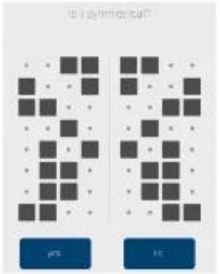
Remember the Position of Dot 1



Mark Yes, if these are symmetrical, otherwise No

Answer: Yes

Remember the Position of Dot 2



Mark Yes, if these are symmetrical, otherwise No

Answer: No

Mark the dots position, in the correct Order (imp)

With each level up, the number of dots and symmetry increases

Question 7: Inductive Logical Reasoning (Doesn't fit the rule:)

- In image 1, 5th line is broken
- In image 2, 4th line is broken
- In image 3, 3th line is broken
- In image 4, 2nd line is broken
- In image 5, 5th line is broken
- In image 6, 2nd line is broken

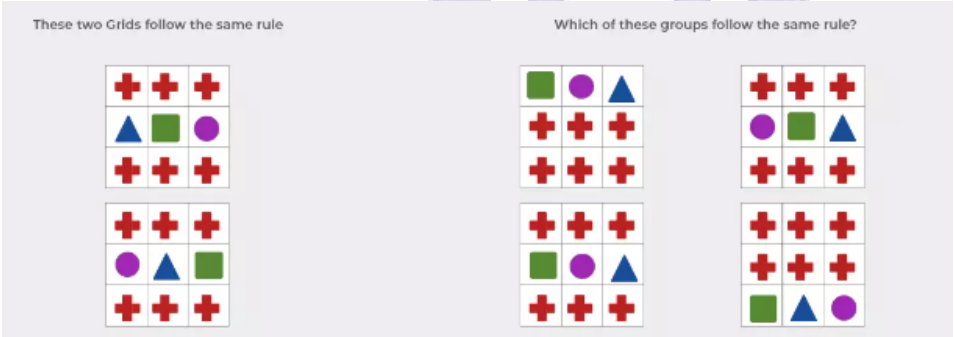
Image 5, doesn't follow the rule, as broken line are forming sequence, line broken are 5th 4th 3rd 2nd 1st then opposite order 2nd 3rd 4th 5th
However, in 5th image, rather than 1st line being broken 5th is broken

In all images, there are two images one filled with black and one empty and they don't overlap one another. While in image 3, they overlap one another, thus its odd one out

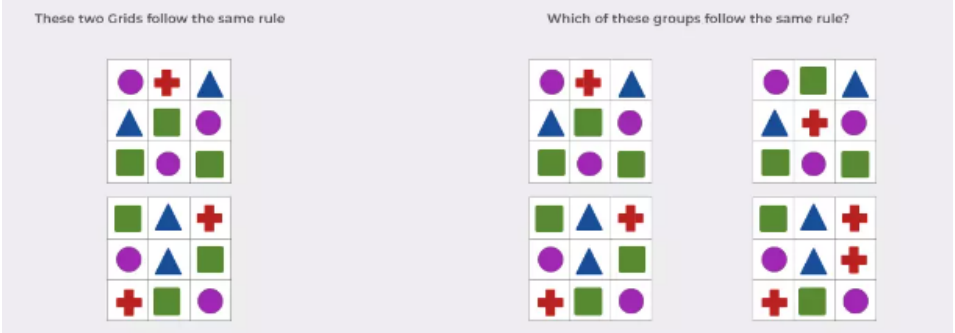
This one, is a little difficult, but, there are two things happening,
1. Center + sign comes and goes in every alternate image
2. Whenever, + sign comes back 2 other + signs in pair go

1. 2nd image : + goes away
2. 3rd image : + comes back and 2 other + signs removed from its left & right
3. 4th image : + goes away
4. 5th wrong : + should come back and 2 other + sign top and bottom removed (As give here : )
5. 6th image : + goes away
6. 7th image : + comes back and 2 other + signs from top-right, bottom-left removed
7. 8th image: + goes away
8. 9th image : + comes back and 2 other + signs from top-left, bottom-right removed

Question 8: Follow the same rule

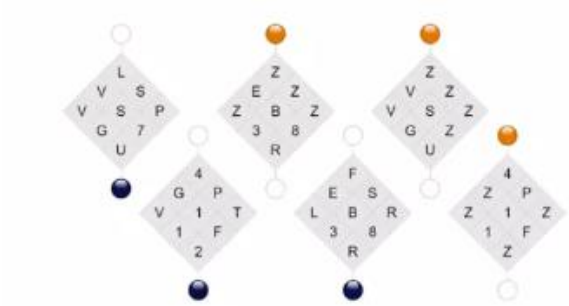


Answer: Image 2 and 3, first and last row all contain + signs



Answer: Image 1 and 3, middle rows don't contain figures with more than 4 sides

Question 9: Color the Grid Challenge

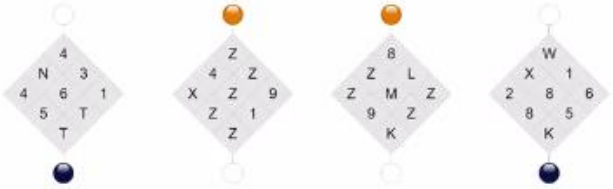


Note that:

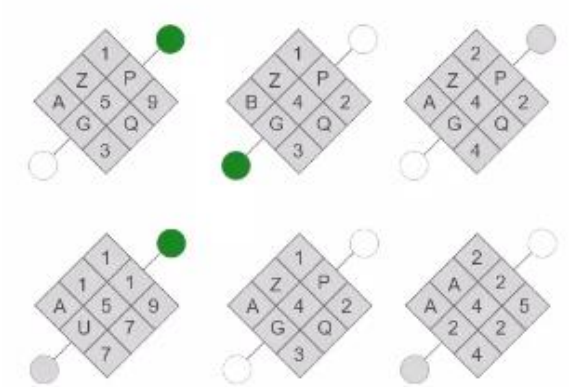
All the grids which have totally, 4 Z's are of orange color (on top)

All the other grids are having blue-black color (on - bottom)

Just mark the same way, options having 4 Z's mark the top with Orange color, the one's which don't mark them with blue-black



Question 10: Color the Grid Challenge

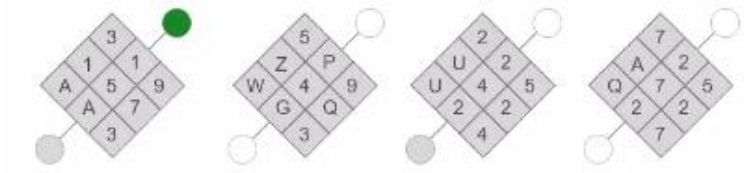


Note that:

If all the grids have odd numbers then op circle is marked green. If only even then marked grey, if combination both then its kept unmarked

If all the grids have consonants then bottom circle is marked green. If only Vowels, then marked grey, if combination of both them kept unmarked

Just mark the same way, in the options



3. IBM

1. Solve 1781.90÷54.20 + 456.13 – 2345.80 *0.98 = ? * 2

2. Solve 24.95% of 797.07 ÷ 19.05 = 54.88 – ?

3. The average expenditure of Sharma for January to June is Rs. 4200 and he spent Rs. 1200 in January and Rs.1500 in July. The average expenditure for the months of February to July is:

4. A jar containing 60litres of the mixture of milk and water. The respective ratio of milk and water in the ratio 7:5. From the jar 12litres of the mixture was taken out and 6 liters of pure milk was added. What is the respective ratio of milk and water after the final operation?

5. Two varieties of juice are mixed in the ratio of 4:5. The price of 1st variety juice is Rs.14 per liter while the second variety is Rs.17 per liter. Find the average price of the mixture?

6. Venkat lends Rs 30,000 of two of his friends. He gives Rs 15,000 to the first at 6% p.a. simple interest. He wants to make a profit of 10% on the whole. The simple interest rate at which he should lend the remaining sum of money to the second friend is:

7. Mahesh lends 40% of his money at 15% per annum, 50% of the rest at 10% per annum and the rest at 18% per annum rate of interest. What would be the annual rate of interest, if the interest is calculated on the whole sum?

8. Find the 4-digit smallest number which when divided by 12, 15, 25, 30 leaves no remainder?

9. A, B, and C can alone complete a work in 10, 12 and 15 days respectively. All started the work but B left the work 3 days before completion. How much work was then done by A and B together in the total work?

10. A sum of money is to be distributed among A, B, C, D in the proportion of 5: 2: 4 : 3. If C gets Rs. 1000 more than D, what is B's share?

11. Three pipes A, B and C can fill a cistern in 6 hours. After working at it together for 2 hours, C is closed and A and B can fill the remaining part in 6 hours. The number of hours taken by C alone to fill the cistern is:

12. Two pipes A and B can fill a tank in 6 hours and 5 hours respectively. If they are turned on alternatively for 1 hour each, find the time in which the tank is full.

13. Two pipes P and Q can fill a tank in 20m and 30m respectively. If both the pipes are opened simultaneously, after how much time should Q be closed so that the tank is full in 16 minutes?

14. Veera Reddy sold 10 sarees for a total profit of Rs. 460 and 12 sarees for a total profit of Rs. 144. At what profit per saree should he sell the remaining 20 sarees so that he gets an average profit of Rs. 18 per sarees?

15. A retailer buys 40 pens at the market price of 36 pens from a wholesaler. If he sells these pens giving a discount of 1%, what is the profit percent?

16. The numerator of a rational number is 4 less than the denominator. If the numerator is increased by 15 and denominator is decreased by 4, we get 6. Find a rational number?

17. Two different numbers, when divided by the same divisor, leaves remainder 7 and 9 respectively. When their sum is divided by the same divisor remainder was 4. Find the divisor?

18. When a number is added to 20 percent of the second number, we get 150 percent of the second number. Find the ratio between the first and second number?

19. If Rs 20/- is available to pay for typing a research report & typist A produces 42 pages and typist B produces 28 pages. How much should typist A receive?

20. A man reaches his office two hours late travelling at 50 km/hr. if he increases his speed to 60km/hr, he is late by 1 hour. find the distance he has to travel to reach his office and speed required to reach the office in time

21. In a simultaneous throw of two dice, what is the probability of getting a total of 10 or 11?

22. The printed price on a book is 400, a bookseller offers a 10% discount on it. If he still earns a profit of 12&, the CP of the book is

23. Printer A prints 8192 characters per min and printer B prints 13862 characters per min four characters are equal to one word. Printer A starts at 7:15 am while Printer B starts at 7:29 am then at what time both will have same no of words printed.

24. 10 men and 15 women together can complete a work in 6 days. It takes 100 days for one man alone to complete the same work. How many days will be required for one woman alone to complete the same work?

25. If a salesman's average is a new order every other week, he will break the office record of the year. However, after 28 weeks, he is six orders behind schedule. In what proportion of the remaining weeks does he have to obtain a new order to break the record?

26. If 19 and 1140 are the respective HCF and LCM of two numbers, which are greater than 19 then what will be the possible number of such pair?

27. Foreign language broadcast records last 90Mins on each of two sides if it takes 5hrs to translate one hour of broadcast how long will it take to translate 16 full records?

28. A clerk multiplied a number by ten when it should have been divided by ten.The ans he got was 100.what should the ans have been?

29. If Rs20/- is available to pay for typing a research report & typist A produces 42 pages and typist B produces 28 pages.How much should typist A receive?

30. The average salary of 3 workers is 95 Rs. per week. If one earns Rs.115 and second earns Rs.65 how much is the salary of the 3rd worker.

31. A 16 stored building has 12000 sq.feet on each floor. Company A rents 7 floors and company B rents 4 floors. What is the number of sq.feet of unrented floor space.

32. During a given week A programer spends 1/4 of his time preparing flow chart, 3/8 of his time coding and the rest of the time in debugging the programs. If he works 48 hours during the week , how many hours did he spend debugging the program.

33. A company installed 36 machines at the beginning of the year. In March they installed 9 additional machines and then disconnected 18 in August. How many were still installed at the end of the year.

34. A man owns 2/3 of the market research beauro business and sells 3/4 of his shares for Rs. 75000. What is the value of Business.

35. If 12 file cabinets require 18 feet of wall space, how many feet of wall space will 30 cabinets require?

36. A computer printer produced 176,400 lines in a given day. If the printer was in operation for seven hours during the day, how many lines did it print per minute?

37. From its total income, A sales company spent Rs.20,000 for advertising, half of the remainder on commissions and had Rs.6000 left. What was its total income?

38. On Monday a banker processed a batch of cheques, on Tuesday she processed three times as many, and on Wednesday she processed 4000 cheques. In the three days, she processed 16000 cheques. How many did she process on Tuesday?

39. The cost of four dozen proof machine ribbons and five dozen accouting machine ribbons was Rs.160/-. If one dozen accounting machine ribbons cost Rs.20/-, what is the cost of a dozen proof machine ribbons?

40. If a clerk can process 80 cheques in half an hour, how many cheques can she process in a seven and one half hour day?

41. In a library, there are two racks with 40 books per rack. On a given day, 30 books were issued. What fraction remained in the racks?

42. The average length of three tapes is 6800 feet. None of the tapes is less than 6400 feet. What is the greatest possible length of one of the other tapes?

43. A company rented a machine for Rs.700/- a month. Five years later the treasurer calculated that if the company had purchased the machine and paid Rs.100/- monthly maintenance charge, the company would have saved Rs.2000/-. What was the purchase price of the machine?

44. Two computers each produced 48000 public utility bills in a day. One computer printed bills at the rate of 9600 an hour and the other at the rate of 7800 an hour. When the first computer finished its run, how many bills did the other computer still have to print?

45. If a salesman s average is a new order every other week, he will break the office record of the year. However, after 28 weeks, he is six orders behindschedule. In what proportion of the remaining weeks does he have to obtain a new order to break the record?

46. On a given day, a bank had 16000 cheques returned by customers. Inspection of the first 800 cheques indicated that 100 of those 800 had errors and were therefore the available immediately for data processing. On this basis, hwo many cheques would be available immediately for data processing on that day?

47. A company figured it needed 37.8 sq.feet of carpot for its reception room. To allow for waste, it decided to order 20% more material than needed. Fractional parts of sq.feet cannot be ordered. At Rs.9/- a sq.feet, how much would the carpet cost?

48. A tape manufacturer reduces the price of his heavy duty tape from Rs.30/- to Rs.28/- a reel and the price of a regular tape from Rs.24/- to Rs.23/- a reel. A computing centre normally spends Rs.1440/- a month for tapes and 3/4 of this is for heavy duty tapes. How much will they save a month under the new prices?

49. In a team of 12 persons, 1/3 are women and 2/3 are men. To obtain a team with 20% women how many men should be hired?

50. The dimensions of a certain machine are 48" X 30" X 52". If the size of the machine is increased proportionately until the sum of its dimensions equals 156",what will be the increase in the shortest side?

51. In a certain company, 20% of the men and 40% of the women attended the annual company picnic. If 35% of all the employees are man, what percent of all the employees went to the picnic?

52. It cost a college Rs.0.70 a copy to produce a Program for the homecoming football game. If Rs.15,000/- was received for advertisements in the program, how many copies at Rs.0.50 a copy must be sold to make a profit of Rs.8000/- ?

4. COGNIZANT

1. The CP of Desk is Rs.2000. A Salesman wants to make 15% profit by selling it. At the time of sale, he declares a discount of 10% on MP. The Marked price is?

2. A boy bought 2 items for Rs.7500. One item he sells at a profit of 16% and another item at 14% loss. In this, the boy makes neither any profit nor any loss. What is the difference between the SP of 2 items?

3. Prakash sold a machine to Swapna at a profit of 30%. Swapna sold this machine to Ajay at a loss of 20%. If Prakash paid Rs.5000 for this machine, then find the cost price of machine for Ajay?

4. A car travels at an average speed of 50 kilometers per hour. How long will it take to travel 200 kilometers?

5. If a box contains 12 red balls, 8 blue balls, and 5 green balls, what is the probability of randomly selecting a blue ball?

6. In a group of persons travelling in a bus, 6 persons can speak Tamil, 15 can speak Hindi, and 6 can speak Gujarati. In that group, none can speak any other language. If 2 persons in the group can speak two languages and one person can speak all three languages, then how many persons are there in the group?

7. Aman completes a journey in 10 hours. He travels the first half of the journey at the rate of 21 km/hr and the second half at the rate of 24 km/hr. Find the total journey in km.

8. A reduction in the price of mangoes by 20% enables a farmer to purchase 12 more mangoes for Rs. 15. So what could be the price of 16 mangoes before the reduction of the price?

9. A person earns an interest of 240 on investing certain amount at Simple interest for 2 years at 5 percent amount. If the rate of interest is compounded annually then how much more interest will be gain by the person at same rate of interest and on the same sum.

10. A sum of rupees 4420 is to be divided between Ramesh and Suresh in such a way that after 5 years and 7 years respectively the amount they get is equal. The rate of interest is 10 percent. Find the share of Ramesh and Suresh

11. There are 2 trucks facing each other at a distance of 500 cm from each other. Each truck moves forward by 100 cm at a speed of 50 cm/s and then moves backwards by 50 cm at a speed of 25 cm/s. How long will they take to collide?

12. One pipe can fill a bucket three times as fast as another pipe. If together the two pipes can fill the bucket in 36 minutes, then the slower pipe alone will be able to fill the bucket in.

13. Seats for Mathematics, Physics and Biology in a school are in the ratio 5:7:8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

14. The average of 11 results is 50. If the average of the first 6 results is 49 and that of last 6is 52, find the sixth result?

15. A mixture contains A and B in the ratio 5: 9. 14 liters of this mixture is taken out and 14 liters of B is poured in. Now the ratio of A to B becomes 2: 5. Find the amount of B originally present in the mixture.

16. There are 8 football teams in a certain league and each team plays each of the other teams exactly once. If each game is played by 2 teams, what is the total number of games played?

17. Rohit's father is three times elder than Rohit. After 8 years, he would be two and a half times of Rohit's age. After a further 8 years, how many times would he be of Rohit's age?

18. A ship, whose speed in 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. What is the speed of the stream in km/hr?

19. The average temperature of Monday, Tuesday and Wednesday were 37°C and on Tuesday, Wednesday and Thursday was 34°C. If the temperature on Thursday was 4/5 th of that of Monday, then what was the temperature on Thursday?

20. There are 5 packages. The weight of the 1st package is 500 kg and the weight of the 2nd package is 50% higher than the weight of the 3rd package whose weight is 45% higher than the 1st package weight. The fourth package at 360 kgs is 60% lighter than the fifth package. Find the average weight of all the five packages.

21. Rajesh and Prabhu went to a bookshop. Rajesh purchased 5 pens, 3 notebooks, and 9 pencils and used up all her money. Prabhu purchased 6 pens, 6 notebooks, and 18 pencils and paid 50% more than what Rajesh paid. What % of the Rajesh money was spent on pens?

22. If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. The actual distance traveled by him is:

23. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?

24. The distance between two cities P and Q is 300km. A train starts from station P at 10 am with speed 80 km/hr towards Q. Another train starts from Q towards P with speed 40km/hr at 11 am. At what time do they meet.

25. Two cities A and B are at a distance of 60 km from each other. Two persons P and Q start from the First city at a speed of 10km/hr and 5km/hr respectively. P reached the second city B and returns back and meets Q at Y. Find the distance between A and Y.

26. A Shopkeeper bought 30 kg of rice at the rate of Rs. 40 per kg. He sold 40% of the total quantity at the rate of Rs. 50 per kg. At what price per kg should he sell the remaining quantity to make a 25% overall profit?

27. If a train travels at a speed of 60 miles per hour, how far will it travel in 2.5 hours?

28. The perimeter of a rectangle is 30 meters, and its length is 3 times its width. What is the length of the rectangle?

29. Ram purchased 20 dozen toys at the rate of Rs. 375 per dozen. He sold each one of them at the rate of Rs. 33. What was his percentage profit?

30. A man borrows Rs 4000 at 8% compound interest for 3 years. At the end of each year, he paid Rs 500. How much amount should he pay at the end of the 3rd year to clear the debt?

31. The average price of 10 books is Rs. 12 while the average price of 8 of these books is Rs. 11.75. Of the remaining two books, if the price of one book is 60% more than the price of the other, what is the price of each of these two books?

32. Arun and Vinod established a firm together. Arun's investment was thrice that of Vinod. Arun also kept the investment for twice as much time as Vinod. If Vinod got a profit of 4000, what was the total profit?

33. What is the greatest number that will divide 964, 1238, and 1400 and leave a remainder of 41, 31, and 51 respectively?

34. A cistern can be filled by a tap in 4 hours while it can be emptied by another tap in 9 hours. If both the taps are opened simultaneously, then after how much time cistern will get filled?

35. In how many different ways, can the letters of the word 'INHALE' be arranged?

36. What is the smallest number that when decreased by 8 is divisible by 21, 27, 33, and 55?

37. A tap can fill a bucket in 6 hours. After half the bucket is filled, three more similar taps are opened. What is the total time taken to fill the bucket completely?

38. In a mixture 60 litres, the ratio of milk to water is 2:1. If this ratio is to be 1:2, then what is the quantity of water needed to be further?

39. If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. The actual distance traveled by him is:

40. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?

41. The distance between two cities P and Q is 300km. A train starts from station P at 10 am with speed 80 km/hr towards Q. Another train starts from Q towards P with speed 40km/hr at 11 am. At what time do they meet.

42. Two cities A and B are at a distance of 60 km from each other. Two persons P and Q start from the First city at a speed of 10km/hr and 5km/hr respectively. P reached the second city B and returns back and meets Q at Y. Find the distance between A and Y.

43. The CP of Desk is Rs.2000. A Salesman wants to make 15% profit by selling it. At the time of sale, he declares a discount of 10% on MP. The Marked price is?

44. A boy bought 2 items for Rs.7500. One item he sells at a profit of 16% and another item at 14% loss. In this, the boy makes neither any profit nor any loss. What is the difference between the SP of 2 items?

45. A Shopkeeper bought 30 kg of rice at the rate of Rs. 40 per kg. He sold 40% of the total quantity at the rate of Rs. 50 per kg. At what price per kg should he sell the remaining quantity to make a 25% overall profit?

46. Prakash sold a machine to Swapna at a profit of 30%. Swapna sold this machine to Ajay at a loss of 20%. If Prakash paid Rs.5000 for this machine, then find the cost price of machine for Ajay?

47. A man borrows Rs 4000 at 8% compound interest for 3 years. At the end of each year, he paid Rs 500. How much amount should he pay at the end of the 3rd year to clear the debt?

48. A person earns an interest of 240 on investing certain amount at Simple interest for 2 years at 5 percent amount. If the rate of interest is compounded annually then how much more interest will be gain by the person at same rate of interest and on the same sum.

49. A sum of rupees 4420 is to be divided between Ramesh and Suresh in such a way that after 5 years and 7 years respectively the amount they get is equal. The rate of interest is 10 percent. Find the share of Ramesh and Suresh

50. The average price of 10 books is Rs. 12 while the average price of 8 of these books is Rs. 11.75. Of the remaining two books, if the price of one book is 60% more than the price of the other, what is the price of each of these two books?

51. The average of 11 results is 50. If the average of the first 6 results is 49 and that of last 6is 52, find the sixth result?

52. A mixture contains A and B in the ratio 5: 9. 14 liters of this mixture is taken out and 14 liters of B is poured in. Now the ratio of A to B becomes 2: 5. Find the amount of B originally present in the mixture.

53. Arun and Vinod established a firm together. Arun ‘s investment was thrice that of Vinod. Arun also kept the investment for twice as much time as Vinod. If Vinod got a profit of 4000, what was the total profit?

54. Avinash being the sleeping partner receives 1/10th of profit and the remaining is divided between Vamsi and Ramu in the ratio of 1:2. If the difference between the profit shares of Avinash and Vamsi is Rs.2000.What is Vamsi’s share in Rs.?

55. Find the number, the second digit of which is smaller than its first digit by 4, and if the number was divided by the digit’s sum, the quotient would be 7.

5. LARSEN & TOUBRO (L&T)

Percentages, SI and CI

1. Calculate the value of 20% of 120.

2. If 10% of oranges are bad, out of 300 oranges, how many oranges are bad?

3. Express 66.66% as a fraction.

4. The price of a pencil is increased from Rs. 2 to Rs. 4. What is the percentage increase?

5. The number of pens in a box decreased from 20 to 10. What is the percentage decrease in the number of pens?

6. Sugar is now being sold at Rs. 10/kg. Till last week, the cost of it was Rs. 8/kg. Find by how much percent a family should reduce its consumption, to keep the expenditure the same.

7. Express 4/9 as percentage.

8. If 120 is 120% of a number, then what is 50% of the same number?

9. A bus increases its speed by 10%. After that, it again increases its speed by 20%. By what percentage is the bus's final speed greater than its original speed?

10. If rate of interest changes from 10% to 20% then what is the percentage change?

11. In an election between the two candidates, the candidate who gets 60% of votes polled has won by 280 votes majority. What was the total number of votes polled?

12. If the numerator of a fraction is increased by 40% and the denominator is decreased by 30% the fraction becomes 1/2. Find the original number.

13. If 20% of a certain number is 80, then what is 30% of that number?

14. The Shopkeeper increased the price of a product by 25% so that customer finds it difficult to purchase the required amount. But somehow the customer managed to purchase only 70% of the required amount. What is the net difference in the expenditure on that product?

15. If A is 25% greater than B then how much percentage is B smaller than A?

Time Speed & Distance

1. A man crosses a 1000 m long street in 4 minutes. What is his speed in km/hr?

2. A man on tour travels first 160 km at 64 km/hr and the next 160 km at 80 km/hr. The average speed (km/h) for the first 320 km of the tour is:

3. Walking at (3/4)th of your usual speed, you will reach the market 12 minutes late. What is the usual time taken by you to reach the market?

4. If you travel from your home to office at the speed of 90 kmph and return home at the speed of 210 kmph, then what is your average speed (kmph) of the entire journey?

5. Walking 6/7th of his usual speed, a man is 12 minutes too late. What is the usual time taken by him to cover that distance?

6. A man rides his bicycle 10 km at an average speed of 12 kmph and again travels 12 km at an average speed of 10 kmph. What is his average speed for the entire trip approximately?

7. An athlete runs 200 metres race in 24 seconds. What is his speed?

8. The distance between two cities A and B is 330 km. A train starts from A at 8 a.m. and travels towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 km/hr. At what time will they meet?

9. A boat can travel at a speed of 12 km/hr in still water. If the speed of the stream is 4 km/hr, find the time taken by the boat to go 256 km downstream.

10. In one hour, a boat goes 14 km along the stream and 6 km against the stream. The speed of the boat in still water (in km/hr) is _____.

11. In a 100 m race, A can beat B by 25 m and B can beat C by 4 m. In the same race, A can beat C by:

12. A train running at the speed of 90 km/hr crosses a pole in 9 seconds. What is the length of the train?

13. A train 360 m long passes a pole in 36 seconds. How long will it take to pass a platform 650 m long?

14. Two trains 280 m and 320 m long run at the speed of 120 km/hr and 80 km/hr respectively in opposite directions on parallel tracks. The time (in seconds) which they take to cross each other, is _____.

15. A train 110 metres long is running with a speed of 60 kmph. In what time will it pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?

Time & Work

1. If Renuka can do a piece of work in 15 days and Priya can do the same piece of work in 10 days, how many days will they together take to complete the same piece of work?

2. Two pipes X and Y can fill a tank in 20 minutes and 30 minutes respectively. If the pipes are opened together, after how many minutes will the tank get filled?

3. Pipe A can fill a tank in 15 minutes whereas pipe B can empty the same tank in 30 minutes. If the pipes are opened together, what will be the time taken to fill the entire tank?

4. Work done by three women together will be equal to that of the work done by two men together. If 6 men can complete a project in 11 days, how many days would be required for 9 women to complete the same project?

5. Abi can do a piece of work in 10 days whereas Binu can do the same piece of work in 20 days. Both of them started the work together but after 6 days Abi left due to some conflicts. If Binu alone completed the remaining piece of work, find the number of days to which the entire work lasted.

6. Ram and Shyam working alone can complete a task in 20 days and 10 days respectively. Working together if they earned Rs. 3000 for the same task, what is Ramesh's share in the earning?

7. 10 men can complete a project in 20 days. How many men should be recruited in order to complete the same project in 10 days?

8. Taps X and Y can fill a tank in 20 minutes and 30 minutes respectively, whereas tap Z can empty it in 60 minutes. If all the three taps are opened together, after how many minutes would the tank get filled?

9. Shreya works twice as fast as Ritu. On working together they are paid with an amount in which Ritu's share is Rs.300. Find the amount paid to them in total.

10. Atul and Beena alone can complete a job in 20 days and 30 days respectively. Both of them along with the help of Simran completed the job in 10 days. If Simran alone worked on the job, find the number of days in which she could complete it.

11. 24 men can complete a task in 12 days. If the number of men is increased as 36, what will be the number of days required by this new group to complete the same task?

12. Anand is twice as good a work man as Bala. If together they can complete a work in 10 days, in how many days can Anand alone complete it?

13. Tap A alone can fill a tank in 40 minutes. If worked along with tap B, the tank was filled in 30 minutes. Find the time in which the tap B alone can fill the tank.

14. Amar, Vimal and Kishore can complete a task in 20 days, 30 days, 40 days respectively. If all of them worked together they are paid Rs. 2600 for their work. What is Kishore's share in this pay?

15. Venkat can do a piece of work in 20 days whereas Shyam can do the same piece of work in 15 days. They started the work together but Shyam quits after 5 days. If they are paid Rs. 3000 for this job, find Shyam's share.

Ratio and Proportion

1. If a : b = 4 : 5 & b : c = 2 : 3, find the ratio between a and c.

2. If 8 : x :: 5 : 0.75. Find the value of x.

3. If Y varies directly as X, and X = 9 when Y = 6, find Y when X = 33.

4. Find the value of x and y, if 4x + 9y = 18; 16x + 36y = 70.

5. Ten years ago, Priya's mother's age was four times that of her daughter. 10 years hence, the mother's age will be twice that of Priya. Then the present age of Priya is:

6. A sum of money is to be distributed among A , B and C in the ratio 2 : 4 : 3 . If B gets Rs.1000 more than C, what is A's share?

7. The fourth proportion to 5,8,15 is :

8. If c varies directly as the square root of d, and c = 14 when d = 64, find c when d = 256.

9. If 3x + 2y = 16, 5x + 7y = 45, find the value of x.

10. A is two years older than B, who is twice as old as C. If the sum of the ages of A, B and C is 27, then how old is B?

11. Two numbers are 20% and 50% more than a third number respectively. The ratio of the first two numbers is:

12. If Rs.55 is divided into three parts in the ratio 1/2 : 1/4 : 1/6, then the first part is:

13. The weight of an object on earth varies directly as the weight of the same object on the moon. A 300 pound object on earth would weigh 48 pounds on the moon. How much would a 75 pound object on earth weigh on the moon ?

14. A man is 24 years older than his son. In two years, his age will be twice the age of his son. The present age of his son is:

15. Solve the two equations, find value of x & y:

Profit and loss, Partnerships and averages

1. Abishek and Baskar together invested Rs.20,000 in a business. The ratio of their investments was 3 : 2. At the end of the year, a total profit of Rs. 3000 was generated. Find their shares of profit.

2. If the Selling Price(S.P.) of 8 articles is the same as the Cost Price (C.P.) of 6 articles, find the gain/loss percentage.

3. Two cars are sold at Rs.5 lakhs each such that a profit of 20% was made on the first car, while a loss of 20% is
incurred on the other. What would be the net profit/loss on the two transactions?

4. A dishonest shopkeeper professes to sell his goods at cost price, but he gives only 750 g instead of 1000 g. What is his profit%?

5. The average weight of 11 children is 11 kg. The average weight of first five children is 9 kg, whereas the average weight of last five children is 13 kg. What is the weight of the sixth child?

6. A book worth Rs.300 is sold for Rs.200. What is the loss percentage?

7. 2 litres of bottle A (with 20% salt solution) is mixed with an unknown quantity of bottle B (with 40% salt solution) such that the mixture has 30% salt solution. How many litres of salt solution from bottle B was mixed with bottle A?

8. Varun started a business by investing 1 lakh. Six months later, Vikram joined him with a capital of Rs.50,000. If at
the end of the year, the total profit is Rs.50,000, then what is Varun's share of profit?

9. If a watch is sold at Rs.X, the profit is 10%. And if the price is reduced by Rs.110, the loss is 10%. Find the cost price of the watch.

10. In what ratio must a grocer mix two varieties of wheat costing Rs.16/kg and Rs.18.5/kg respectively, so as to get a mixture worth Rs.17/kg?

11. Average weight of students of class A is 40 kg and that of class B is 45 kg. Find the average weight of students of both the classes put together.

12. Two pen drives are bought for Rs.1000 each. One of them is sold at a profit of 10%, while the other is sold at a loss of 10%. What is the overall profit/loss percentage in the entire transaction?

13. What is the average of the series 11,22,33,.....,1100?

14. Two solutions with acid concentrations of 20% and 30% are mixed in the ratio of 1 : 2 respectively. What will be the acid concentration in the resultant mixture?

15. If an article worth Rs.50 is sold at a profit of 150% what is the Selling price?

Permutation, Combination & Probability

1. If there are four trains from Bangalore to Pune and six trains from Pune to Mumbai. In how many ways one can travel from Bangalore to Mumbai?

2. In how many ways can 6 persons be seated in 4 chairs?

3. What is the maximum number of attempts required to open a 4 slot number lock where each slot can take any value from 0 to 9?

4. How many 4 letter words with or without meaning can be formed using all the letters of the word "PART"?

5. How many 5 letter words can be formed using all the letters of the word "BREAD" if repetition is allowed?

6. How many words can be formed using all the letters of the word TREE?

7. How many six digit numbers can be formed using the digits 1, 2, 3, 4, 5, and 6 if the second last digit is supposed to be even always?

8. How many diagonals does a decagon have?

9. Abhishek has 9 trousers and 12 shirts. In how many different ways can he select a trouser and a shirt?

10. Using all the letters of the word "THURSDAY", how many different words can be formed?

11. A committee has 5 men and 6 women. What are the number of ways of selecting 2 men and 3 women from the given committee?

12. What are the number of ways to select 3 red balls and 2 blue balls from 4 red balls and 5 blue balls?

13. In how many ways 5 letters can be posted in 6 post boxes?

14. Garima has 2 jackets, 5 shirts and 6 pairs of slacks. If an outfit consists of all the three garments mentioned above, how many different outfits she can wear?

15. How many four digit numbers can be formed using the digits {1, 3, 4, 5, 7,9}(repetition of digits is not allowed)?

Numbers

1. Find the unit digit of 985.

2. Find the remainder when 575 is divided by 3.

3. Find the number of factors of 4500.

4. Two bells chime at an interval of 10 minutes and 15 minutes respectively. At what time will they chime together?

5. Find the highest power of 6 in (50!)

6. Find the last digit of 3278123.

7. Find the LCM of 48 and 32.

8. Find the greatest number that will divide 12, 36 and 54 exactly.

9. Find the least number which when divided by 5, 7 and 11, leaves a remainder 6 in each case.

10. Simplify: $(943)^2 - (942)^2$ = _____.

11. Find the least number that is exactly divisible by 6, 8 and 12.

12. Find the rightmost non-zero integer of the expression 2840125 + 2870155.

13. Find the least number which when divided by 24,16, 20 leaves remainder 20, 12, 16 respectively.

14. A person starts multiplying consecutive positive integers from 50. How many numbers should he multiply, so that he will have a result that will end with 2 zeroes?

15. If both 72 and 22 are the factors of the number (a x 43 x 55 x 172), then what is the smallest possible value of a?

6. ACCENTURE

Numerical Ability:

1. In a city ABC, the population of males decreased by 8% from 2018 to 2019. If the male population in 2018 was 7200, then find the male population in 2019.

2. Anthony purchased two dozen oranges at $12 per dozen and three dozen oranges at $18 per dozen. Find the average cost per dozen of the oranges that he purchased.

3. Lincoln can complete a task in 12 days, Joshua can complete it in 18 days. Chris can complete the same task in x days. Chris started the task. After 3 days, Lincoln and Joshua joined. If the task is completed in 4 more days, then find the value of x.

4. In a certain month, the total income of Andrew, Bruce and Chloe is $50,000. In that month, Andrew spends 70% of his income, Bruce spends 75% of his income and Chloe spends 80% of her income. The ratio of the amounts spent by Andrew, Bruce and Chloe in that month is 35:90: 64. Find the income of Andrew in the month.

5. If 3.6h = 1.6k, then find (h-k)/(h + k).

6. Jack, a con-man, was running along a road at 10 km/hr. He crossed a policeman moving at a speed of 15 km/hr in the opposite direction. The policeman had to continue for 12 minutes before he could find a gap in the road and start chasing him again. Find the total time taken in minutes) by the policeman to catch the con-man from the time he crossed him.

7. Find the amount lost by Hannah when she sold a hand wash at a loss of 22%, if she bought it for $150.

8. Pam can complete a job in 36 days. She started the work and after 6 days, Leslie joined her. They completed the job in 12 more days. Find the number of days in which Leslie alone can complete it.

9. Christina purchased some articles for $2400. She sold two-third of the articles purchased at 10% loss. Find the profit percentage at which the rest of the goods must be sold to gain an overall profit of 25%.

10. The sum of the present age of Lucy, Molly and Mary is 75 years. If the ratio of their age is 4 : 5 : 6, then what is the present age of Molly?

7. DELOITTE

Numerical Ability:

1. What is the greatest number that will divide 22, 90, and 150 will the same remainder in each case?

2. Richard and Marie can complete a task of writing in 2 days when working together, if Richard alone go for typing he need 12 days to complete, Marie can complete the same task when working in.

3. Ramesh and sahil were given some money and the ratio of the money was 3:8. Their father gives each of them Rs. 10/- and which makes their money in the ratio 2:5. Calculate and find who has the smaller money?

4. There are four friends named Ram, Mohan, Raj, Roy. The sum of their ages was 96. Six years later the ratio will become 8:7:6:9. What is Raj's present age?

5. A cricketer scores 85 runs in his 17^{th} inning and increases his average by 3 runs. Find out the average score at the end of the 17^{th} inning.

6. Find the HCF of 18, 108, and 264

7. Find the smallest 4-digit number, when divided by 7, 9 and 11 leaves a remainder of 3, 5 and 7 in each case.

8. If 43322K is exactly divisible by 72, what is K?

9. Find the remainder if 2^{39} is divided by 7

10. Find the last digit of 587^{1997}

11. Find the last 2 digits of 2^{265}

12. In how many ways can the word MANGOES be arranged, in which A and N are at the extreme positions?

13. How many different 7 digit numbers can be formed using the digits 1, 3, 0, 3, 5, 3, 5 taking all at a time?

14. How many terms of the A.P. 1,4,7, are needed to give the sum 1001?

15. A single soul can merge with another soul in every second, and thus two souls get reduced to a single soul. If a soul cannot merge with another soul, then it becomes a ghost. Every soul tries not to become a ghost. On a particular day, there were (2^42000 - 1) souls. After how many seconds will all souls become ghosts?

16. A can do a piece of work in 4 days, B can do it in 20 days. With the help of C, they finish the work in 2 days. In how many days can C alone do the whole work?

17. A can do a piece of work in 20 days. If B is 80% more efficient than A, then the number of days required by B to do the same piece of work is:

18. In a village the average age of n people is 39 years. After verification, it was found that one person was 50 years older than his age considered in the average. The new average, after correction, increased by 1. The value of n is?

19. A train normally covers a certain distance at a speed of 100 km/hr. If it halts for a fixed time interval in each hour, its average speed reduces to 80 km/hr. What is the average time interval for which the train halts in each hour?

20. Monthly incomes of A and B are in the ratio of 5:4 and their savings are in the ratio of 4:3. If the expenditure of each is 600, then the monthly incomes of each are?

21. A travelled from B to C covering a total distance of 300 km in 9 hrs. He travelled by car at 25 km/h and the rest by train at 40 km/h. The distance travelled by car is:

22. The price of an item is increased by 40%. By what percent should the new price be decreased to bring it back to the original price?

23. The Indian cricket team played 20 one-day matches in a season and won 25% of the matches they played. If they wanted a minimum success rate of 75%, what is the minimum number of matches they would have to play more?

24. I went to buy a Maruti at Nurav Motors. The dealer offered me three discount options on the list price of 200000. Which option is the best for me?

25. A and B start a business with some investments. A as a working partner received 20% of the annual profits as salary and the remaining was equally divided among A and B. If the entire profit was divided among A and B in the ratio of their investments, A would have received 1000 rs less than what he actually got. B's share of the profit is 6000. If B's investment is 21000, what is A's investment?

8. HEXAWARE

1. A can do piece of work in 12 days. B can do this work in 16 days. A started work alone. After how many days should B join him, so that the work is finished in 9 days?

2. A and B invest in a business in the ratio 3:2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is:

3. A seller of the fruit juice shop has 20 liters of mango juice. If he mixes 5 liters of water, which is freely available, in 20 liters of pure mango juice. If the cost of pure mango juice is Rs. 18 per liter, then find the profit of the seller, when he sells all the mixture at cost price.?

4. The salaries of Rithika and Shivam are in the ratio 2:3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40:57. What is Shivam's present salary?

5. If a man cycles at 10 km/hr, then he arrives at a certain place at 1 pm. If he cycles at 15 km/hr, he will arrive at the same place at 11 am. Then find the distance travelled by him.

6. The ages of Krishna and Vipul are in the proportion of 4:7. After 0 years, the proportion of their ages will be 4:5. Then the current age of vipul is:

7. Anand is earning 30% more than Bhanu and Bhanu is earning 40% more than Charitha. Anand is spending 10% more than Bhanu and Bhanu is spending 8% more than Charitha. What percent of Charitha's income is Anand's saving?

8. Sumanth is twice efficient plumber as Mahesh and together they finish a fitting work in 16 days. In how many days can it be done by Sumanth alone?

9. There is an equilateral triangle of which each side is 2 m. with all the three corners as centers, circles each of radius 1m are described. Find the areas of the remaining portion (excluding the area common to all the circles and triangles).

10. In a class, the total number of students is 72. Which of the following can be the ratio of the number of girls and boys in the class?

11. Tina invests some amount in a savings bank account that earns an interest of 4% p.a. compounded quarterly. If the amount at the end of 12 months is $582738.2, then find the amount invested (in $).

12. Read the information given below and answer the question that follows:
f(a,b,c) = a^3 - b^2 + c
g(a,b,c) = (a + b + c)/2
h(a,b,c) = abc

Which of the following has the minimum value?

13. There are three cans A, B and C of same quantity containing the mixture of water and gas in the ratios of 1:2, 1:1 and 2:1. Two new mixtures AB and BC are formed by mixing A and B in the ratio 2:1 and B and C in the ratio of 1:2. What is the ratio of gas in mixture AB to water in mixture BC?

14. Number of rectangles that can be formed using 17 horizontal lines and 14 vertical lines is _____

15. Patrick takes 12 minutes to cover 5.4 km long running track. Find the running speed of Patrick.

16. Judith sells her watch for $170 at a loss of 15%. At what price should she sell it to get a loss of 5%?

17. Sarah spends 28% of her income on food, 22% on house rent, and 30% on miscellaneous. If the savings at the end of a month is $280, then her total income in that month is

18. If$(z + \sqrt{z}) = 6/25$, then determine the value of z.

9. TECH MAHINDRA

Memory Based Paper:

1. The average weight of a certain number of students in a class is 55.5 kg. If 4 students with averageweight 60 kg join the class, then the average weight of all students in the class increases by 360 g.The number of students in the class, initially, is:

2. Instead of multiplying a number by 11, the number is divided by 11, what is the percentage of error obtained?

3. A sum of Rs. 25600 is invested on simple interest partly at 7% per annum and the remaining at 9%per annum. The total interest at the end of 3 years is Rs. 5832. How much money (in Rs.) was invested at 9% per annum?

4. Two liquids A and B are mixed in a bucket in the ratio 7 : 5. If 9 liters of the mixture is replaced by10 liters of liquid B, the ratio of both the liquids becomes 7 : 9. How many liters of liquid A was inthe bucket?

5. A sum of Rs. 25600 is invested on simple interest partly at 7% per annum and the remaining at 9%per annum. The total interest at the end of 3 years is Rs. 5832. How much money (in Rs.) wasinvested at 9% per annum?

6. A and B invested an equal amounts in the beginning for a year. In the second year. A gave Rs. 1000to B. In the third year, A further gave 1000 to B. The ratio of profits after 3 years was 4 : 5. Find thetotal amount invested by each in the first year.

7. What price (in Rs.) should Radha mark on a bag which costs Rs. 1680 so as to earn a profit of 25%after allowing a discount of 16% on the marked price?

8. A person can row 5 m/sec in still water. The speed of the stream is 6 km/h. The time (in hours) takenby him to row a distance of 76.8 km downstream is:

9. Keshav, Surjeet and Thomas started a business with investments in the ratio 2 : 3 : 4. The ratio oftheir period of investments is 5 : 6 : 9. Twenty percent of the profit was spent on rent andmaintenance of the office. Remaining profit was distributed among themselves. If the difference in the sharesof profit of Keshav and Surjeet is Rs.7264, then how much is the total profit (in Rs.)?

10. Places A and B are 45 km apart from each other. A car starts from place A and another car startsfrom place B at the same time. If they move in the same direction, they meet in 4 and a half hourand if they move towards each other, they meet in 27 minutes. What is the speed (in km/h) of the car whichmoves faster?

11. A man wants to cross a river perpendicularly. He takes 4 minutes to cross the river in still water,and takes 5 minutes in upstream. If the river is 100 metres wide, what is the speed of stream?

12. A shopkeeper gives a discount of 25% on a toy and earns a profit of 25% if he gives a 10% discount only then what will be the profit percentage

13. Aryan's mother is 6 times older than Aryan, after 6 years she will be 3 times of Aryan's age, what is Aryan's present age ?

14. The average age of five friends is 80 years while the average age of some other 10 friends is 65 years. The average age of all the 15 friends is:

15. The distance between Agra and Kanpur is 778 kms. A train covers the journer from Agra to Kanpur at 84 km per hour and return back to Agra with a uniform speed of 56 km per hour . find the average speed of the train during the whole journey

16. The average score of a Kohli for ten matches is 30 runs. If the average for the first six matches is 40, then find the average for the last four matches.

17. Sachin is 40 years old and Vijay is 60 years old. How many decades ago was the proportion of their ages 3 : 5?

18. 1 Decade ago, Karthikh’s mother was quadrice older than her son. After one decade, the mother will be two times older than her son. The current age of Karthikh is?

19. Father’s age today is three times as his daughter’s. After 10 years it would be just twice. What is the daughter’s age today?

20. A trader mixes 42 kg of salt at 15 rs per kg, with 30 kg of salt of 16 rs per kg, and sells the mixture at 20 rs per kg, find his profit percent.

21. A milkman purchases the milk at x rs per litre, after adding 2 litres of water in every 6y litres of milk, he solds the milk at 2x rs per litre, find his profit percentage

10. INFOSYS

1. Anita goes to College at 20 km/h and reaches college 4 minutes late. Next time she goes at 25 km/h and reaches the college 2 minutes earlier than the scheduled time. What is the distance of her school?

2. A truck covers a distance of 376 km at a certain speed in 8 hours. How much time would a car take at an average speed which is 18 kmph more than that of the speed of the truck to cover a distance which is 14 km more than that travelled by the truck ?

3. Two cars namely A and B start simultaneously from a certain place at the speed of 40 kmph and 55 kmph, respectively. The car B reaches the destination 2 hours earlier than A. What is the time taken by A to reach the destination?

4. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

5. X and Y start from the same point and run around a circular stadium, whose circumference is 2800 m, at the rate of 250 m and 350 m per minute respectively in the opposite direction. They will meet each other in?

6. A work is done by 30 workers not all of them have the same capacity to work. Every day exactly 2 workers, do the work with no pair of workers working together twice. Even after all possible pairs have worked once, all the workers together works for six more days to finish the work. Find the number of days in which all the workers together will finish the work?

7. (x-2) person can do a work in x days and (x+7) person can do 75% of the same work in (x-10) days. Then in how many days can (x+10) person finish the work?

8. Sruthi, Swetha and Swati together can cut 216 Apples of the same size in 3 hours. Number of Apples cut by Sruthi in 9 hours is same as the number of Apples cut by Swati in 7 hours. In one hour, Swati can cut as many Apples more than Swetha as Swetha can cut more than Sruthi.Then the number of Apples cut by Swetha in one hour?

9. The number of votes not cast for the PNC Party increased by 25% in the National General Election over those not cast for it in the previous Assembly Polls, and the PNC Party lost by a majority twice as large as that by which it had

won the Assembly Polls. If a total 2,60,000 people voted each time, how many voted for the PNC Party in the previous Assembly Polls?

10. A train is going from Mumbai to Pune and make 5 stops on the way. Three persons enter the train after it has started from Mumbai with 3 different tickets. How many different sets of tickets may they have had?

11. Spider has one sock and one shoe for each of its 8 legs. In how many different ways can the spider put on its socks and shoes, assuming that in each leg the sock has to be put on before the shoe?

12. One man can do as much work in one day as a woman can do in 2 days. A child does one-third the work in a day as a woman. If an estate owner hires 39 pairs of hands—men, women and children in the ratio 6 : 5 : 2 and pays them in all Rs. 1, 113 at the end of the day' s work, what must the daily wages of a child be, if the wages are proportional to the amount of work done ?

13. In a hockey tournament, there are 12 teams, divided into 2 groups. Each group has 6 teams. Teams of each group will play once against each other. From each group, 4 top teams will qualify for the second round. In the second round, each team will play against every other team in its group once. 4 top teams of the second round will qualify for the semifinal round, where they will play against each other once. The top 2 teams will proceed to the final. The final will be played in the form of the best of three matches. The minimum and a maximum number of matches in this tournament will respectively be:

14. Raj was given a task to arrange the letters of the word 'SWITZERLAND". In how many ways can he arrange the letters of the word "SWITZERLAND" so that the positions of the vowels are used by vowels only and positions of the consonants are used by the consonants only?

15. If a man is given 5 numerical digits and 4 alphabets, how many alphanumeric words can be formed using exactly 2 digits and 3 alphabets?

16. Find LCM of 12, 15, 20, 27

17. A does a work in 10 days, B in 6 days. Find the number of days they can complete the work together?

18. In a farm, 50 hens lay 200 eggs in 2 days, how many days that 20 hens to lay 400 eggs?

19. The population of a town 3 years ago was ‘ b ‘ and the population of the town 3 years from now will be ‘ c’. What is the current population of the town?

20. 4 men can repair a road in 7 hours. How many men are required to repair the road in 2 hours?

21. Ram is a five-year elder to his youngest sibling Shreya. Shreya is two years younger than her brother Ritesh. Ritesh is 13 years old and is Ram’s brother. How old will ram be in two years from now?

22. Out of 52 cards, 4 cards are drawn at random. What is the probability of getting 1 king, 1 queen, 1 jack?

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