

CLASS

13

# PERCENTAGE

111

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

$$\frac{1}{3} = 33\frac{1}{3}\%$$

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

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

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

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

$$\frac{1}{8} = 12\frac{1}{2}\%$$

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

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

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

$$\frac{1}{12} = 8\frac{1}{3}\%$$

$$\frac{1}{13} = 7\frac{9}{13}\%$$

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

$$\frac{1}{15} = 6\frac{2}{3}\%$$

$$\frac{1}{16} = 6\frac{1}{4}\%$$

$$\frac{1}{17} = 5\frac{15}{17}\%$$

$$\frac{1}{18} = 5\frac{5}{9}\%$$

$$\frac{1}{19} = 5\frac{5}{19}\%$$

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

$$\frac{1}{24} = 4\frac{1}{6}\%$$

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

$$\frac{1}{40} = 2\frac{1}{2}\%$$

$$\frac{3}{8} = 37\frac{1}{2}\%$$

$$\frac{5}{8} = 62\frac{1}{2}\%$$

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

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

⊕

$$\frac{1}{3} = 33\frac{1}{3}\%$$

$$\frac{2}{3} = 66\frac{2}{3}\%$$

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

$$\frac{4}{5} = 80\%$$

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

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

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

$$\frac{5}{11} = 45\frac{5}{11}\%$$

$$\frac{7}{11} = 63\frac{7}{11}\%$$

$$\frac{10}{11} = 90\frac{10}{11}\%$$

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

$$\frac{4}{9} = 44\frac{4}{9}\%$$

$$\frac{7}{9} = 77\frac{1}{9}\%$$

$$\frac{1}{12} = 8\frac{1}{3}\%$$

$$\frac{5}{12} = 8\frac{1}{3} \times 5$$

$$= 40\frac{5}{3}$$

$$\Rightarrow 41\frac{2}{3}$$

$$\frac{1}{12} = 8\frac{1}{3}\%$$

$$\frac{7}{12} = 58\frac{1}{3}\%$$

$$\frac{11}{12} = 91\frac{3}{4}\%$$

$$\textcircled{\times} \quad \frac{1}{6} = 16\frac{2}{3}\text{/-} \quad \left| \begin{array}{l} \frac{1}{7} = 14\frac{2}{7}\text{/-} \\ \frac{4}{7} = 57\frac{1}{7}\text{/-} \end{array} \right. \quad \frac{1}{8} = 12\frac{1}{2}\text{/-}, \quad 112\text{/-}$$

$$\frac{5}{6} = 16\frac{2}{3} \times 5 \quad \left| \begin{array}{l} \frac{5}{8} = 62\frac{1}{2}\text{/-} \\ \frac{3}{8} = 37\frac{1}{2}\text{/-} \end{array} \right.$$

$$= 83\frac{1}{3}\text{/-}$$

$$\textcircled{+} \rightarrow \frac{11}{7} = 1 + \frac{4}{7} \Rightarrow 157\frac{1}{7}\text{/-}$$

↓      ↓  
100/-    57\frac{1}{7}\text{/-}

$$\rightarrow \frac{31}{6} = 5 + \frac{1}{6} \Rightarrow 516\frac{2}{3}\text{/-}$$

↓      ↓  
500/-    16\frac{2}{3}\text{/-}

$$\rightarrow \frac{37}{8} = 462\frac{1}{2}\text{/-} \quad \left( \begin{array}{l} 8 \times 4 \rightarrow 32 \\ \downarrow 400/- \end{array} \right) \quad (37 - 32 = 5 \quad \therefore \rightarrow \frac{5}{8})$$

$$\rightarrow \frac{26}{3} = 886\frac{2}{3}\text{/-} \quad \left| \begin{array}{l} \frac{21}{11} = 1 + \frac{10}{11} = 190\frac{10}{11}\text{/-} \end{array} \right.$$

$$\rightarrow \frac{85}{16} = 531\frac{1}{4}\text{/-}$$

New method for larger fractions.

$$\textcircled{\times} \quad 29 - 9\frac{8}{39}$$

$$29 - 9 - \frac{8}{39}$$

$$20 - \frac{8}{39}$$

$$19 + 1 - \frac{8}{39}$$

$$19\frac{31}{39}$$

$$\textcircled{\times} \quad \frac{23}{12}$$

$$200 - 8\frac{1}{3} = 191\frac{2}{3}\text{/-}$$

$$\textcircled{\times} \quad \frac{21}{11}$$

$$200 - 9\frac{1}{11} = 190\frac{10}{11}$$

$$\textcircled{\times} \quad \frac{1}{12} \quad t_2 = 8\frac{1}{3}$$

$$200 - 8\frac{1}{3}$$

$$191\frac{2}{3}\text{/-}$$

$$\begin{aligned} & 200 - 9 \\ & = 191 \end{aligned}$$

$$\begin{aligned} & 190 + 1 - \frac{1}{11} \\ & 190\frac{10}{11} \end{aligned}$$



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$$\textcircled{B} \quad \frac{44}{15} \\ = 300 - 6\frac{2}{3} \\ = 293\frac{1}{3}$$

$$\textcircled{*} \quad \frac{39}{8} \\ = 500 - 12\frac{1}{8} \\ = 487\frac{1}{8}$$

$$300 - 7 \\ = 293\frac{1}{3} \text{ Ans} \quad \begin{array}{l} \frac{2}{3} \rightarrow \\ 1 \text{ कम है} \\ \text{so } \frac{1}{3} \end{array}$$

$$\textcircled{B} \quad 566\frac{2}{3} = 500 + 66\frac{2}{3} \Rightarrow 5 + \frac{2}{3} \Rightarrow 5\frac{2}{3} \Rightarrow \frac{17}{3}$$

$$\rightarrow 437\frac{1}{8} = 4 + \frac{3}{8} = \frac{35}{8}$$

$$\rightarrow 157\frac{1}{7} = 1 + \frac{4}{7} = \frac{11}{7}$$

$$\rightarrow 216\frac{2}{3} = 2 + \frac{1}{6} = \frac{13}{6}$$



$\textcircled{B}$

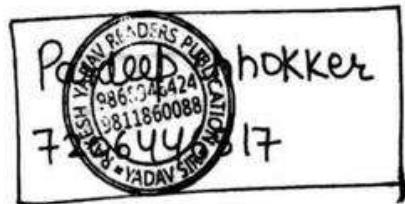
$$25\% = \frac{1}{4}$$

Result  
original value/No.

$$4 \times 25\% = 1$$

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

$$7 \times 71\frac{3}{7} = 5.$$



- ① if  $16\frac{2}{3}\%$  of a no. is added with itself then result becomes 4956 . find the original no.

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

Original no.

$$6+1=7 \rightarrow 4956$$

$$1 \rightarrow 708$$

$$6 \rightarrow 708 \times 6 = 4248$$

original no. = 4248 Ans

- ② if  $6\frac{2}{3}\%$  of a no. is sub. from itself then result becomes 5670 . find the original no.

$$6\frac{2}{3}\% = \frac{-1}{15}$$

O.N.  $\times 405$

$$14 \rightarrow 5670$$

$$1 \rightarrow 405$$

$$6075 \text{ Ans}$$

O.N  
- Original no.

- ③ if  $11\frac{1}{9}\%$  of a no. is added with itself then result becomes  $\frac{900}{955}$ . Find the original no.

$$11\frac{1}{9}\% = \frac{+1}{9}$$

$\times 90$

$$10 \rightarrow 900$$

$$1 \rightarrow 90$$

$$810 \text{ Ans}$$

- ④ If 64 is added in a no. then no. becomes  $157\frac{1}{7}\%$  of itself . Find the number.

$$157\frac{1}{7}\% = \frac{11}{7} \rightarrow 4 \rightarrow 64$$

$\times 16$

$$1 \rightarrow 16$$

⑤ 112 Ans

- ⑤ If 930 is added in a no. then no. becomes  $444\frac{4}{9}\%$  of itself . find the original no.

$$444 \frac{4}{9} \text{ l} = \frac{40}{9} \Big) 31 \xrightarrow[1 \rightarrow 30]{} 30 \quad \left| \begin{array}{l} 444 \frac{4}{9} \text{ l.} \\ 400 + 44 \frac{4}{9} \text{ l.} \\ 4 + \frac{4}{9} = \underline{\underline{\frac{40}{9}}} \end{array} \right. \quad 115$$

⑥ If 16 is added in a no. then result becomes  $116\frac{2}{3}$ .

of itself. find the no.

$$116 \frac{2}{3} + 1 = \left( \frac{7}{6} \right) + 1 \rightarrow 16$$

$\xrightarrow{\times 16}$  96 Ans

⑦ if 21 is added in a no. then result becomes  $137\frac{1}{2}$ .  
if a no.. find the no.

$$137 \frac{1}{2} \div 11 = \frac{11}{8}) \quad 3 \quad \overline{)21}$$

$x+7$       1      7

56 Ans

⑧ if the length of a rectangle is ↑ by  $3\frac{1}{2}\%$ . and its breadth is ↓ by  $30\%$ . Find the % change in its area.

$$\begin{array}{rcl}
 L & \times & B \\
 \text{ori.} \rightarrow 8 & 5 & = 40 \\
 \text{new} \rightarrow 11 & 4 & = 44
 \end{array}
 \quad \begin{array}{l}
 \text{Area} \\
 | \\
 \text{ori.} = \frac{1}{8} \\
 \text{new} = \frac{1}{5}
 \end{array}$$

$$\therefore \text{Change in Area} = \frac{\pi}{40} \times 10\phi = 10\%.$$

9) The price of sugar is  $\uparrow$  by  $16\frac{2}{3}\%$ . and the consumption of a family is  $\downarrow$  by 20%. find the % change in his expenditure.

$$\begin{array}{l} \text{Price} \times \text{cons.} = \text{Exp.} \\ \text{Old} - 6 \qquad \qquad 5 \qquad = \qquad 30 \\ \text{New} - 7 \qquad \qquad 4 \qquad = \qquad 28 \end{array} \quad \left| \begin{array}{l} 16 \frac{2}{3}\% = \frac{1}{6} \\ 20\% = \frac{1}{5} \end{array} \right.$$

$\frac{2}{30} \times 100 = 6 \frac{2}{3}\%$ .

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- (10) The sale of a cinema ticket is ↑ by  $57\frac{1}{7}\%$ . and price of ticket ↑ by  $16\frac{2}{3}\%$ . Find the % change in his revenue.

$$\begin{array}{rcl} \text{Sale} & \times & \text{price} = \text{revenue} \\ \text{ori} \rightarrow & 7 & 6 = 42 \\ & & ) +35 \\ \text{New} \rightarrow & 11 & 7 = 77 \end{array}$$

$$\begin{array}{l} \frac{5}{6} \times 100 = 83\frac{1}{3}\% \\ \frac{5}{6} = 16\frac{2}{3}\% \end{array}$$


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- (11) If the sides of a square is ↑ by 40%. Find the % change in its area.

$$\begin{array}{rcl} \text{side} & \text{Area} \\ \text{ori} \rightarrow & 5 & 25 \\ & & ) +24 \\ \text{New} \rightarrow & 7 & 49 \end{array} \quad \frac{24}{25} \times 100 = 96\%.$$

- (12) The population of a town is 1,89,000.  $\frac{4}{9}$  of them are males & rest females. 50% male are married. i) find the % of married population. ii) find the % of married female.

$\frac{4}{9}$ Male Total Pop.	↓ 2	M 4 F 5	i) $\frac{4}{9} \times 100 = 44\frac{4}{9}\%$  ii) $\frac{2}{5} \times 100 = 40\%$
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- (13) A labour works 60 Hrs. per week and he earn Rs 2400 as wages. If his per hour wages ↑ by 40% and duration of work reduced by  $16\frac{2}{3}\%$ . Find the % change in his income?

$$\begin{array}{l} \text{Rs/hr} \times \text{hour} = \text{wages} \quad | \quad 40\% \leftarrow \frac{+2}{5} \\ 5 \text{Rs/hr} \times 6 \text{h} = 30 \\ 7 \text{Rs/hr} \times 5 \text{h} = 35 ) +5 \quad .16\frac{2}{3}\% \leftarrow \frac{-1}{6} \\ \frac{5}{30} \times 100 = 16\frac{2}{3}\% \end{array}$$

(14) A man multiply a no. by  $\frac{7}{4}$  instead of  $\frac{3}{5}$ . find the % change in his revenue.

$$\begin{array}{l} \frac{3}{5} \times 20 = 12 \\ \times \frac{7}{4} \times 20 = 35 \end{array} \quad \left( \begin{array}{l} 23 \\ 12 \end{array} \right) \quad \begin{array}{l} \frac{23}{12} \times 100 \\ = 19\frac{2}{3}\% \end{array} \quad \begin{array}{l} \text{let no. } \rightarrow 20 \\ (\text{LCM of } 4, 5) \end{array}$$

(15) A student multiplied a no. by  $\frac{3}{5}$  instead of  $\frac{5}{3}$ . find the % error in the calculation.

$$\begin{array}{l} \frac{5}{3} \times 15 = 25 \\ \times \frac{3}{5} \times 15 = 9 \end{array} \quad \left( \begin{array}{l} -16 \\ 25 \end{array} \right) \quad \begin{array}{l} \frac{16}{25} \times 100 = 64\% \end{array}$$

(16) A student multiply a no. by  $\frac{3}{4}$  instead of  $\frac{4}{3}$ . find % error in calculation.

$$\begin{array}{l} \frac{4}{3} \times 12 = 16 \\ \times \frac{3}{4} \times 12 = 9 \end{array} \quad \left( \begin{array}{l} 7 \\ 16 \end{array} \right) \quad \begin{array}{l} \frac{7}{16} \times 100 = 43\frac{3}{4}\% \end{array}$$

(17) if the income tax is ↑ by 19%. net income is ↓ by 6%. find the rate of income tax.

Tax  $\propto \frac{1}{\text{net income}}$

Income	Tax	Net income
25	6	19

$$\text{Tax} \times \frac{19}{100} = NI \times \frac{6}{100}$$

$$\frac{\text{Tax}}{NI} = \frac{6}{19} \quad \Rightarrow \text{Income} = 6 + 19 = 25$$

Income	Tax	Net income
100	20	80

Tax में जो ↑ होगा, तो NI का ↓ होगा & vice-versa

- (18) if the income tax is  $\uparrow$  by 17% then net income is reduced by 8%. find the rate of income tax. 118

	Income	Tax	Net income
	20	3	17
	$\frac{3}{20} \times 100 = 15\%$		

- (19) Sheets (s)  $\times 71\frac{3}{7}\% = 25$  In a train there are as many wagons as there are no. of seats in each wagon. In one of the wagon carrying 25 persons is filled with  $71\frac{3}{7}\%$  of its capacity. find the maximum no. of passengers that can be accommodated if it has min 20% seats always vacant.
- $s \times \frac{5}{7} = 25.5$
- $s = 35$
- wagons = 35
- Total sheets = 1225
- $1225 \times \frac{80}{100} = 980.$

- (20) A man can type 20 lines in 10 minutes but he leaves 8% margin on each line. In how much time he will type 23 pages with 40 lines on each page on w/c he leaves 25% more margin than before.

1 min  $\rightarrow$  2 lines

8% margin  $\rightarrow$  92% type

Efficiency (1min)  $\Rightarrow 2 \times 92\%.$

$$\frac{\frac{5}{40} \times 23 \times 90\%}{2 \times 92\%} = 450 \text{ min.}$$

~~Ans~~



$$8 \times \frac{25}{100} = 2$$

8 + 2 = 10% margin now

- (21) if x earns 25% more than y. What % less does y earn than x.

$$\begin{array}{ccc} x & & y \\ \swarrow & \downarrow & \searrow \\ 5 & - & 4 \end{array} \Rightarrow \frac{1}{5} \times 100 = 20\%.$$

- (22) if Kishan salary is  $16\frac{2}{3}\%$  less than Radha. By how much % does Radha's salary is more than Kishan.

$$\begin{array}{ccc} K & & R \\ \swarrow & \downarrow & \searrow \\ 5 & - & 6 \end{array} \Rightarrow \frac{1}{5} \times 100 = 20\%.$$

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

(23) If  $x$  is  $\frac{5}{6}$  times as large as  $p$ . By how much percentage is  $q$  less than  $p$ .

$$\frac{p}{6} - \frac{q}{1} = \frac{5}{6} \times 100 = 83\frac{1}{3}\%$$

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(24) If 60% of the students in a school are boys and the no. of girls is 972. How many boys are there in the school.

$$x = \frac{2}{3} q$$

2	—	972
1	—	486

$$60\% = \frac{3}{5}$$

लक्षणी = 5-3=2

if a student scores 25% marks then he is failed by 210 marks.

(25) But if he scores 55% marks then he is passed with 240 marks. Find the passing %.

$$\text{Max. marks} = x$$

$$25\% x + 210 = 55\% x - 240$$

$$x = 1500$$

$$\text{Pass marks} = \frac{25}{100} \times 1500 + 210 = 585$$

$$\text{Pass \%} = \frac{585}{1500} \times 100 = 39\%$$

(26)

$$25\% = -210$$

$$55\% = +240$$

$$\hline 30\% & 450 \\ 1\% & 15 \\ 100\% & 1500 \\ \Rightarrow \frac{210}{15} & = -14\% \\ \text{Pass \%} & = 25\% + 14\% = 39\% \end{array}$$



(26) If a student score 36% marks then he is failed by 32 marks.

but when he score 48% marks he is passed by 64 marks.

Find passing %

$$36\% - 32$$

$$48\% + 64$$

$$\hline 12\% & \rightarrow 96 \\ 14\% & — 8 \end{array}$$

$$\frac{32}{8} = 4\%$$

$$\text{Pass \%} = 36 + 4$$

$$= 40\%$$

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(27) When a student score 40% marks then he is failed by 50 marks. but when he score 50% marks then he is passed with 40 marks. Find passing %.

$$\begin{array}{r}
 40\% \quad -50 \\
 50\% \quad +40 \\
 \hline
 90 \rightarrow 10\% \\
 1\% \rightarrow 9
 \end{array}
 \quad \frac{50}{9} = 5 \frac{5}{9}\%$$

$$\text{pass}\% = 45 + 5 \frac{5}{9}\%$$

$$= 45 \frac{5}{9}%$$

- (28) When a student score 30% marks then he fails by 5 marks. But when he scores 40% marks he got 10 more marks than passing%. find (i) maximum marks (ii) passing %.

$$\begin{array}{r}
 30\% \quad -5 \\
 40\% \quad +10 \\
 10\% \quad \hline
 1\% \quad 1.5
 \end{array}
 \quad \text{max. marks} = 150$$

$$\text{Pass marks} = 30 + 3 \frac{1}{3}$$

$$= 33 \frac{1}{3}\%$$

- (29) There are two types of animals in a room some are cats & some are dogs. Each cat takes 7 biscuits and each dog takes 9 biscuits. if 355 biscuits are eaten by 45 animals. find the no.

$$\begin{array}{c}
 45 \\
 \swarrow \quad \searrow \\
 \text{cat} \quad \text{dog} \\
 7 \quad 7+2 \\
 45 \times 7 = 315
 \end{array}
 \quad \begin{array}{r}
 355 \\
 -315 \\
 \hline
 40
 \end{array}
 \quad \begin{array}{l}
 \text{of cats \& dogs} \\
 \text{by allegation}
 \end{array}$$

$$\frac{40}{2} = 20 \text{ dogs}$$

$$\text{cats} = 25$$

$$\begin{array}{c}
 355 \\
 \swarrow \quad \searrow \\
 7 \quad 9 \\
 \text{cat} \quad \text{dogs} \\
 315 \quad 405 \\
 5\% : 4\%
 \end{array}$$

$$\begin{array}{r}
 9 \rightarrow 45 \\
 1 \rightarrow 5 \\
 \text{cat} = 5 \times 5 = 25 \\
 \text{dogs} = 5 \times 4 = 20
 \end{array}$$

- (30) In a zoo, there are rabbits and pigeons. if the heads are counted there are 280. If legs are counted there are 820. How many pigeons are there.

$$\begin{array}{c}
 280 \\
 \swarrow \quad \searrow \\
 P \quad R \\
 2 \text{ legs} \quad 2 \text{ legs} + 2 \text{ legs} \\
 280 \times 2 = 560 \text{ legs}
 \end{array}
 \quad \begin{array}{r}
 820 \\
 -560 \\
 \hline
 260
 \end{array}
 \quad \begin{array}{c}
 \text{Rabbit} = 130 \\
 \text{Pigeons} = 150
 \end{array}$$

- (31) The population of a town is 6000. If males are ↑ by 5%, and female are ↑ by 9%. then population will become 6500 after 1 year. Find the no. of males & females.

$$\begin{array}{c}
 \text{6000} \\
 \diagdown \quad \diagup \\
 m \qquad F \\
 8\% \qquad 5\% + 4\%
 \end{array}
 \quad \left| \begin{array}{l}
 \frac{500}{-300} \\
 \hline \cancel{m} \quad 200 \\
 F \times \frac{4}{100} = 200 \quad \left| \begin{array}{l} \cancel{1\%} \rightarrow 50 \\ 100\% \rightarrow 5000 \end{array} \right. \\
 F = 5000 \\
 M = 1000
 \end{array} \right.$$

- (32) The population of a village was 9600. If the males & females are ↑ by 8% and 5%. The population will become 10,272 after 1 year. Find the no. of males at present.

$$\begin{array}{c}
 9600 \\
 \diagdown \quad \diagup \\
 f \qquad m \\
 5\% \qquad 5\% + 3\%
 \end{array}
 \quad \left| \begin{array}{l}
 \begin{array}{r}
 672 \\
 -480 \\
 \hline 192
 \end{array} \\
 3\% \quad 192 \\
 1\% \quad 64 \\
 \text{males} = 6400
 \end{array} \right. \quad \left| \begin{array}{l}
 F = 9600 \\
 -6400 \\
 \hline 3200
 \end{array} \right.$$



### CLASS

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- (33) A family consumes 25 kg rice and 9 kg wheat per month. It spends Rs 350. The price of rice is 20% of the price of wheat. If the price of wheat is ↑ by 20%, then find the % reduction in consumption of rice, if it has the same amount to spend. The price of rice is constant.

$$\begin{array}{ccc}
 25 \text{ kg} & 9 \text{ kg} & \text{rice} \quad \text{wheat} \\
 \text{rice} & \text{wheat} & 0.2 \rightarrow 5 \text{ Rs/kg} \quad 25 \text{ Rs/kg} \\
 \\ 
 \text{dot} = \frac{1}{5} & 1x & \downarrow \text{constant} \quad \downarrow 20\% \uparrow \\
 & 5x & \text{New P} \rightarrow 5 \text{ Rs/kg} \quad 30 \text{ Rs/kg}
 \end{array}$$

$$x = 5$$

$$\text{wheat} = 25 \text{ Rs/kg}$$

$$\text{rice} = 5 \text{ Rs/kg}$$

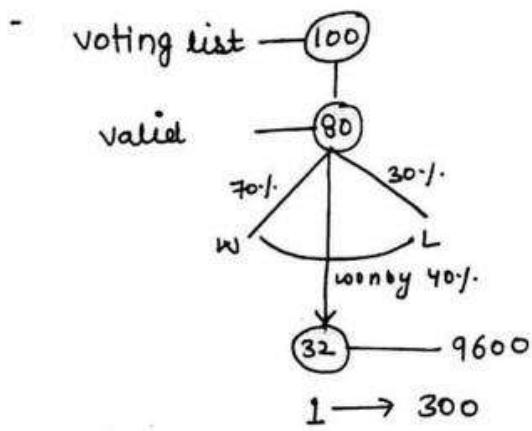
$$\begin{array}{r}
 350 \\
 -270 \\
 \hline 80 \text{ Rs for consumption of rice}
 \end{array}$$

$$\frac{80}{5} = 16 \text{ kg}$$

Reduction in rice consumption =

$$25 - 16 = 9 \Rightarrow \frac{9}{25} \times 100 = 36\%$$

- 34) In an election 2 candidates participated. 20% voter declare invalid and the winner gets 70% of the valid votes. and won by 9600 votes. find the no. of  
 i) voting list ii) valid votes



$$\text{i) voting list} = 100 \times 300 = 30000$$

$$\text{ii) valid votes} = 80 \times 300 = 24000$$

$$x \times \frac{4}{5} \times \frac{3}{5} = 9600$$

$$x = 30,000$$

$\textcircled{*}$   $x = \text{voting list}$

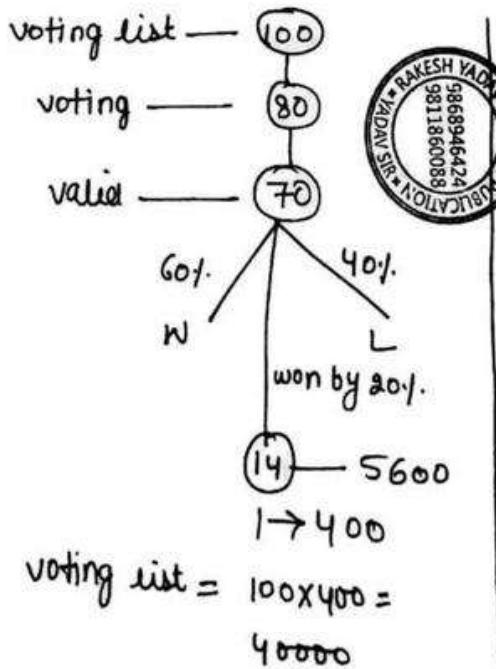
$20\% = \frac{1}{5}$  invalid

valid =  $\frac{4}{5}$

won by 40% =  $\frac{3}{5}$

$\frac{3}{5}$  of valid votes = 9600

- 35) In an election two candidates participated. 20% voters did not vote.  $12\frac{1}{2}\%$  votes declared invalid and winner get 60% of the valid vote and won by 5600 votes. find the no. of voter list.



$$\text{voting list} = 100 \times 400 = 40000$$

$$x \times \frac{4}{5} \times \frac{7}{8} \times \frac{1}{5} = 5600$$

$$x = 40,000$$

20% =  $\frac{1}{5}$  - voters do not vote

voting =  $\frac{4}{5}$

$12\frac{1}{2}\% = \frac{1}{8}$  - invalid

valid =  $\frac{7}{8}$

20% =  $\frac{1}{5}$  (win margin)

- (36) In an election 10% voters did not vote and  $11\frac{1}{2}\%$  votes declared invalid and the winner got 75% of the valid votes. If he won by 2000 votes then find the voting list.

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$$x \times \frac{9}{10} \times \frac{8}{9} \times \frac{1}{2} = 2000$$

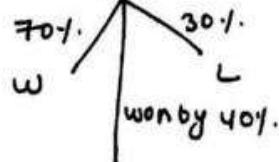
$$x = 5000$$

- (37) In an election two candidates participated, 10% voters did not vote, out of which 10% votes declared invalid and the winner got 70% of the valid votes and win by 7290 votes. Then find the voting list.

voting list — 100

voting — 90

valid — 81



$$81 \times \frac{2}{5} \rightarrow 7290$$

$$1 \rightarrow \frac{7290 \times 5}{81 \times 2} = 225$$

$$\text{voting list} = 225 \times 100 = 22500$$

$$x \times \frac{9}{10} \times \frac{9}{10} \times \frac{2}{5} = 7290$$

$$x = \frac{7290 \times 10 \times 10 \times 5}{9 \times 9 \times 2}$$

$$x = 22500$$

- (38) In an election two candidates participated. 30% voters did not cast their votes, out of which 600 votes declared invalid and the winner got 75% of valid votes and wins by 1500 votes. Find the no. of voting list.

$$\left( \underbrace{x \times \frac{4}{5} - 600}_{\text{valid votes}} \right) \times \frac{1}{2} = 1500$$

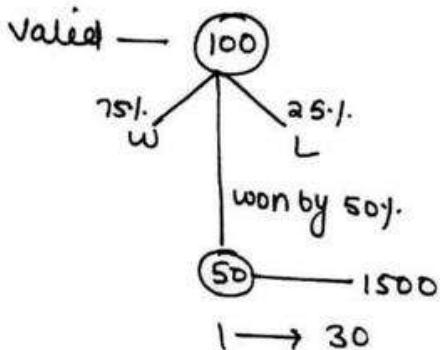
124.

$$\text{valid votes} = 1500 \times 2 = 3000$$

$$\text{voting } (x \times \frac{4}{5}) = 3000 + 600 = 3600$$

$$\text{voting list } (x) = \frac{900}{3600 \times \frac{5}{4}} = 4500$$

OR



$$\text{valid votes} = 30 \times 100 = 3000$$

$$\text{voting} = \text{valid} + \text{invalid}$$

$$= 3000 + 600 = 3600$$

$\frac{4}{5}$  voting  
 $\frac{1}{5}$  total

$$4 \rightarrow 3600$$

$$1 \rightarrow 900$$

$$\text{Total votes} = 900 \times 5 = 4500$$

- (39). In an election two candidates participated, 10% voters did not vote, 2500 votes declared invalid and the winner gets 55% of the valid votes and wins by 5000 votes. Find the no. of voters in the voting list?

$$\left( x \times \frac{9}{10} - 2500 \right) \times \frac{1}{10} = 2000$$

$$x = \frac{2500}{\frac{9}{10}} = 25000$$

- (40) A salesman is allowed 12% commission on the total sales made by him and a bonus of 1% on the sales over 15000. If the total earning of the salesman is 7650 Rs, find the total sales.

$$\text{Total sales} = x$$

$$\text{commission} = x \times \frac{12}{100}$$

$$\text{Bonus} = (x - 15000) \times \frac{1}{100}$$

$$\Rightarrow \frac{12x}{100} + (x - 15000) \times \frac{1}{100} = 7650$$

$$\Rightarrow \frac{12x}{100} + \frac{x}{100} - 150 = 7650$$

$$\frac{13x}{100} = 7800$$

$$x = 60,000$$

$$\text{Total sales} = 60,000$$

15000	15000 +
↓	↓

12%                    13%

125

अगर सारी sale में 13% होते  
salesman को (15000 में 1%) का  
extra benefit दोगा।

$$15000 \times \frac{1}{100} = 150$$

$$\text{Now his earning} = 7650 + 150 = 7800$$

$$\text{T.S का } 13\% = 7800$$

$$T.S \times \frac{13}{100} = \frac{600}{600}$$

$$T.S = 60,000$$

- (41) A salesman is allowed ~~12%~~ commission on the total sales made by him and a bonus of 1% on the sales over 20,000 if the total earning of the salesman is Rs 6800. find the total sale.

20,000	+
↓	↓

$$2\% \quad 9\% \quad 10\%$$

$$\text{Now Total earning} = 6800 + 200 = 7000$$

$$T.S \times \frac{10}{100} = 7000$$

$$T.S = 70,000$$

- (42) A salesman is allowed ~~5%~~ commission on the total sales made by him and a bonus of ~~1%~~ on the sales over 10,000. if his total earning is Rs 1990, find the total sales.

$$10,000 \times \frac{1}{200} = 50$$

$$1990 + 50 = 2040$$

$$T.S \times \frac{6}{100} = 2040$$

$$T.S = 34000 \text{ Rs.}$$

(43)  $\text{Exp.} \rightarrow 30$   
 consum: 6 kg : 5 kg  
 $\text{price} \rightarrow 5 \text{Rs/kg} : 6 \text{Rs/kg}$   
 $\frac{1}{6} \times 100 = 16\frac{2}{3}\%$

(42)  $\text{Exp.} \rightarrow 100$  for exam 126  
 now exp.  $\rightarrow 120$  same करने की लिए 20 की कमी करनी पड़ती है।  
 $-20$   
 $\frac{20}{120} \times 100 = 16\frac{2}{3}\%$

(44) if the price of sugar is  $\downarrow$  by 30%. Then by how much % the consumption  $\uparrow$  so that the exp. remains same.

Soln  $\text{Exp.} \rightarrow 100$   
 now exp.  $\rightarrow 70$   $+30$   
 same राशि  $\frac{2}{7}$   
 $\frac{30}{70} \times 100 = 42\frac{6}{7}\%$

(43) The price of sugar  $\uparrow$  by 30%. By how much % the consumption is  $\downarrow$  so that expenditure will not increase.

(45) The price of sugar is  $\downarrow$  by 30%. By how much % the consumption is  $\uparrow$  so as the expenditure will  $\downarrow$  by 10% only.

~~(45)~~  $\text{Exp.} \rightarrow 100$   
 now exp.  $\rightarrow 70$   $+20$   
 $\frac{20}{70} \times 100 = 28\frac{4}{7}\%$

The price of sugar is  $\uparrow$  by 20%. By how much kg of consumption is  $\downarrow$  so as the expenditure will  $\uparrow$  by 5% only when he originally consume 80 kg sugar.

$$\begin{array}{c}
 \text{Diagram: } \\
 \begin{array}{ccccc}
 & 100 & & 105 & \\
 & \downarrow & & \nearrow & \\
 120 & & -15 & & \\
 \end{array}
 \end{array}
 \quad 
 \begin{aligned}
 & \frac{15}{120} \times 100 = 12\frac{1}{2}\% \\
 & \Rightarrow \begin{array}{l}
 \begin{array}{r}
 \begin{array}{c} \nearrow -1 \\ \searrow 8 \end{array} \\
 \begin{array}{c} \text{dec. consumption} \\ \text{original} \end{array} \\
 280
 \end{array} \\
 1 \rightarrow 35
 \end{array} \\
 & 35 \text{ kg Ans.}
 \end{aligned}$$


---

- (47) The price of sugar is  $\uparrow$  by 30% due to this a family use 40 kg less sugar so as expenditure will  $\uparrow$  by 10% only. find original consumption.

$$\begin{array}{c}
 \text{Diagram: } \\
 \begin{array}{ccccc}
 & 100 & & 110 & \\
 & \downarrow & & \nearrow & \\
 130 & -20 & & & \\
 \end{array}
 \end{array}
 \quad 
 \begin{aligned}
 & \frac{-20}{130} \\
 & \begin{array}{l}
 \begin{array}{r}
 \begin{array}{c} \nearrow -2 \\ \searrow 13 \end{array} \\
 \begin{array}{c} \text{dec. cons.} \\ \text{original} \end{array} \\
 x20
 \end{array} \\
 2 \longrightarrow 40 \\
 1 \longrightarrow 20
 \end{array} \\
 & 260 \text{ kg Ans.}
 \end{aligned}$$

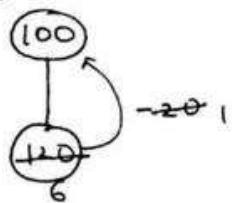

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- (48) The price of sugar is  $\uparrow$  by 30% due to this a family purchase 32 kg more sugar so as the exp. will  $\downarrow$  by 16% only. find the current consumption.

$$\begin{array}{c}
 \text{Diagram: } \\
 \begin{array}{ccccc}
 & 100 & & 84 & \\
 & \downarrow & & \nearrow & \\
 70 & +14 & & & \\
 \text{s} & & & &
 \end{array}
 \end{array}
 \quad 
 \begin{aligned}
 & = \frac{+1}{5} \nearrow 32 \\
 & \begin{array}{l}
 \begin{array}{r}
 \begin{array}{c} \nearrow 32 \\ \searrow 5 \end{array} \\
 \begin{array}{c} \text{current cons.} \\ \text{o.c.} \end{array} \\
 x32 \\
 160
 \end{array} \\
 32 + 160 \\
 = 192
 \end{array}
 \end{aligned}$$


---

- (49) The price of sugar is  $\uparrow$  by 20% due to this a family purchase 12 kg less sugar for Rs 300. find  
 i) original consumption      iii) original price  
 ii) current consumption      iv) current price



$$\begin{array}{r} -1 \\ \hline 6 \\ 0 \cdot c \times 12 \rightarrow 72 \text{ kg} \end{array}$$

$$0 \cdot c = 72 \text{ kg} \quad \overline{128}$$

$$0 \cdot \text{price} = \frac{300}{72} = 4 \frac{1}{6} \text{ rs/kg}$$

$$c \cdot c = 60 \text{ kg}$$

$$c \cdot \text{price} = \frac{300}{60} = 5 \text{ rs/kg}$$

- (50) The price of rice ↓ by 10%. due to which a family used 50 gm more rice in Rs 1. find original consumption.



+10%

$$\begin{array}{r} +1 \\ \hline 9 \\ | \\ x50 \\ 450 \text{ gm} \end{array}$$

$$0 \cdot c = 450 \text{ gm.}$$

## CLASS

### 16

- (51) In an election to 2 candidates participated. 10% didn't vote. 300 votes declared invalid and the winner get 60% of the voting list and win by 900 votes. find no. of valid votes.

$$\text{voting list} = 100x$$

$$\text{voting} = 90x$$

$$\text{valid} = (90x - 300)$$

$$\begin{array}{ccc} & w & \\ & \swarrow & \searrow \\ 60x & & (30x - 300) \end{array}$$

$$\begin{aligned} \text{win margin} &= 60 - (30x - 300) \\ &= 30x + 300 \end{aligned}$$

$$30x + 300 = 900$$

$$x = 20$$

$$\text{voting list} = 2000$$

$$\text{voting} = 1800$$

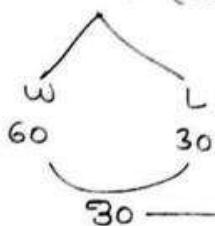
$$\text{Valid votes} = 1500$$

Ques

voting list — 100

voting — 90

valid — 90 (let)



$$1 \rightarrow 20$$

NOT logical (Tभाग आं प्रकाले के फूट भी 129.)

$$V_oL = 100 \times 20 = 2000$$

$$\text{valid} - 90 \times 20 = 1800 - 300$$

$$= 1500$$

$$\text{voting} - 90 \times 20 = 1800$$

$$900 - 300 = 600$$

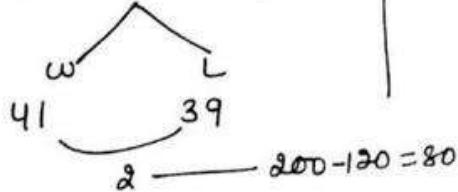
- 52 In an election 2 candidate participate. 20% voters did not vote & 120 votes declare invalid. winner gets 200 more votes than his opponent. winner wins by 800 votes and winner gets 41% of the voter list. find the voting list.

Sol

voting list — 100

voting — 80

valid — 80 (let)



$$V_oL \rightarrow 100 \times 40 = 4000$$

$$\text{voting} \rightarrow 80 \times 40 = 3200$$

- 53 A company allowed 9% commission on the total sales to his salesmen. and a bonus of 2% on the sales over Rs 80,000. if the salesman deposited 63200 in the company after deducting his earning on the total sales. Find the total sales made by the salesman.

$$\text{Total sales} = x$$

$$\text{commission} = \frac{x \times 9}{100}$$

$$\text{Bonus} = (x - 20,000) \times \frac{1}{100}$$

$$\text{Earning} = \text{comm.} + \text{Bonus}$$

$$= \frac{9x}{100} + (x - 20,000) \times \frac{1}{100}$$

$$= \frac{9x}{100} + \frac{x}{100} - 200$$

$$= \frac{x}{10} - 200$$

$$\text{T.S.} - \text{Earning} = 63,200$$

$$x - \left( \frac{x}{10} - 200 \right) = 63,200$$

$$\frac{9x}{10} = 63,000$$

$$x = 70,000 \quad \underline{\text{Ans.}}$$

<u>OR</u>	20,000	+
	↓	↓
	9%	10%

130

if company give 10% commission  
on all sale (company की  
20000 का 10% कम (loss) होता).

$$20,000 \times \frac{1}{100} = 200$$

$$\text{company gets} = 63200 - 200 \\ = 63000$$

$$10\% = \frac{1}{10} \begin{array}{l} \text{Earning} \\ \text{Total sale} \end{array}$$

$$\text{deposit} = 10-1 = 9 \rightarrow 63,000 \\ 1 \rightarrow 7000$$

$$\text{T.S.} = 10 \times 7000 = 70,000 \quad \underline{\text{Ans.}}$$

- (54) A company give 12% commission to his salesman on his total sales and above sales of 15000 a 1% bonus.  
if the salesman deposited 52350 in the company after deducting his commission from total sales. find total sales.

$$15,000 \times \frac{1}{100} = 150$$

$$52,350 - 150 = 52,200$$

$$\frac{12}{100} \rightarrow \text{Earning}$$

$$\text{T.S.}$$

$$\text{deposit} = 87 \rightarrow 52,200$$

$$1 \rightarrow 600$$

$$\text{T.S.} = \\ 100 \times 600$$

$$= 60,000$$

Ans.

- (55) A company give 5% commission to his salesman upto the sale of 10,000 and a ~~10%~~ commission of 4% on the sales above 10,000. If the salesman deposited Rs 31,100 in the company after deducting his commission then find total sales.

$$10,000 \times \frac{1}{100} = 100$$

$$\text{deposit} = 31100 + 100 \\ = 31200$$

$$\frac{4}{100} = \frac{-1}{25}$$

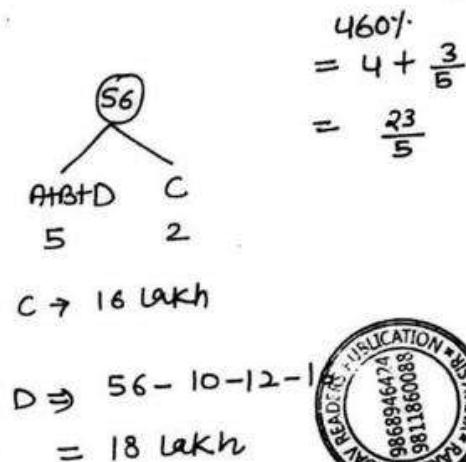
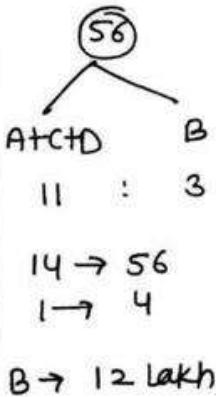
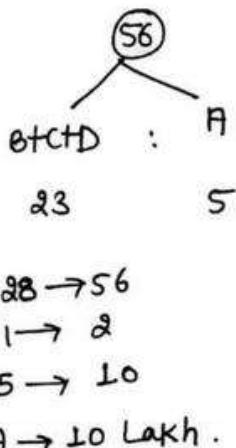
$$\text{Deposite} = 24 - 31200 \\ 1 - 1300$$

$$\text{T.S} = 1300 \times 25$$

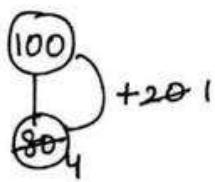
$$= 32500$$

131

- (56) A, B, C and D purchase a flat. 56 lakhs. The share of B+C+D is 460% of A, the share of A+C+D is  $366\frac{2}{3}\%$  of B and C's share is 40% of A+B+D.  
Find the share of D.



- (57) The price of sugar is + by 20% due to this a family purchase 20 kg more sugar for Rs 400. find  
i) original consumption      iii) original price  
ii) current consumption.      iv) current price.



$$+1 \xrightarrow{4} 20 \text{ kg}$$

$$O.C \times \frac{90}{80} = 80 \text{ kg}$$

$$O.C = 80 \text{ kg}$$

$$O.P = \frac{400}{80} = 5 \text{ Rs/kg}$$

$$C.C = 100 \text{ kg}$$

$$C.P = \frac{400}{100} = 4 \text{ Rs/kg}$$

- (58) A reduction of Rs 2 per kg enables a man to purchase 4 kg more sugar for Rs 16. Find original price.

- A) 3 Rs/kg      C) 5 Rs/kg  
B) 4 Rs/kg      D) 6 Rs/kg

$$O.\text{price} = x \text{ Rs/kg}$$

$$C.\text{price} = (x-2) \text{ Rs/kg}$$

$$\frac{16}{x-2} - \frac{16}{x} = 4$$

option  $\frac{3}{4}$

Ans - B ( 4 Rs/kg )

- (59) A reduction of 50 paise/dozen in the price of eggs a person buy 1 dozen more eggs for Rs 66. find original price.

A) 5 Rs/kg      C) 7 Rs/kg

O.price - x Rs/kg

B) 6 Rs/kg

D) 8 Rs/kg

C.price - x - 0.5

$$\frac{66}{x-0.5} - \frac{66}{x} = 1$$

6 Rs per dozen.



- (60) A man spends 60% of his income. If his income is ↑ by 15%. and his expenditure is ↑ by 15%. find the % change in his saving.

Income	Exp.	Saving
500	300	200
+75	+45	+30
575	345	230

$$60\% = \frac{3}{5} \begin{matrix} \text{EXP.} \\ \text{I} \end{matrix}$$

$$\frac{30}{200} \times 100 = 15\% \uparrow$$

- (61) A man spends 75% of his income. if his income is ↑ by 20% & exp. is ↑ by 10%. find the % change in the saving.

Income	Exp	Saving
400	300	100
+80	+30	+50

$$75\% = \frac{3}{4} \begin{matrix} \text{EXP} \\ \text{I} \end{matrix}$$

$$\frac{50}{100} \times 100 = 50\% \uparrow$$

- 62) A man spends Rs 5700 out of his income of 8550. If his income and exp. is ↑ by 19% and 13%. find the % change in saving.

133

I	Exp	S	
300	200	100	$\frac{8550}{3} : \frac{5700}{2}$
↓ +57	↓ +26	↓ +31	$\frac{31}{100} \times 100 = 31\% \uparrow$ <u>Ans</u>
		131	

CLASS  
17

Pardeep Chhokker  
7206446517

- 63) The population of a town is ↑ by  $16\frac{2}{3}\%$  in 1st year, ↓ by  $37\frac{1}{2}\%$  in 2nd year, ↑ by  $57\frac{1}{7}\%$  in 3rd year. Then find the present population if after 3 years the population will become 1,65,000.

$$(+)(-) (+)$$

$$16\frac{2}{3}\% \quad 37\frac{1}{2}\% \quad 57\frac{1}{7}\%$$

$$\frac{+1}{6} \quad -\frac{3}{8} \quad +\frac{4}{7}$$

$$x \times \frac{7}{6} \times \frac{5}{8} \times \frac{11}{7} = +\frac{3000}{48}$$

$$x = 1,44,000$$

$$\begin{array}{r} 6 \quad 7 \\ 8 \quad 5 \\ \hline 7 \quad 11 \\ \hline 48 \quad 55 \rightarrow 165000 \\ 1 \rightarrow 3000 \end{array}$$

$$48 \rightarrow 48 \times 3000 = 144000$$



- 64) A man spends 5% of his total income in travelling and 20% of the rest spend in food and then he donate Rs 120 and he still left with 1400 Rs. find his income.

$$\begin{array}{l} T \quad F \\ 5\% \quad 20\% \\ \frac{-1}{20} \quad -\frac{1}{5} \end{array}$$

$$x \times \frac{19}{20} \times \frac{4}{5} - 120 = 1400$$

$$\begin{array}{r} x \times \frac{19}{25} = +\frac{80}{20} \\ x = 2000 \text{ Rs} \end{array}$$

$$\begin{array}{r} \text{OR} \\ 20 \quad 19 \\ 5 \quad 4 \\ \hline 100 \quad 76 \rightarrow 1520 \\ | \rightarrow 120 \\ 2000 \text{ Rs} \quad \underline{\text{Ans}} \end{array}$$

- 65 An electronic contractor has certain length of wire 134 m. 10% wire has stolen and 70% of the remaining was sold out. Find the original length of wire if 810 mtr. wire is still left.

$$x \times \frac{9}{10} \times \frac{3}{10} = 810$$

$$x = 3000 \text{ mts.}$$

- 66 In a library 20% of the books are in Hindi, 50% of the remaining in English and 30% of the remaining are in French and rest 6300 books are in regional language. Then find the no. of books in library.

$$\begin{array}{ccc} H & E & F \\ 20\% & 50\% & 30\% \end{array}$$

$$\frac{1}{5} \quad \frac{1}{2} \quad \frac{3}{10}$$

$$x \times \frac{2}{5} \times \frac{1}{2} \times \frac{7}{10} = \frac{450}{6300}$$

$$x = 450 \times 2 \times 25$$

$$= 900 \times 25 = 22500$$

- 67 A manufacturer sold his goods to wholeseller at 25% profit and the wholeseller sells it to retailer at 20% profit and the retailer sold it to customer at 28% profit. Then find the cost price of goods for manufacturer if the customer purchase it at Rs 9600.

$$x \times \frac{5}{4} \times \frac{6}{5} \times \frac{32}{25} = \frac{500}{9600}$$

$$x = 5000$$

- 68 A spends 50% of his income on household items and of the remaining 50% on transport, 25% on entertainment, 10% on sports and remaining amount of 900 is saved. What is Mr. A's monthly income.

$$x \times \frac{1}{2} \times \frac{15}{100} = 900$$

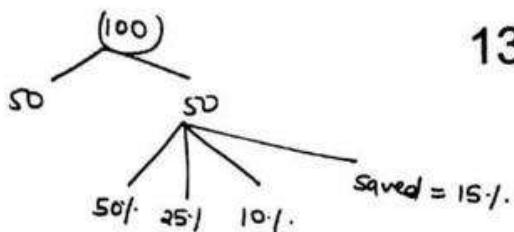
$$x = 12000 \text{ Ans}$$

T	E	SP
50	25	10

↓  
85% of Remaining

saved = 15%.

135

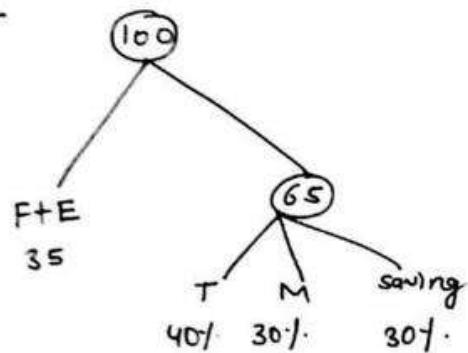


$$50 \times \frac{15}{100} = 900$$

$$1 \rightarrow 120$$

$$100 \rightarrow 12000$$

- 69) Mr. Mar spent 30% of his income on food and 15% on children's education, 40% of the remaining he spent on entertainment & transport together and 30% on medical. He is left with an amount of Rs 8775 after all these expenditures. What is Mr. Mar's monthly income.



$$\frac{13}{65} \times \frac{36}{100} = 8775$$

$$\frac{100}{2} = 50$$

$$1 \rightarrow \frac{675}{8775 \times 2}$$

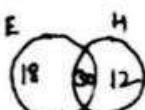
$$1 \rightarrow 450$$

$$100 \rightarrow 45000$$

OR

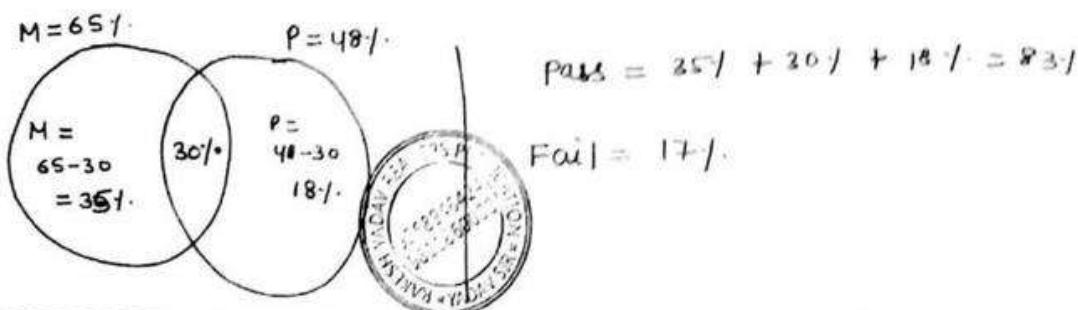
$$x \times \frac{65}{100} \times \frac{30}{100} = 8775$$

- 70) In a class of 60 children, 30% children can speak only English, 20% only Hindi and rest of the children can speak both the languages. How many children can speak Hindi?

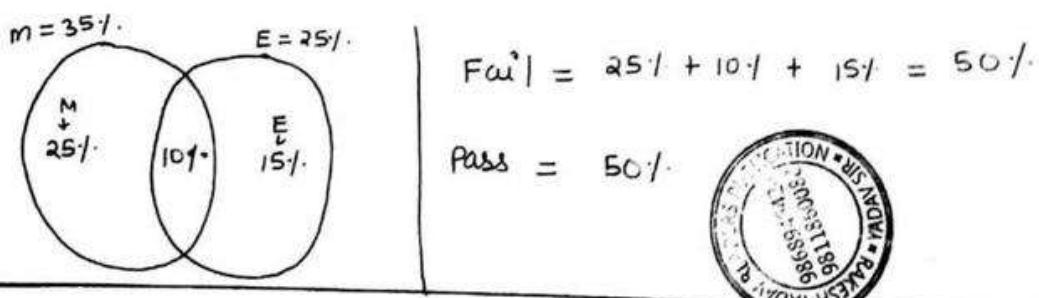


Hindi → 42

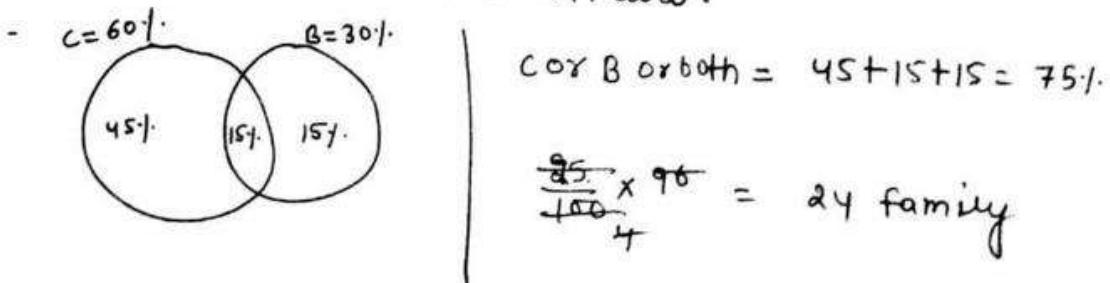
- (71) In an exam, 65% of the students passed in maths, 48% passed in physics and 30% passed in both. How much % of students failed in both the subjects. 136



- (72) In an exam, 35% of the students failed in maths, and 25% in English. If 10% failed in both math & English then how much % passed in both the subjects.



- (73) In a village each of the 60% of families has a cow, each of the 30% families has buffalow and each of the 15% of the families has both a cow and a buffalow. In all there are 96 families in the village. How many families do not have a cow or a buffalow.



- 74) if the numerator of a fraction is increased by 200% and the denominator is increased by 350%, the resultant fraction is  $\frac{5}{12}$ . What was the original fraction?

Let the original fraction be  $\frac{x}{y}$

$$\text{ACQ: } \frac{x \times (100+200)\%}{y \times (100+350)\%} = \frac{5}{12}$$



$$\Rightarrow \frac{300x}{450y} = \frac{5}{12}$$

$$\Rightarrow \frac{x}{y} = \frac{5}{8} \quad \underline{\text{Ans.}}$$

- 75) A solution of salt and water contain 5% salt. If 20L of water is evaporated then salt becomes 15%. Find the initial solution.

	salt	water		salt	water
Initial	$1_{x_3}$	$19_{x_3}$	$-40L \rightarrow 20L$	<u>salt is same throughout</u>	$95\%$
New	$3$	$17$	$1 \rightarrow \frac{1}{2}$	$15\%$	$85\%$

$$\text{Initial solution} = 60 \times \frac{1}{2} = 30L \quad \underline{\text{Ans.}}$$

- 76) 12 L of mix of acid & water contain 30% acid. How much litre of water should be withdrawn to make acid 40%.

Initial	$\frac{\text{Acid}}{3 \times 2} \textcircled{6}$	$\frac{\text{water}}{7 \times 2} \textcircled{14}$	$(6+14) = 20L \longrightarrow 12L$	$1 \longrightarrow \frac{12}{20} = \frac{3}{5} \text{ ur}$
New	$\frac{2 \times 3}{3 \times 3} \textcircled{6}$	$\frac{3 \times 3}{3 \times 3} \textcircled{9}$	$-\text{5L}$	$\text{water withdrawn} = \frac{3}{5} \times 5 = 3L$

- 77 When income of a man is ↑ by 6000 Rs, tax rate reduced from 18% to 15%. while in both the situations 25% of the income is tax free. find his initial income if he paid equal taxes in both cases.

$$\frac{x \times 75}{100} \times \frac{18}{100} = (x+6000) \times \frac{75}{100} \times \frac{15}{100}$$

$$6x = 5x + 30000$$

$$x = 30,000$$

Tax rate 18% & 15%  
पर्ती 6000  
करे ?

$x$	$x + 6000$
18%	15%
$x \times \frac{3}{100}$	$6000 \times \frac{15}{100}$
$x = 30,000$	$3\% \text{ tax saving}, 6000 \frac{9}{4} \text{ is } 15\%$ $\frac{9}{4} \text{ equal } 2\%$

- 78 A man saves a certain part of his monthly income so that he can purchase a car in 16 months. Find the % ↑ in his saving so that he can purchase the same car in 14 months only.

$$\frac{112 \text{ Rs}}{7 \text{ Rs}} \times \frac{8 \text{ Rs}}{+1} \Rightarrow \frac{1}{7} \times 100 \Rightarrow 14\frac{1}{7} \% \uparrow$$

16 month      14months

- 79 A watermelon contains 90% water. After sometime it contains only 12% water, if now its weight is 50 kg calculate the original weight.

Fresh →	Pulp	water
	$1_{x_{22}} + 22$	$9_{x_{22}} + 198$
Dry →	22	3
		Pulp का wt. same रहता है fresh/dry भी।

Dry  $(22+3) = 25 \rightarrow 50 \text{ kg}$   
 $1 \rightarrow 2 \text{ kg}$

wt. of fresh =  $(22+198) \times 2 = 440 \text{ kg}$

$10 \times f = 88 \times 50$   
 $f = 440 \text{ kg}$

(80) 20 kg fresh watermelon contains 96%. water, after some time water remains 95%. find the present weight of watermelon.

139

$$\begin{array}{c} P \\ \hline F \rightarrow 1 : 24 \end{array}$$

$$\begin{array}{l} \rightarrow 4 : 96 \\ 1 : 24 \end{array}$$

$$D \rightarrow 1 : 19$$

$$\begin{array}{l} \rightarrow 5 : 95 \\ 1 : 19 \end{array}$$

$$\text{wt. of fresh melon } (1+24) = 25 \text{ unit} \rightarrow 20 \text{ kg}$$

$$1 \text{ unit} \rightarrow \frac{4}{5} \text{ kg}$$

$$\boxed{20 \times 4 = 5 \times D \text{ melon}} \\ D \text{ melon} = 16 \text{ kg}$$

$$\text{wt. of Dry melon } (1+19) = 20 \Rightarrow \frac{20 \times 4}{5} = 16 \text{ kg Ans}$$

(81) Fresh fruit contains 68% water and dry fruit contains 30% water. How many kg of dry fruits can be made from 75 kg of fresh fruits.

$$\boxed{32 \times 75 = 80 \times D.f} \\ D.f = 30 \text{ kg.}$$

$$\begin{array}{c} P \\ \hline F \rightarrow 8 : 17 \end{array}$$

$$\text{Fresh } (8+17) = 25 \text{ unit} \rightarrow 75 \text{ kg} \\ 1 \rightarrow 3 \text{ kg}$$

$$D \rightarrow 4 \times 2 \quad 1 \times 2$$

$$\text{Dry fruit } (8+2) \rightarrow 10 \rightarrow 10 \times 3 = 30 \text{ kg Ans}$$

(82) A company allow 7% commission on total sales to the salesman. But if the salesman is appointed on a fix salary of Rs 3000 + 4% commission on the sales more than Rs 10,000, then salesman receive Rs 800 more on the 2nd condition. find the total sales.

$$1^{\text{st}} \rightarrow x \times \frac{7}{100} = \frac{7x}{100}$$

$$2600 + \frac{4x}{100} = \frac{7x}{100} + 800$$

$$2^{\text{nd}} \rightarrow 3000 + (x-10000) \times \frac{4}{100}$$

$$x = 60,000$$

$$\rightarrow 3000 + \frac{4x}{100} - 400$$

$$\rightarrow 3600 + \frac{4x}{100}$$

- 83) In an election Kareena and Katrina participated 140.  $\frac{2}{5}$  of the voters promised to vote for Kareena and rest promise to vote for Katrina. On the voting day 15% of the voters went back on their promise to vote for Kareena and 85% of the voters went back on their promise to vote for Katrina. Find the total no. of voters, if Kareena wins by 750 votes.

<u>Kareena</u>	<u>Katrina</u>
200	300
-30	-75
<u>170</u>	<u>225</u>
+75	+30
<u>245</u>	<u>255</u>
10	



$$\begin{array}{l} \frac{2}{5} \text{ Kareena} \\ \text{Total} \\ 2 : 3 \\ 200 : 300 \end{array}$$

$$10 \rightarrow 750$$

$$1 \rightarrow 75$$

$$\text{Total votes} = 500 \times 75$$

$$= 37500$$

- 84) Ram purchase 6 black and  $x$  white balls. The price of black ball is  $\frac{5}{2}$  of the price of the white ball. At the time of making the bill clerk made a mistake and inter-change the no. of balls, due to this the bill amount increased by 45%. Find  $x$ .

<u>Black</u>	<u>white</u>
6	<del><math>x</math></del>
5 Rs	& Rs

$$30 + 2x \quad (\text{Right bill})$$

$$5x + 12 \quad (\text{Wrong bill})$$

$$B = w \times \frac{5}{2}$$

$$\frac{B}{w} = \frac{5}{2}$$

$$\frac{30+2x}{12+5x} \rightarrow \frac{100}{145}$$

$$x = 15$$

## SIMPLE INTEREST

(241)

- ① if the SI on a certain sum of money for 3 years at the rate of 12.5% is Rs 3500 less than its principal. find the sum and SI.

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

$P$        $\overset{SI(1\text{year})}{\text{Sunit}}$        $SI$        $\overset{\text{3unit (for 3years)}}{\text{Sunit}}$        $SI = \frac{P \times R \times T}{100}$

Sunit  $\rightarrow$  3500 Rs  
 1unit  $\rightarrow$  700 Rs.

$$\text{Principal} = 8 \times 700 = 5600 \text{ Rs}$$

$$SI = 3 \times 700 = 2100 \text{ Rs. } \underline{\text{Ans.}}$$

- ② if the SI on a certain sum of money @  $6\frac{2}{3}\%$  per annum for 4 years is Rs 4400 less than its principal. find the SI and principal.

$$6\frac{2}{3}\% = \frac{1}{15}$$

$P$        $\overset{SI 1\text{yr}}{15\text{unit}}$        $SI$        $\overset{4\text{unit}}{11\text{unit}}$        $4\text{unit}$   
 11unit  $\rightarrow$  4400 Rs  
 1unit  $\rightarrow$  400 Rs

ebook.gocareer.in

$$\text{Principal} = 15 \times 400 = 6000 \text{ Rs.}$$

$$SI = 4 \times 400 = 1600 \text{ Rs.}$$

- ③ The rate of SI for 1st 3 years is 6%, for next 4 years it is 7%. And the period beyond 7 years it is 7.5% per annum. If a man invest Rs 18800 for 11 years, find the SI earned by him ?

$6\% \times 3\text{yr} = 18\%$ $7\% \times 4\text{yr} = 28\%$ $7.5\% \times 4\text{yr} = 30\%$ $\text{Rate for 11yr} = 76\%$	$SI = 18800 \times \frac{76}{100}$ $= 14888 \text{ Rs. } \underline{\text{Ans}}$
---	---

- (4) The rate of SI on a certain sum of money [242]  
 is 4% per annum for 1st two years, 6% per  
 annum for next 4 years, and 8% per annum for  
 the period beyond 6 years. If the simple interest  
 earned by a sum is Rs 1120 in 9 years, find  
 the sum.

$$\begin{aligned} 4\% \times 2 \text{ yr} &= 8\%. \\ 6\% \times 4 \text{ yr} &= 24\%. \\ 8\% \times 3 \text{ yr} &= 24\%. \\ \text{Rate for 9 years} &= \underline{\underline{56\%}}. \end{aligned}$$

$$\begin{aligned} P \times \frac{56}{100} &= +1120 \\ P &= 20,00 \text{ Rs.} \quad \underline{\text{Ans}} \end{aligned}$$

- (5) A bicycle can be purchased on cash payment of Rs 1500. But the same cycle can also be purchased on the cash down payment of Rs. 350 and rest can be paid in three equal annual instalment of Rs 400 for next three years. Find the rate of simple interest?

$$\begin{array}{r} 1500 \\ - 350 \\ \hline 1150 \end{array} \quad \begin{array}{r} 400 \times 3 = 1200 \\ SI = \frac{1200}{1150} \\ \hline 50 \text{ Rs} \end{array}$$

$$\begin{array}{r} 1150 \\ - 400 ) I \\ \hline 750 \\ - 400 ) II \\ \hline 350 \\ - 400 ) III \end{array}$$

$$\begin{aligned} \frac{1150 \times \gamma \times 1}{100 \times 12} + \frac{750 \times \gamma \times 1}{100 \times 12} + \frac{350 \times \gamma \times 1}{100 \times 12} &= 50 \\ \frac{\gamma}{1200} [1150 + 750 + 350] &= 50 \\ \frac{\gamma}{1200} \times 2250 &= 50 \\ \gamma &= 26 \frac{2}{3}\% \end{aligned}$$

Ans.

- (6) The cash price of a pen is 60 Rs. But it can also be purchased on a cash down payment of Rs 20 and 6 monthly equal instalment @ the rate of Rs 8 per month. Find the rate percent.

$$\begin{array}{r}
 \begin{array}{r}
 60 \\
 -10 \\
 \hline
 40
 \end{array} & \begin{array}{l}
 SP \times 6 \\
 = 48
 \end{array} \\
 \\ 
 \begin{array}{r}
 40 \\
 -8 \\
 \hline
 32
 \end{array} & \\
 \begin{array}{r}
 32 \\
 -8 \\
 \hline
 24
 \end{array} & \\
 \begin{array}{r}
 24 \\
 -8 \\
 \hline
 16
 \end{array} & \\
 \begin{array}{r}
 16 \\
 -8 \\
 \hline
 8
 \end{array} & \\
 \begin{array}{r}
 8 \\
 -8 \\
 \hline
 0
 \end{array} & \\
 \\ 
 & \begin{array}{l}
 120 \\
 \downarrow \\
 \text{Principal of } 6 \text{ installments.}
 \end{array}
 \end{array}$$

$$\frac{120 \times r \times 1}{100 \times 12} = 8$$

$$r = 80\%$$

Calculate the  
Principal of  
every month.

(243)

- ⑦ The cash price of a pen is Rs 10. But it can also be purchased on 11 monthly equal instalment of Rs 1 each. find the rate of simple interest ?

$$\begin{array}{r}
 10 \\
 9 \\
 8 \\
 7 \\
 6 \\
 5 \\
 4 \\
 3 \\
 2 \\
 1 \\
 0
 \end{array} \quad \begin{array}{l}
 11 \\
 \frac{55 \times r \times 1}{100 \times 12} = 1 \\
 \hline
 20
 \end{array}$$

$$r = 21 \frac{9}{11}\%$$

- ⑧ A man borrowed a sum of Rs 7000 from bank at SI. After 3 years he paid Rs 3000 to the bank and @ the end of 5 years he paid Rs 5450 and clear all his dues. find the rate percent ?

$$\begin{array}{r}
 7000 \\
 7000 \\
 7000 \\
 4000 \\
 4000 \\
 \hline
 29000
 \end{array} \quad \begin{array}{l}
 3000 \\
 + 5450 \\
 \hline
 8450 \\
 - 7000 \\
 \hline
 1450 = SI
 \end{array}$$

$$\frac{29000 \times r \times 1}{100} = 1450$$

$$r = 5\%$$

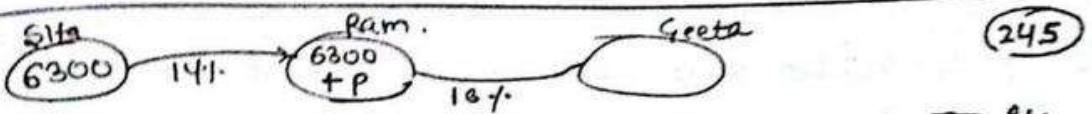
- ⑨ A man borrowed a sum of Rs 6000 from bank at SI. After 4 years he paid Rs 2500. and at the end of 5 th year he paid Rs 4550 and clear all his dues. find the rate of simple interest ?

$$\begin{array}{r}
 6000 \\
 6000 \\
 6000 \\
 6000 \\
 3500 \\
 \hline
 27500
 \end{array}
 \quad
 \begin{array}{r}
 2500 \\
 4550 \\
 \hline
 7050 \\
 -6000 \\
 \hline
 \text{SI} = 1050
 \end{array}
 \quad
 \frac{87500 \times r \times 1}{100} = 1050 \\
 r = 3 \frac{9}{11} \%$$

- ⑩ A man lent out two equal sums in two parts at the rate 8% and 7% per annum on SI. If the former is recovered 6 months earlier than the later , & he received equal amount of Rs 2560 each from both the parts . find the principal .

$\begin{array}{ll}  \text{I} & \text{II} \\  P & P \\  8\% & 7\% \\  (t - \frac{1}{2}) \text{ year} & t \text{ year} \\  \text{दोनों के equal} \\  \text{amt. receive हो रही} \\  \text{कि } \therefore \text{ SI same होगा}  \end{array}$	$  \begin{aligned}  \frac{P \times 8(t - \frac{1}{2})}{100} &= \frac{P \times 7 \times t}{100} \\  8t - 4 &= 7t \\  t &= 4 \\  \Rightarrow P + \frac{P \times 7 \times 4}{100} &= 2560 \\  \frac{28P}{100} &= 2560 \Rightarrow P = 2000 \text{ Rs}  \end{aligned}  $ 
--	--

- ⑪ Ram borrow a sum of Rs 6300 from Sita at the rate of 14% per annum for 3 years . He added some more money in it and lent it to Geeta at 16% per annum for 3 years. In this process he earn a total profit of Rs 618 . find how much amount does he added ?



$$\frac{(6300+P) \times 16 \times 3}{100} - \frac{6300 \times 14 \times 3}{100} = 618 \Rightarrow P = 500 \text{ Rs.}$$

(OR) Ram saves 618 in 3 years.

$$\text{Sos in 1 year} = \frac{618}{3} = 206 \text{ Rs}$$

$$\text{saving} = 16\% - 14\% = 2\% \text{ of } 6300$$

$$6300 \times \frac{2}{100} = 126 \text{ Rs}$$

diff of saving

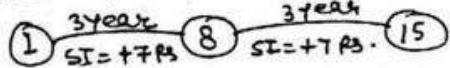
$206 - 126 = 80 \text{ Rs}$ . This diff is becoz of amt P invested by Ram.

$$\frac{P \times 16 \times 1}{100} = 80 \Rightarrow P = 500 \text{ Rs}$$

Ans

(12) If a certain ~~sum~~ sum of money becomes 8 times of itself in 3 years. In how much time it will

be 64 times of itself.



$$7 \text{ Rs} \longrightarrow SI = 3 \text{ years}$$

$$63 \text{ Rs} \longrightarrow SI = \frac{3}{7} \times 63 = 27 \text{ years. Ans}$$

$$* P = 1 \text{ Rs}$$

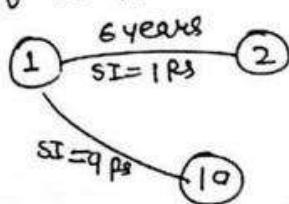
$$SI = 63 \text{ Rs}$$

$$\text{Amt} = 64 \text{ Rs}, \text{so}$$

64 times in

27 years.

(13) A certain sum of money become double of itself in 6 years on SI. In what time it will be 10 times of itself.



$$1 \text{ Rs} \longrightarrow SI = 6 \text{ years}$$

$$9 \text{ Rs} \longrightarrow SI = 6 \times 9 = 54 \text{ years.}$$



(14) A certain sum @ certain rate percent per annum simple interest becomes Rs 2100 in two years and Rs 2250 in 5 years. find principal & rate percent.

$$2 \text{ year} \longrightarrow 2100 \quad ] \quad \frac{150}{5} = 50 \text{ (SI for 1 year)}$$

$$5 \text{ year} \longrightarrow 2250$$

(CP)      250  
              (SI for 5 years)

$$\frac{250 \times r \times 1}{100} = 50$$

$r = \frac{5}{2} \%$

- (15) if a certain sum of money invested for a <sup>246</sup> ~~certain~~ time it amounts to Rs 350 @ 5% per annum, and it amounts to Rs 250 @ 3% per annum. find the time and principal?

$$\begin{aligned} P & \xrightarrow{\text{---}} t \xrightarrow{\text{---}} 5\% = 350 < \begin{matrix} P \\ 5\% \cdot SI \end{matrix} \\ P & \xrightarrow{\text{---}} t \xrightarrow{\text{---}} 3\% = 250 < \begin{matrix} P \\ 3\% \cdot SI \end{matrix} \end{aligned} \quad ] \quad \frac{100}{2\%} = 50$$

$\begin{matrix} 100 \\ (P) \end{matrix} \quad \begin{matrix} 150(SI) \end{matrix}$

$$\frac{100 \times 1 \times t}{100} = 50$$

$t = 50 \text{ years}$

- (16) if a certain sum of money amounts 10,000 in 5 years and Rs 10,800 in 7 years at a certain rate of interest. find rate percent.

$$\begin{aligned} 5 \text{ years} & \xrightarrow{\text{---}} 10,000 \xrightarrow{\text{---}} P + SI(5 \text{ years}) \\ 7 \text{ years} & \xrightarrow{\text{---}} 10,800 \xrightarrow{\text{---}} P + SI(7 \text{ years}) \end{aligned} \quad ] \quad \begin{matrix} \text{diff of } SI \text{ of } \\ 2 \text{ years} \\ = 800 \end{matrix}$$

$$\frac{800}{2} = 400 = SI \text{ for 1 year.}$$

$$P = 10,800 - 7(400) = 8000$$

$$\frac{8000 \times 8 \times 1}{100} = 400^5$$

$$8 = 5\%$$

- (2) A man deposit a total amt. of Rs. 65,000 in 3 banks A, B and C at the rate of simple interest 12%, 16% and 18% respectively. and earn a total SI of Rs 10,180 in one year. If the amount invested in bank A was  $7\frac{3}{4}\%$  of amount invested in bank C. find the amt. invested in bank B.

- (3) A man invested a certain sum of Rs 80,000 in 3 banks A, B and C @ 15%, 16% and 27%. Amt. invested in bank A is 20% of the amt. invested in C. find the amount invested in bank B if he earn a interest of Rs 36,400 SI in two years.

$$C = 5x$$

$$A = x$$

$$B = 80000 - x$$

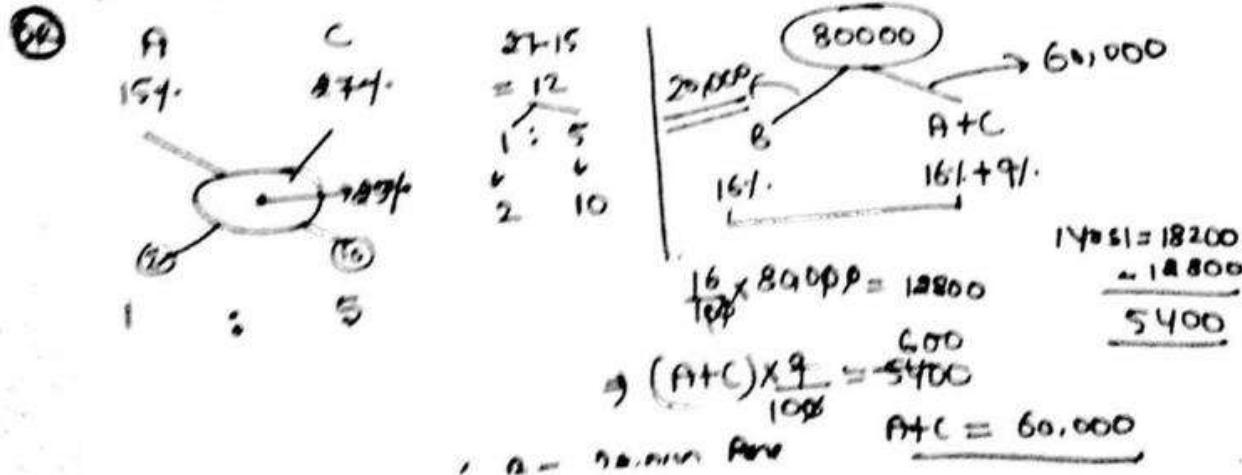
$$\frac{x \times 15 \times 2}{100} + \frac{(80000 - 6x) \times 16 \times 2}{100} + \frac{5x \times 27 \times 2}{100} = 36400$$

$$x = 10,000$$

$$C = 5x = 50,000$$

$$A = x = 10,000$$

$$B = 80000 - 60000 = 20,000 \text{ Ans.}$$



Soln-17

$$A = 71 \frac{3}{7} \% \cdot C$$

248

$$\frac{A}{C} = \frac{5x}{7x} = \frac{5x}{7x}$$

$$A = 5x$$

$$C = 7x$$

$$B = 65000 - 12x$$

$$\frac{5x \times 12}{100} + \frac{(65000 - 12x) \times 16}{100} + \frac{7x \times 18}{100} = 10180$$

$$\Rightarrow \frac{2}{100} (5x \times 6 + (65000 - 12x) \times 8 + 7x \times 9) = \frac{5090}{10180}$$

$$30x + 520000 - 96x + 63x = 509000$$

$$3x = 11000$$

$$x = \frac{11000}{3}$$

$$\therefore B = 65000 - \frac{12x}{3} \times \frac{11000}{3}$$

$$= 21000 \quad \underline{\text{Ans.}}$$

- (19) Rs 26,000 is invested in two parts in such a way that the SI from 1st part @ 10% per annum for 5 years is equal the simple interest on 2nd part @ 9% per annum for 6 years. find both the parts.

- (20) Rs 12,600 is invested in 3 parts in such a way that SI on 1st part @ 2% per annum for 3 years is equal to SI on 2nd part @ 3% per annum for 4 years is equal to SI on 3rd part @ 4% per annum for 5 years are equal. find the SI on each part.

- (21) Rs 18,750 is invested by a man 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 amount at an age of 18 years @ 5% per annum ? find the share of younger child.

solutions

(19)  $\frac{A \times 10 \times 5}{100} = \frac{B \times 9 \times 6^3}{100}$  | 249

5 unit — 26,000  
1 unit — 500 Rs

25A = 27B

$\frac{A}{B} = \frac{27}{25}$

A =  $27 \times 500 = 13,500$  Rs  
B =  $25 \times 500 = 12,500$  Rs

Ans

(20) 12,600

$$\frac{A \times 2 \times 3}{100} = \frac{B \times 3 \times 4}{100} = \frac{C \times 4 \times 5}{100}$$

3A = 6B = 10C = 30 (L.C.M of 3, 6, 10)

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

18 unit — 12,600 Rs  
1 unit — 700 Rs.

A = 7000, B = 3500, C = 2100.

SI on 18<sup>th</sup> part =  $\frac{7000 \times 2 \times 3}{100} = 420$  Rs. = 2<sup>nd</sup> & 3<sup>rd</sup> part.

(21) 12 year                  14 year

$\frac{Y}{P} + \frac{Y \times 5 \times 6}{100} = \frac{E}{P} + \frac{E \times 5 \times 4}{100}$

$\frac{13dY}{100} = \frac{12dE}{100}$

$\frac{Y}{E} = \frac{12}{13}$

$y = \text{Younger}$   
 $E = \text{Elder}$

25 unit — 18750  
1 unit — 750

Younger =  $12 \times 750$   
= 9000 Rs.

250

- (22) A person invest money in 3 diff scheme for 6 year, 10 year, 12 years @ 10%, 12% and 15% SI respectively. At the completion of each scheme he gets the same interest, find the ratio of his investment.

$$\frac{P_1 \times 10 \times 6}{100} = \frac{P_2 \times 12 \times 10}{100} = \frac{P_3 \times 15 \times 12}{100}$$

$$1 \cdot P_1 = 2 P_2 = 3 P_3$$



$$6 : 3 : 2 \quad \underline{\text{Ans}}$$

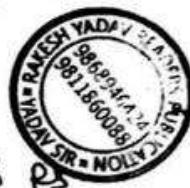
- (23) If Rs 64 amounts to Rs 83.20 in 2 years. What will Rs 86 amounts to in 4 years @ the same rate percent per annum.

$$\begin{array}{r} 83.20 \\ - 64.00 \\ \hline \text{SI} = 19.20 \text{ Rs} \end{array}$$

$$\frac{64 \times r \times 2}{100} = 19.20$$

$$r = 15\%$$

$$\Rightarrow \frac{86 \times 15 \times 4}{100} = \frac{258}{5} = 51.6 \text{ Rs}$$



$$\text{Amount} = 86 + 51.6 = 137.6 \text{ Rs} \quad \underline{\text{Ans}}$$

- (24) A man borrowed a total amt. of Rs 30,000, A part of it on SI @ 12% per annum & remaining on SI @ 10% p.a. if at the end of 2nd year, he paid in all Rs 36,480 to settle the loan amt. what was the amt. borrowed at 12% per annum.

$$\begin{array}{c}
 30,000 \\
 \diagdown \quad \diagup \\
 \text{I} \qquad \text{II} \\
 10\% \qquad 10\% + 2\%
 \end{array}$$

$$\begin{aligned}
 \text{SI for 1 year} &= \frac{6480}{2} \\
 &= 3240
 \end{aligned}$$

251

$$\begin{array}{r}
 \frac{10}{100} \times 30,000 \\
 = 3000 \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 3240 \\
 - 3000 \\
 \hline
 240
 \end{array}$$

$$\text{II} \times \frac{2}{100} = \frac{120}{240}$$

$$\text{II} = 12,000 \text{ Rs. } \underline{\text{Ans}}$$

- (25) A money lender finds that due to a ~~forget~~ decrease in the rate from 13% to 12½%, his yearly income reduced by Rs 104. What is his capital?

$$P \times \frac{1}{2} + = 104$$

$$P \times \frac{1}{200} = 104$$

$$P = 20800 \text{ Rs. } \underline{\text{Ans}}$$



$$\text{Annual Income/Payment/Installment} = \frac{\text{Due Debt} \times 100}{100t + \frac{rt \times (t-1)}{2}}$$

- (26) What annual payment will discharge a debt of Rs 944 in 4 annual equal installments at the rate of 12% p.a. on SI.

$$\frac{944 \times 100}{400 + \frac{7 \times 4 \times 3}{2}} = \frac{944 \times 100}{400 + 72}$$

$$\Rightarrow \frac{\cancel{944} \times 100}{\cancel{472}} \Rightarrow 200 \text{ Rs} \quad \underline{\underline{\text{Ans.}}}$$

- (27) what annual installment will discharge a debt of Rs 2210 due in 4 years @ 7% SI.

$$\frac{2210 \times 100}{400 + \frac{7 \times 4 \times 3}{2}} = \frac{2210 \times 100}{442} = 500 \text{ Rs}$$

$$\underline{\underline{\text{Ans.}}}$$

- (28) The annual payment of Rs 700 in 5 yr @ 10% pa SI will discharge a debt of what amount?

$$700 = \frac{D \times 100}{500 + \frac{10 \times 5 \times 4}{2}}$$

$$700 = \frac{D \times 160}{600} \quad D = 4200 \text{ Rs} \quad \underline{\underline{\text{Ans.}}}$$

Op

700	280
700	210
700	140
700	70
700	0
3500	700

$$\frac{700 \times 1 \times 10}{160} = 70 \text{ Rs}$$

↓  
140 SI

$$3500 + 700 = 4200 \text{ Rs.} \quad \underline{\underline{\text{Ans.}}}$$

### True Discount

[ 253 ]

Principal  $\rightarrow$  Present worth  
 SI  $\rightarrow$  True discount  
 Amount  $\rightarrow$  Due debt.

- ⑨ Find the present worth and true discount recurring SI.  
 p-a SI of Rs 10,000 due in 5 years.

$$\text{Present worth} = P$$

$$\frac{\text{True SI}}{\text{Discount}} = \frac{P \times 5 \times 5}{100} = \frac{25}{100} P$$

$$\text{Due debt} = P + \frac{25P}{100} = 10,000$$

$$\frac{+25P}{100} = +\frac{800}{100}$$

$$P = 8000 \text{ Rs}$$

$$\text{Present worth} = 8000$$

$$\text{True discount} = 10,000 - 8000 = 2000 \text{ Rs.}$$

- ⑩ find the present worth of Rs 9950 due  $3\frac{1}{4}$  years hence @  $7\frac{1}{2}\%$  p-a SI. Also find the true discount.

$$\text{Let Present worth} = 100$$

$$T.D = \frac{100 \times 15 \times 13}{100 \times 2 \times 4} = \frac{195}{8} \text{ unit}$$

$$\text{Due debt} = 100 + \frac{195}{8} = \frac{995}{8} \text{ unit} \longrightarrow 9950$$

$$1 \text{ unit} \longrightarrow 80 \text{ Rs}$$

$$\therefore \text{Present worth} = 100 \times 80 = 8000 \text{ Rs}$$

$$\text{True discount} = \frac{195}{8} \times \frac{10}{80} = 1950 \text{ Rs.} \quad \underline{\text{Ans}}$$

- ③ find the diff b/w True discount and SI 254  
on Rs 2400 due after 5 years @ 4% per annum.

Present worth = 100 Rs (let)

$$T.D = \frac{100 \times 4 \times 5}{100} = 20 \text{ unit}$$

$$\text{Due Debt} = 100 + 20 = 120 \text{ unit} \rightarrow 2400 \\ 1 \text{ unit} \rightarrow 20 \text{ Rs}$$

$$T.D = 20 \times 20 = 400 \text{ Rs}$$

$$\text{Present worth} = 100 \times 20 = 2000 \text{ Rs.}$$

$$SI = \frac{2400 \times 4 \times 5}{100} = 480$$

$$SI - TD = 480 - 400 = 80 \text{ Rs} \quad \underline{\text{Ans'}}$$