

EXPLANATIONS

TYPE-I

1. (2) Using Rule 3,

Selling price

$$= 1400 \times \frac{100 - 15}{100}$$

$$= 1400 \times \frac{85}{100} = ₹ 1190$$

2. (4) Let the C.P. of article be 'x'

$$\therefore (100 - 7)\% x = 651$$

$$\therefore x = \frac{651}{93} \times 100 = ₹ 700$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= 651 \left(\frac{100}{100 - 7} \right)$$

$$= \frac{651 \times 100}{93}$$

$$\text{C.P.} = \text{Rs. } 700$$

3. (4) CP of 75 litres of mixture of

milk and water = ₹ 630

SP of 75 litres of mixture of milk

and water = $9 \times 75 = ₹ 675$

$$\text{Gain} = 675 - 630 = ₹ 45$$

$$\text{Gain per cent} = \frac{45}{630} \times 100$$

$$= \frac{50}{7} = 7\frac{1}{7}\%$$

4. (4) Using Rule 1,

Case I : Percentage Profit

$$= \frac{17 \times 100}{36} \approx 47\%$$

Case II : Percentage Profit

$$= \frac{24 \times 100}{50} = 48\%$$

Case III : Percentage Profit

$$= \frac{19 \times 100}{40} = 47.5\%$$

Case IV : Percentage Profit

$$= \frac{29 \times 100}{60} = 48.3\%$$

Obviously, (4) is the best transaction.

5. (1) Using Rule 1,

Total cost of typewriter

$$= ₹ (1200 + 200) = ₹ 1400$$

$$\text{S.P.} = ₹ 1680$$

$$\text{Profit} = ₹ (1680 - 1400)$$

$$= ₹ 280$$

$$\therefore \text{Profit \%} = \frac{280}{1400} \times 100 = 20\%$$

6. (4) If the cost price be ₹ x, then

$$\text{S.P.} = \frac{100}{95}x = ₹ \frac{20}{19}x$$

$$\therefore \text{Gain} = \frac{20x}{19} - x = ₹ \frac{x}{19}$$

$$\therefore \text{Gain percent} = \frac{\frac{x}{19}}{x} \times 100$$

$$= 5.26\%$$

Aliter : Using Rule 3,

$$\text{Here C.P.} = \frac{95}{100} \text{ S.P.}$$

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 + \text{Profit}\%} \right)$$

$$\frac{95}{100} \text{ S.P.}$$

$$= \text{S.P.} \left(\frac{100}{100 + \text{Profit}\%} \right)$$

$$9500 + 95 \text{ profit}\% = 10000$$

$$\text{Profit \%} = \frac{500}{95}$$

$$\text{Profit \%} = 5.26\%$$

$$7. (2) \text{S.P.} - \text{C.P.} = \frac{10 \text{ S.P.}}{100} = \frac{\text{S.P.}}{10}$$

$$\Rightarrow \text{S.P.} - \frac{\text{S.P.}}{100} = \text{C.P.} = 27$$

$$\Rightarrow \text{S.P.} = \frac{27 \times 10}{9} = ₹ 30$$

Aliter : Using Rule 1,

$$\text{C.P.} = 27, \text{ Profit} = \frac{10}{100}$$

$$\text{S.P.} = \frac{\text{S.P.}}{10}$$

$$\text{Profit} = \text{S.P.} - \text{C.P.}$$

$$\frac{\text{S.P.}}{10} = \text{S.P.} - 27$$

$$27 = \text{S.P.} - \frac{\text{S.P.}}{10}$$

$$\text{S.P.} = \frac{27 \times 10}{9}$$

$$\text{S.P.} = ₹ 30$$

8. (4) Using Rule 1,

$$\text{S.P.} = ₹ 100$$

$$\text{C.P.} = ₹ 80$$

$$\therefore \text{Gain} = ₹ 20$$

$$\therefore \text{Gain per cent}$$

$$= \frac{20}{80} \times 100 = 25\%$$

9. (3) Let the original price be ₹ x.

$$= \frac{80}{100} \times x = ₹ \frac{4x}{5}$$

$$\text{SP} = \frac{4x}{5} \times \frac{140}{100} = ₹ \frac{28x}{25}$$

Gain on original price

$$= \frac{28x}{25} - x = \frac{3x}{25}$$

$$\therefore \text{Gain \%} = \frac{\frac{3x}{25}}{x} \times 100$$

$$= 12\%$$

10. (3) Let the CP = ₹ 100

Then, SP = ₹ 120

Let the marked price = ₹ x.

Then, 90% of x = ₹ 120

$$\Rightarrow x$$

$$= \frac{120 \times 100}{90} = \frac{400}{3} = 133\frac{1}{3}\%$$

Hence, the marked price is

$$33\frac{1}{3}\% \text{ above the cost price.}$$

11. (4) Using Rule 1,

If the S.P. of article be x, then its

$$\text{CP} = x - \frac{x}{4} = ₹ \frac{3x}{4}$$

$$\therefore \text{Gain \%} = \frac{\frac{x}{4}}{\frac{3x}{4}} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

12. (2) Using Rule 1,

Tricky Approach

If the cost price is ₹ 100, then selling price = ₹ 120 and gain = ₹ 20

$$\text{Required gain \%} = \frac{20}{120} \times 100$$

$$= \frac{50}{3} = 16\frac{2}{3}\%$$

- 13.** (4) Let the S.P. of the bedsheet be Rs. x .

$$\therefore 450 + \frac{10 \times x}{100} = x$$

$$\Rightarrow x - \frac{x}{10} = 450$$

$$\Rightarrow \frac{9x}{10} = 450$$

$$\Rightarrow x = \frac{450 \times 10}{9} = ₹ 500$$

Aliter : Using Rule 1,
C.P. = Rs. 450,

$$\text{Profit} = \frac{10 \text{ S.P.}}{100} = \frac{\text{S.P.}}{10}$$

$$\text{Profit} = \text{S.P.} - \text{C.P.}$$

$$\frac{\text{SP}}{10} = \text{S.P.} - 450$$

$$450 = \text{S.P.} - \frac{\text{S.P.}}{10}$$

$$\text{S.P.} = \frac{450 \times 10}{9}$$

$$\text{S.P.} = ₹ 500$$

- 14.** (1) Using Rule 3,
C.P. of article

$$= \frac{100}{100 - \text{loss per cent}} \times \text{S.P.}$$

$$= \frac{100}{96} \times 960 = ₹ 1000$$

- 15.** (3) Using Rule 1,
Cost price

$$= \frac{791000 \times 100}{113} = ₹ 700000$$

$$\therefore \text{Gain} = 791000 - 700000 = ₹ 91000$$

- 16.** (3) Using Rule 3,

$$\text{Cost price} = \frac{64000 \times 100}{80}$$

$$= ₹ 80000$$

- 17.** (1) Using Rule 1,
Actual C.P. = $225 + 15 = ₹ 240$

$$\text{Gain} = 300 - 240 = ₹ 60$$

$$\therefore \text{Gain per cent}$$

$$= \frac{60}{240} \times 100 = 25\%$$

- 18.** (3) Using Rule 3,
If the C.P. be x , then

$$\frac{x \times 130}{100} = 1690$$

$$\Rightarrow x = \frac{1690 \times 100}{130} = ₹ 1300$$

$$\text{19. (3) S.P. of the fan} = \frac{150 \times 80}{100}$$

$$= ₹ 120$$

- 20.** (1) Gain per cent

$$= \frac{11}{33} \times 100 = \frac{100}{3} = 33\frac{1}{3}\%$$

- 21.** (4) If the marked price of the product be ₹ 100, then

$$\text{C.P.} = ₹ 70$$

$$\text{S.P. retailer} = ₹ 100$$

$$\therefore \text{Gain per cent}$$

$$= \frac{30}{70} \times 100 = \frac{300}{7}$$

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

- 22.** (4) If the marked price of watch be x , then

$$x \times \frac{90}{100} = \frac{450 \times 120}{100}$$

$$\Rightarrow x = \frac{450 \times 120}{90} = ₹ 600$$

- 23.** (2) Actual C.P. of radio

$$= 600 + \frac{600 \times 5}{100} = ₹ 630$$

$$\therefore \text{Required S.P.}$$

$$= \frac{630 \times 115}{100} = ₹ 724.50$$

- 24.** (2) If the original cost of shirt be x , then

$$x \times \frac{80}{100} = 64$$

$$\Rightarrow x = \frac{64 \times 100}{80} = ₹ 80$$

- 25.** (1) C.P. of 1 bucket = x

$$\text{C.P. of 1 mug} = y$$

$$\therefore 8x + 5y = 92 \quad \dots(i)$$

$$5x + 8y = 77 \quad \dots(ii)$$

By using equation (i) $\times 5$ - equation (ii) $\times 8$,

$$40x + 25y - 40x - 64y$$

$$= 460 - 616$$

$$\Rightarrow -39y = -156$$

$$\Rightarrow y = 4$$

From equation (i),

$$8x + 20 = 92$$

$$\Rightarrow 8x = 92 - 20 = 72$$

$$\Rightarrow x = 9$$

$$\therefore \text{C.P. of 2 mugs and 3 buckets}$$

$$= 2 \times 4 + 3 \times 9$$

$$= 8 + 27 = ₹ 35$$

- 26.** (4) Minimum cost price

$$= 150 \times 15 = ₹ 2250$$

$$\text{Maximum selling price}$$

$$= 350 \times 15 = ₹ 5250$$

$$\text{Gain} = 5250 - 2250 = ₹ 3000$$

[150 being the lowest & 350 being the highest price]

- 27.** (1) Cost price = ₹ x

$$\text{S.P.} = \frac{120x}{100} = ₹ \frac{6x}{5}$$

$$\text{Gain} = ₹ \frac{x}{5}$$

$$\therefore \text{Required gain per cent}$$

$$= \frac{\frac{x}{5}}{\frac{6x}{5}} \times 100$$

$$= \frac{100}{6} = \frac{50}{3}$$

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

- 28.** (1) Total oranges bought = 12 (let)

$$\therefore \text{Their cost price} = 3 + 2$$

$$= ₹ 5$$

For profit of 20%,

$$\text{S.P.} = \frac{5 \times 120}{100} = ₹ 6$$

- 29.** (1) C.P. of article = ₹ x

$$\text{S.P.} = \frac{120x}{100} = ₹ \frac{6x}{5}$$

$$\text{Gain} = \frac{6x}{5} - x = \frac{6x - 5x}{5}$$

$$= ₹ \frac{x}{5}$$

$$\therefore \text{Gain per cent}$$

$$= \frac{\text{Gain}}{\text{S.P.}} \times 100$$

$$= \frac{\frac{x}{5}}{\frac{6x}{5}} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$$

- 30.** (2) C.P. of article = ₹ x (let)

$$\text{S.P. of article} = ₹ \frac{4x}{3}$$

$$\text{Gain} = \frac{4x}{3} - x = \frac{4x - 3x}{3}$$

$$= ₹ \frac{x}{3}$$

$$\therefore \text{Gain per cent} = \frac{x}{3} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

31. (4) S.P. of article

$$= \frac{(100 - \text{loss}\%)}{100} \times \text{C.P.}$$

$$= \frac{100 - 10}{100} \times 15 = \frac{90 \times 15}{100}$$

$$= ₹ 13.50$$

32. (3) C.P. of watch = Rs. x (let)

$$\therefore \text{S.P.} = \frac{120x}{100} = \text{Rs. } \frac{6x}{5}$$

Case II,

$$\text{C.P.} = \text{Rs. } \frac{9x}{10}$$

$$\text{S.P.} = \text{Rs. } \left(\frac{6x}{5} - 30 \right)$$

According to the question,

$$\frac{6x}{5} - 30 = \frac{9x}{10} \times \frac{120}{100} = \frac{27x}{25}$$

$$\Rightarrow \frac{6x}{5} - \frac{27x}{25} = 30$$

$$\Rightarrow \frac{30x - 27x}{25} = 30$$

$$\Rightarrow 3x = 30 \times 25$$

$$\Rightarrow x = \frac{30 \times 25}{3} = \text{Rs. } 250$$

33. (1) Original price of 1 mango = Rs. x (let).

$$\therefore \text{C.P. of 1 mango} = \frac{100x}{125}$$

$$= \text{Rs. } \frac{4x}{5}$$

Case II,

According to the question,

$$x + 1 = \frac{4x}{5} \times \frac{150}{100}$$

$$\Rightarrow x + 1 = \frac{6x}{5} \Rightarrow \frac{6x}{5} - x = 1$$

$$\Rightarrow \frac{x}{5} = 1 \Rightarrow x = \text{Rs. } 5$$

34. (1) C.P. of article = Rs. x (let).
According to the question,

$$\frac{x \times 90}{100} = 270$$

$$\Rightarrow x = \frac{270 \times 100}{90} = \text{Rs. } 300$$

35. (3) S.P. of 4 bananas

$$= \left(100 + \frac{100}{3} \right) \% \text{ of Re. } 1$$

$$= \text{Rs. } \frac{400}{300} = \text{Rs. } \frac{4}{3}$$

\therefore Number of bananas sold for

$$\text{Rs. } \frac{4}{3} = 4$$

\therefore Number of bananas sold for Re. 1

$$= \frac{4}{4} \times 3 = 3$$

36. (2) C.P. of article

$$= \frac{100}{100 - 20} \times 450$$

$$= \frac{100 \times 450}{80} = \text{Rs. } 562.5$$

\therefore To gain 20%

$$\text{S.P.} = \frac{562.5 \times 120}{100} = \text{Rs. } 675$$

37. (4) Let the C.P. of article be Rs. x .

According to the question,

$$425 - x = x - 355$$

$$\Rightarrow 2x = 425 + 355 = 780$$

$$\Rightarrow x = \frac{780}{2} = \text{Rs. } 390$$

38. (4) Let C.P. of each article be Re. 1.

C.P. of 15 articles = Rs. 15

Their S.P. = Rs. 10

\therefore Loss percent

$$= \frac{15 - 10}{15} \times 100$$

$$= \frac{100}{3} = 33.3\%$$

39. (2) Let the C.P. of each banana be Re. 1.

\therefore C.P. of 6 bananas = Rs. 6

Their S.P. = Rs. 8

\therefore Profit per cent

$$= \frac{8 - 6}{6} \times 100$$

$$= \frac{200}{6} = \frac{100}{3} = 33\frac{1}{3}\%$$

40. (3) Let the C.P. of bag be Rs. x .
According to the question,

$$x \times \frac{115}{100} = 230$$

$$\Rightarrow x = \frac{230 \times 100}{115} = \text{Rs. } 200$$

For profit of 20%,

$$\text{S.P. of bag} = \text{Rs. } \left(\frac{200 \times 120}{100} \right)$$

$$= \text{Rs. } 240$$

41. (4) Let the cost price of article be Rs. 100.

\therefore First S.P. = Rs. 120

When the selling price be Rs. 240,

$$\text{Profit} = \text{Rs. } (240 - 100)$$

$$= \text{Rs. } 140$$

\therefore Profit percent

$$= \frac{140}{100} \times 100 = 140\%$$

42. (3) Let the C.P. of cycle be Rs. x .
Case I,

$$\text{S.P. of cycle} = \text{Rs. } \left(\frac{90x}{100} \right)$$

$$= \text{Rs. } \frac{9x}{10}$$

Case II,

$$106\% \text{ of } x = \frac{9x}{10} + 200$$

$$\Rightarrow \frac{106x}{100} - \frac{9x}{10} = 200$$

$$\Rightarrow \frac{106x - 90x}{100} = 200$$

$$\Rightarrow \frac{16x}{100} = 200$$

$$\Rightarrow x = \frac{200 \times 100}{16}$$

$$= \text{Rs. } 1250$$

43. (4) Let the cost price of each book be Re. 1.

\therefore C.P. of 20 books = Rs. 20

S.P. of 20 books = Rs. 25

\therefore Profit per cent

$$= \left(\frac{25 - 20}{20} \right) \times 100$$

$$= \frac{5 \times 100}{20} = 25\%$$

PROFIT AND LOSS

44. (1) Let C.P. of each article be Re. 1.
 \therefore C.P. of 40 articles = Rs. 40
 S.P. of 40 articles = Rs. 50
 \therefore Profit per cent

$$= \left(\frac{50 - 40}{40} \times 100 \right) \% = 25\%$$

45. (1) C.P. of taperecorder

$$= \text{Rs. } \left(\frac{100}{104} \times 1040 \right)$$

$$= \text{Rs. } 1000$$

$$\text{On selling for Rs. } 950,$$

$$\text{Loss} = \text{Rs. } (1000 - 950)$$

$$= \text{Rs. } 50$$

$$\therefore \text{Loss per cent} = \frac{50 \times 100}{1000}$$

$$= 5\%$$

46. (1) Let the C.P. of each book be Re. 1.

$$\therefore \text{Total C.P. of 25 books}$$

$$= \text{Rs. } 25$$

$$\text{Their S.P.} = \text{Rs. } 20$$

$$\therefore \text{Loss per cent}$$

$$= \left(\frac{25 - 20}{25} \right) \times 100$$

$$= \frac{5}{25} \times 100 = 20\%$$

47. (3) According to the question,

$$\frac{80}{100} \text{ of C.P.} = \text{S.P.}$$

$$\Rightarrow \frac{4}{5} \text{ of C.P.} = \text{S.P.}$$

$$\Rightarrow \text{C.P.} = \text{S.P.} \times \frac{5}{4}$$

48. (2) Let the C.P. of the watch be Rs. 100.

$$\therefore \text{Its S.P.} = \text{Rs. } 125$$

$$\therefore \text{Profit per cent on its S.P.}$$

$$= \frac{\text{Profit}}{\text{S.P.}} \times 100$$

$$= \frac{25}{125} \times 100 = 20\%$$

49. (1) C.P. of article

$$= \left(\frac{100}{100 + \text{profit \%}} \right) \times \text{S.P.}$$

$$= \text{Rs. } \left(\frac{100}{120} \times 240 \right)$$

$$= \text{Rs. } 200$$

50. (1) Let the C.P. of article be Rs. x.

$$\text{According to the question,}$$

$$78 - x = 2 \text{ (69 - x)}$$

$$\Rightarrow 78 - x = 138 - 2x$$

$$\Rightarrow 2x - x = 138 - 78$$

$$\Rightarrow x = \text{Rs. } 60$$

51. (3) Let the C.P. of article be Rs. x.

$$\text{According to the question,}$$

$$524 - x = x - 452$$

$$\Rightarrow 2x = 524 + 452 = 976$$

$$\Rightarrow x = \frac{976}{2} = \text{Rs. } 488$$

TYPE-II

1. (1) Using Rule 8,

Required profit

$$= \frac{36 - 30}{30} \times 100 = 20\%$$

2. (3) Suppose the C.P. of each article is ₹ 1

$$\text{Then C.P. of 10 articles} = ₹ 10$$

$$\text{S.P. of 10 articles} = ₹ 15$$

$$\therefore \text{Profit} = ₹ 5$$

$$\% \text{ profit} = \frac{5 \times 100}{10} = 50\%$$

Aliter : Using Rule 8,

$$\text{Here, } x = 15, y = 10$$

$$\text{Profit\%} = \frac{x - y}{y} \times 100$$

$$= \left(\frac{15 - 10}{10} \right) \times 100$$

$$= 50\%$$

3. (4) Let C.P. be ₹ 1

$$\text{C.P. of 3 articles} = ₹ 3$$

$$= \text{S.P. of P. of 5 articles.}$$

$$\text{Loss\%} = \frac{(5 - 3)}{5} \times 100$$

$$= 2 \times 20 = 40\%$$

Aliter : Using Rule 8,

$$\text{Here, } x = 3, y = 5$$

$$\text{Loss \%} = \left(\frac{x - y}{y} \right) \times 100$$

$$= \left(\frac{3 - 5}{5} \right) \times 100 = -40\%$$

(-ve sign shows loss)

$$= 40\%$$

4. (3) Let the cost price of one table = x

$$\therefore \text{Cost price of 15 tables}$$

$$= 15x$$

$$\text{and cost price of 20 tables}$$

$$= 20x$$

$$\text{According to the question}$$

$$\text{Selling price of 20 tables}$$

$$= \text{cost price of 15 tables} = 15x$$

$$\therefore \text{Loss} = 20x - 15x = 5x$$

$$\therefore \text{Loss\%} = \frac{5x \times 100}{20x} = 25\%$$

Aliter : Using Rule 8,

$$\text{Here, } x = 15, y = 20$$

$$\text{Loss \%} = \frac{x - y}{y} \times 100$$

$$= \left(\frac{15 - 20}{20} \right) \times 100$$

$$= \frac{-5}{20} \times 100$$

$$= -25\%$$

(-ve sign shows loss)

$$= 25\%$$

5. (2) Gain % = $\frac{18 - 15}{15} \times 100$

$$= \frac{3}{15} \times 100 = 20\%$$

Aliter : Using Rule 8,

$$\text{Here, } x = 18, y = 15$$

$$\text{Gain\%} = \left(\frac{x - y}{y} \right) \times 100$$

$$= \left(\frac{18 - 15}{15} \right) \times 100$$

$$= \frac{3}{15} \times 100$$

$$= 20\%$$

6. (3) Using Rule 8,

Loss per cent

$$= \frac{400 - 320}{400} \times 100$$

$$= \frac{80}{400} \times 100 = 20\%$$

7. (4) Let the C.P. of one orange = 1

$$\therefore \text{C.P. of 40 oranges} = ₹ 40$$

$$\text{and S.P. of 40 oranges} = ₹ 50$$

$$\therefore \text{Profit} = (50 - 40) = ₹ 10$$

$$\therefore \text{Profit \%} = \frac{10}{40} \times 100 = 25\%$$

Aliter : Using Rule 8,

$$\text{Here, } x = 50, y = 40$$

$$\text{Profit \%} = \left(\frac{x - y}{y} \right) \times 100$$

$$= \left(\frac{50 - 40}{40} \right) \times 100$$

$$= 25\%$$

8. (2) Let C.P. of each orange be ₹ 1
Then, C.P. of 10 oranges = ₹ 10
S.P. of 10 oranges = ₹ 12

$$\text{Gain \%} = \left(\frac{2}{10} \times 100 \right) \% = 20\%$$

Aliter : Using Rule 8,

Here, $x = 12$, $y = 10$

$$\begin{aligned} \text{Profit \%} &= \left(\frac{x-y}{y} \right) \times 100 \\ &= \left(\frac{12-10}{10} \right) \times 100 \\ &= 20\% \end{aligned}$$

9. (1) Required profit per cent

$$= \frac{10-9}{9} \times 100$$

$$= \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

Aliter : Using Rule 8,

Here, $x = 10$, $y = 9$

$$\begin{aligned} \text{Profit \%} &= \left(\frac{x-y}{y} \right) \times 100 \\ &= \left(\frac{10-9}{9} \right) \times 100 \\ &= \frac{1}{9} \times 100 \\ &= 11\frac{1}{9}\% \end{aligned}$$

10. (3) Gain per cent

$$= \frac{400-320}{320} \times 100$$

$$= \frac{80}{320} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 400$, $y = 320$

$$\begin{aligned} \text{Profit \%} &= \left(\frac{x-y}{y} \right) \times 100 \\ &= \left(\frac{400-320}{320} \right) \times 100 \\ &= \frac{80}{320} \times 100 = 25\% \end{aligned}$$

11. (4) Let the CP of each pen be ₹ 1.

∴ CP of 8 pens = ₹ 8

SP of 8 pens = ₹ 12

$$\therefore \text{Gain \%} = \frac{4}{8} \times 100 = 50\%$$

Aliter : Using Rule 8,

Here, $x = 12$, $y = 8$

$$\begin{aligned} \text{Profit \%} &= \left(\frac{x-y}{y} \right) \times 100 \\ &= \left(\frac{12-8}{8} \right) \times 100 \\ &= \frac{4}{8} \times 100 = 50\% \end{aligned}$$

12. (3) Let the CP of each article be ₹ 1

∴ CP of 9 articles = ₹ 9

∴ SP of 9 articles = ₹ 8

∴ Loss = ₹ 1

$$\therefore \text{Loss \%} = \frac{1}{9} \times 100$$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

Aliter : Using Rule 8,

Here, $x = 8$, $y = 9$

$$\begin{aligned} \text{Loss \%} &= \left(\frac{y-x}{y} \right) \times 100 \\ &= \left(\frac{9-8}{9} \right) \times 100 \\ &= \frac{100}{9} = 11\frac{1}{9}\% \end{aligned}$$

13. (2) C.P. of article for A = Rs. 100

$$\text{A's S.P.} = \frac{100 \times 120}{100}$$

= Rs. 120

$$\text{B's S.P.} = \frac{120 \times 85}{100}$$

= Rs. 102

= C.P. for C

∴ Required profit percent = 2%

14. (2) Let C.P. of each article be ₹ 1

Then, C.P. of 7 articles = ₹ 7

S.P. of 7 articles = ₹ 10

$$\therefore \text{Gain \%} = \frac{10-7}{7} \times 100 = \frac{300}{7}$$

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

Aliter : Using Rule 8,

Here, $x = 10$, $y = 7$

$$\begin{aligned} \text{Profit \%} &= \left(\frac{x-y}{y} \right) \times 100 \\ &= \left(\frac{10-7}{7} \right) \times 100 \\ &= \frac{300}{7} = 42\frac{6}{7}\% \end{aligned}$$

15. (1) Using Rule 1,

Let the original selling price of radio = ₹ 100

∴ C.P. of radio = ₹ 90

∴ New selling price = ₹ 108

$$\therefore \text{Gain per cent} = \frac{18}{90} \times 100$$

= 20%

16. (4) Let CP of each coconut be ₹ 1.

∴ CP of 2500 coconuts = ₹. 2500

SP of 2500 coconuts = ₹ 2750

$$\therefore \text{Gain \%} = \frac{2750-2500}{2500} \times 100$$

= 10%

Aliter : Using Rule 8,

Here, $x = 2750$, $y = 2500$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{2750-2500}{2500} \right) \times 100$$

$$= \frac{250}{2500} \times 100 = 10\%$$

17. (2) If the CP of A articles be equal to SP of B articles, then

$$\text{Loss percent} = \frac{B-A}{B} \times 100$$

$$= \frac{16-10}{16} \times 100 = \frac{6}{16} \times 100$$

= 37.5%

Aliter : Using Rule 8,

Here, $x = 10$, $y = 16$

$$\text{Loss \%} = \left(\frac{y-x}{y} \right) \times 100$$

$$= \left(\frac{16-10}{16} \right) \times 100$$

$$= \frac{600}{16} = 37.5\%$$

18. (3) If the CP of each article be ₹ 1 then

CP of 4 articles = ₹ 4

SP of 4 articles = ₹ 5

∴ Profit percent

$$= \frac{5-4}{4} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 5$, $y = 4$

$$\text{Profit \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{5-4}{4} \right) \times 100$$

$$= \frac{100}{4} = 25\%$$

19. (1) Let the CP of 1 orange = ₹ 1
 \therefore SP of 10 oranges = ₹ 13

$$\therefore \text{Gain percent} = \frac{13-10}{10} \times 100$$

$$= 30\%$$

Aliter : Using Rule 8,

Here, $x = 13$, $y = 10$

$$\text{Profit \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{13-10}{10} \right) \times 100$$

$$= \frac{300}{10} = 30\%$$

20. (1) Let the C.P. of each article be ₹ 1.

\therefore C.P. of 10 articles = ₹ 10

and S.P. of 10 articles = ₹ 11

\therefore Profit percent

$$= \frac{11-10}{10} \times 100 = 10\%$$

Aliter : Using Rule 8,

Here, $x = 11$, $y = 10$

$$\text{Profit \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{11-10}{10} \right) \times 100$$

$$= \frac{100}{10} = 10\%$$

21. (4) Profit percent

$$= \frac{10-8}{8} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 10$, $y = 8$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{10-8}{8} \right) \times 100$$

$$= \frac{200}{8} = 25\%$$

22. (2) Percentage profit

$$= \frac{25-20}{20} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 25$, $y = 20$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{25-20}{20} \right) \times 100$$

$$= \frac{500}{20} = 25\%$$

23. (4) Let the CP of 1 apple = ₹.1

\therefore CP of 18 apples = ₹ 18

SP of 18 apples = ₹ 24

$$\therefore \text{Gain percent} = \frac{6}{18} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

Aliter : Using Rule 8,

Here, $x = 24$, $y = 18$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{24-18}{18} \right) \times 100$$

$$= \frac{6}{18} \times 100 = 33\frac{1}{3}\%$$

24. (3) Profit percent

$$= \frac{400-320}{320} \times 100$$

$$= \frac{80}{320} \times 100 = 25\%$$

Aliter : Using Rule 8

Here, $x = 400$, $y = 320$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{400-320}{320} \right) \times 100$$

$$= \frac{80}{320} \times 100 = 25\%$$

25. (3) Gain per cent

$$= \frac{20-16}{16} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 20$, $y = 16$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{20-16}{16} \right) \times 100$$

$$= \frac{4}{16} \times 100 = 25\%$$

26. (3) Gain per cent

$$= \frac{15-12}{12} \times 100 = 25\%$$

Aliter : Using Rule 8,

Here, $x = 15$, $y = 12$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{15-12}{12} \right) \times 100$$

$$= \frac{3}{12} \times 100 = 25\%$$

27. (4) Percentage profit

$$= \frac{18-16}{16} \times 100$$

$$= \frac{25}{2} = 12\frac{1}{2}\%$$

Aliter : Using Rule 8,

Here, $x = 18$, $y = 16$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{18-16}{16} \right) \times 100$$

$$= \frac{2}{16} \times 100$$

$$= \frac{25}{2} = 12\frac{1}{2}\%$$

28. (2) Gain per cent

$$= \frac{40-25}{25} \times 100$$

$$= \frac{15}{25} \times 100 = 60\%$$

Aliter : Using Rule 8,

Here, $x = 40$, $y = 25$

$$\text{Gain \%} = \left(\frac{x-y}{y} \right) \times 100$$

$$= \left(\frac{40-25}{25} \right) \times 100$$

$$= \frac{15}{25} \times 100 = 60\%$$

29. (2) S.P. of book

$$= \frac{150 \times 120}{100} = ₹ 180$$

Aliter : Using Rule 3,

$$\begin{aligned}\text{S.P.} &= \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right) \\ &= \frac{150 \times (100 + 20)}{100} \\ &= \frac{150 \times 120}{100} = ₹180\end{aligned}$$

- 30.** (3) S.P. of 33 metres of cloth
= C.P. of 33 metres of cloth +
S.P. of 11 metres of cloth
∴ S.P. of 22 metres of cloth
= C.P. of 33 metres of cloth

$$\begin{aligned}\therefore \text{Gain per cent} &= \frac{33 - 22}{22} \times 100 \\ &= 50\%\end{aligned}$$

Aliter : Using Rule 9,
Here, $x = 33$, $y = 11$

$$\text{Profit \%} = \frac{y \times 100}{x - y}$$

$$= \frac{11 \times 100}{33 - 11}$$

$$= \frac{11 \times 100}{22} = 50\%$$

- 31.** (3) Using Rule 1,
20 items are broken out of 144
items.

∴ C.P. of 124 items

$$= ₹ \left(\frac{144 \times 90}{100} \right) = ₹ 129.60$$

$$\text{Total S.P.} = ₹ (1.20 \times 124)$$

$$= ₹ 148.8$$

$$\therefore \text{Gain} = ₹ (148.80 - 129.60)$$

$$= ₹ 19.20$$

∴ Gain per cent

$$= \frac{19.20}{129.60} \times 100 = 14.8\%$$

- 32.** (2) Let the required gain % = x .

$$\therefore 150 \times \frac{90}{100} + 300 \times \frac{(100 + x)}{100}$$

$$= \frac{450 \times 120}{100}$$

$$\Rightarrow 135 + 3(100 + x) = 540$$

$$\Rightarrow 3(100 + x) = 540 - 135 = 405$$

$$\therefore 100 + x = \frac{405}{3} = 135$$

$$\Rightarrow x = 135 - 100 = 35\%$$

- 33.** (2) Using Rule 1,

C.P. of 50 pairs of shoes

$$= ₹ (50 \times 189.50)$$

$$= ₹ 9475$$

$$\text{Their S.P.} = ₹ 10000$$

$$\text{Gain} = ₹ (10000 - 9475) = ₹ 525$$

- 34.** (1) Using Rule 2,
Loss per cent

$$= \frac{\text{Loss}}{\text{C.P.}} \times 100$$

$$= \frac{5750 - 4500}{5750} \times 100$$

$$= \frac{125000}{5750} = 21.74\%$$

- 35.** (1) Using Rule 1,
Actual C.P. of article
= Rs. (3550 + 50)
= Rs. 3600

$$\text{Gain} = 3816 - 3600 = \text{Rs. } 216$$

∴ Gain percent

$$= \frac{216}{3600} \times 100 = 6\%$$

- 36.** (3) C.P. of each camera

$$= \text{Rs. } x \text{ (let)}$$

S.P. of first camera

$$= \text{Rs. } \frac{118x}{100}$$

S.P. of second camera

$$= \frac{118x}{100} \times \frac{90}{100}$$

$$= \text{Rs. } \frac{1062x}{1000}$$

$$\text{Profit} = \frac{118x}{100} + \frac{1062x}{1000} - 2x$$

$$= \frac{1180x + 1062x - 2000x}{1000}$$

$$= \text{Rs. } \frac{242x}{1000}$$

∴ Gain per cent

$$= \frac{242x}{1000 \times 2x} \times 100 = 12.2\%$$

- 37.** (1) Marked price of article = Rs.
 x and C.P. = Rs. 100 (let)

$$\therefore \frac{x}{2} = 80 \Rightarrow x = \text{Rs. } 160$$

Gain on selling at the marked
price = 60%

- 38.** (1) S.P. of 20 metre of cloth

= C.P. of 20 metre of cloth + S.P.
of 4 metre of cloth

$$\Rightarrow \text{S.P. of } (20 - 4 = 16) \text{ metre of cloth}$$

= C.P. of 20 metre of cloth

$$\therefore \text{Gain\%} = \frac{20 - 16}{16} \times 100$$

$$= \frac{100}{4} = 25\%$$

Aliter : Using Rule 9,
Here, $x = 20$, $y = 4$,

$$\text{Gain \%} = \frac{y \times 100}{x - y}$$

$$= \frac{4 \times 100}{20 - 4}$$

$$= \frac{4}{16} \times 100 = 25\%$$

- 39.** (3) Let 40 articles (LCM of 8 and
10) be bought.

∴ C.P. of 40 articles

$$= \frac{8 \times 40}{10} = \text{Rs. } 32$$

$$\text{Their S.P.} = \frac{10 \times 40}{8} = \text{Rs. } 50$$

$$\therefore \text{Profit percent} = \frac{50 - 32}{32} \times 100$$

$$= \frac{1800}{32} = 56.25\%$$

Aliter : Using Rule 13,
Here, $a = 10$, $x = 8$
 $b = 8$, $y = 10$

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{10 \times 10 - 8 \times 8}{8 \times 8} \right) \times 100\%$$

$$= \frac{36}{64} \times 100$$

$$= \frac{1800}{32} = 56.25\%$$

- 40.** (4) Using Rule 2,

∴ C.P. of 1000 gm of cashew
nut

$$= \text{Rs. } 250$$

∴ C.P. of 50 gm of cashew nut

$$= \frac{250}{1000} \times 50 = \text{Rs. } 12.5$$

S.P. of 50 gm of cashew nut

$$= \text{Rs. } 10$$

∴ Loss per cent

$$= \frac{12.5 - 10}{12.5} \times 100 = 20\%$$

- 41.** (4) C.P. of each book = Re. 1
 \therefore C.P. of 60 books = Rs. 60
 Their S.P. = Rs. 100
 \therefore Gain per cent

$$= \frac{100 - 60}{60} \times 100$$

$$= \frac{200}{3} = 66\frac{2}{3}\%$$

Aliter : Using Rule 8,
 Here, $x = 100$, $y = 60$

$$\text{Gain \%} = \left(\frac{x - y}{y} \right) \times 100$$

$$= \left(\frac{100 - 60}{60} \right) \times 100$$

$$= \frac{200}{3} = 66\frac{2}{3}\%$$

- 42.** (4) Let C.P. of each article be Re. 1.
 \therefore C.P. of 9 articles = Rs. 9
 \therefore S.P. of 9 articles = Rs. 10
 \therefore Profit percent

$$= \frac{10 - 9}{9} \times 100 = \frac{100}{9} = 11\frac{1}{9}\%$$

Aliter : Using Rule 8
 Here, $x = 10$, $y = 9$

$$\text{Gain \%} = \left(\frac{x - y}{y} \right) \times 100$$

$$= \left(\frac{10 - 9}{9} \right) \times 100$$

$$= \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

- 43.** (1) Using Rule 2,

$$\text{C.P. of } 2\frac{1}{2} \text{ dozen or 30 eggs} =$$

$$\frac{20}{12} \times 30 = \text{Rs. 50}$$

$$\text{Their S.P i.e. S.P. of 24 eggs} \\ = 22 \times 2 = \text{Rs. 44}$$

$$\therefore \text{Loss} = \text{Rs. } (50 - 44) = \text{Rs. 6}$$

$$\therefore \text{Loss \%} = \frac{6}{50} \times 100 = 12\%$$

- 44.** (3) Using Rule 10,
 Here, selling prices are same,
 Profit-loss percent are same.
 In such transactions, there is always loss.

$$\text{Loss percent} = \frac{10 \times 10}{100} = 1\%$$

- 45.** (1) Let the man buy in all 30 oranges.

$$\therefore \text{C.P. of 15 oranges at 3 for Rs.}$$

$$40 = \frac{40}{3} \times 15 = \text{Rs. 200}$$

Again, C.P. of 15 oranges at 5 for

$$\text{Rs. 60} = \frac{60}{5} \times 15 = \text{Rs. 180}$$

$$\therefore \text{Total C.P.} = \text{Rs. } (200 + 180) \\ = \text{Rs. 380}$$

S.P. of 30 oranges

$$= \frac{50}{3} \times 30 = \text{Rs. 500}$$

$$\therefore \text{Profit} = \text{Rs. } (500 - 380) \\ = \text{Rs. 120}$$

$$\therefore \text{Profit \%} = \frac{120}{380} \times 100$$

$$= 31.58\% \approx 32\%$$

- 46.** (4) Using Rule 1,
 C.P. of article = Rs. 100 (let).
 \therefore S.P. = Rs. 125
 New S.P. = Rs. 250
 \therefore Profit percent

$$= \frac{250 - 100}{100} \times 100 = 150\%$$

- 47.** (1) Using Rule 1,
 S.P. of article

$$= \frac{1500 \times 125}{100} = \text{Rs. 1875}$$

Net S.P. after paying tax

$$= \text{Rs. } (1875 - 75) = \text{Rs. 1800}$$

$$\therefore \text{Profit} = 1800 - 1500$$

$$= \text{Rs. 300}$$

$$\therefore \text{Profit percent} = \frac{300}{1500} \times 100$$

$$= 20\%$$

- 48.** (1) Using Rule 3,
 C.P. of hand-cart

$$= \frac{100}{75} \times 720 = \text{Rs. 960}$$

For 25% profit

$$\text{S.P.} = \frac{125}{100} \times 960$$

$$= \text{Rs. 1200}$$

- 49.** (4) Using Rule 8,
 Let the cost of each chair be Re. 1.
 \therefore C.P. of 30 chairs = Rs. 30.
 Their S.P. = Rs. 25

$$\therefore \text{Loss per cent}$$

$$= \frac{30 - 25}{30} \times 100$$

$$= \frac{50}{3} = 16\frac{2}{3}\%$$

- 50.** (1) Using Rule 8,
 Profit percent

$$= \frac{12 - 10}{10} \times 100$$

$$= \frac{2 \times 100}{10} = 20\%$$

- 51.** (2) Let the C.P. of each pen be Re. 1.

$$\therefore \text{C.P. of 20 pens} = \text{Rs. 20}$$

$$\therefore \text{S.P. of 20 pens} = \text{Rs. 25}$$

\therefore Profit per cent

$$= \frac{(25 - 20)}{20} \times 100$$

$$= \frac{500}{20} = 25\%$$

- 52.** (2) Let C.P. of 1 kg. of rice be Rs. 100.

According to the question,

$$\therefore \text{S.P. of 700 gm. of rice}$$

$$= \text{Rs. 110}$$

$$\therefore \text{S.P. of 1000 gm. of rice}$$

$$= \frac{110}{700} \times 1000$$

$$= \frac{1100}{7} = \text{Rs. } 157\frac{1}{7}$$

$$\therefore \text{Profit per cent} = 57\frac{1}{7}\%$$

- 53.** (3) C.P. of 4 dozens of eggs at the rate of Rs. 24 per dozen

$$= \text{Rs. } (24 \times 4) = \text{Rs. 96}$$

C.P. of 2 dozens of eggs at Rs. 32 per dozen

$$= \text{Rs. } (32 \times 2) = \text{Rs. 64}$$

Total C.P. of 6 dozens of eggs

$$= \text{Rs. } (96 + 64)$$

$$= \text{Rs. 160}$$

S.P. for 20% profit

$$= \left(\frac{160 \times 120}{100} \right)$$

$$= \text{Rs. 192}$$

$$\therefore \text{S.P. per dozen} = \frac{192}{6}$$

$$= \text{Rs. 32}$$

- 54.** (2) According to the question,

$$\text{Loss\%} = \frac{\text{C.P.} - \text{S.P.}}{\text{S.P.}}$$

Where C.P. = Rs. x

S.P. = Rs. y

$$\Rightarrow \frac{10}{100} = \frac{x - y}{y} = \frac{1}{10}$$

$$\Rightarrow 10x - 10y = y$$

$$\Rightarrow 10x = 11y$$

At C.P.,

$$\text{Loss\%} = \frac{x-y}{x} \times 100$$

$$= \frac{x - \frac{10}{11}x}{x} \times 100$$

$$= \frac{11x - 10x}{11x} \times 100 = \frac{100}{11}$$

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

- 55.** (1) C.P. of cycle = Rs. 1000
Its S.P. = Rs. 1200
Profit = Rs. (1200 - 1000)
= Rs. 200

∴ Profit per cent

$$= \frac{200}{1000} \times 100 = 20\%$$

- 56.** (2) Profit per cent

$$= \frac{\text{Error}}{\text{True weight} - \text{error}} \times 100$$

$$= \left(\frac{50}{1000 - 50} \right) \times 100$$

$$= \frac{50 \times 100}{950} = \frac{100}{19} = 5\frac{5}{19}\%$$

- 57.** (3) Let the C.P. of each article be Re. 1.
Percentage of dishonesty = 10%
(Here $x\% = 10\%$)

$$\therefore \text{Actual C.P.} = \frac{100}{110} = \text{Rs. } \frac{10}{11}$$

∴ He buys 110 articles in Rs. 100.

∴ He sells 90 articles at the C.P. of 100 articles.

$$\therefore \text{Actual S.P.} = \frac{100}{90} = \text{Rs. } \frac{10}{9}$$

∴ Profit per cent

$$= \frac{\frac{10}{9} - \frac{10}{11}}{\frac{10}{9}} \times 100$$

$$= \frac{20}{99} \times \frac{11}{10} \times 100 = \frac{200}{9}$$

$$= 22\frac{2}{9}\%$$

TYPE-III

- 1.** (4) Cost price of 1 orange = ₹ $\frac{3}{7}$

∴ Cost price of 100 oranges

$$= \frac{3}{7} \times 100 = \frac{300}{7}$$

$$\therefore 100\% = \frac{300}{7}$$

$$\therefore 133\% = \frac{300}{7} \times \frac{133}{100} = ₹ 57$$

- 2.** (2) Using Rule 1,

$$\text{C.P.} = 12$$

$$\text{S.P.} = 12 \times 1.25 = 15$$

$$\text{Total Profit} = 15 - 12 = 3$$

$$\% \text{ gain} = \frac{3}{12} \times 100 = 25\%$$

- 3.** (1) Let the cost price of 1 book be x

∴ Cost price of 3 books = 3x

and, cost price of 12 books

$$= 12x$$

Selling price of 12 books

$$= 1800$$

$$= 12x + 3x = 15x$$

$$\Rightarrow 15x = 1800$$

$$\therefore x = \frac{1800}{15} = 120$$

The cost price of each book

$$= ₹ 120$$

- 4.** (3) C.P. of an article = ₹ $\frac{10}{11}$

$$\text{S.P. of an article} = ₹ \frac{11}{10}$$

$$\therefore \text{Profit} = \frac{11}{10} - \frac{10}{11}$$

$$= \frac{121 - 100}{110} = ₹ \frac{21}{110}$$

$$\therefore \text{Profit \%} = \frac{\frac{21}{110} \times 100}{\frac{10}{11}}$$

$$= \frac{2100}{110} \times \frac{11}{10} = 21\%$$

Aliter : Using Rule 13,

Here, a = 11, x = 10

b = 10, y = 11

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{11 \times 11 - 10 \times 10}{10 \times 10} \right) \times 100\%$$

$$= \left(\frac{121 - 100}{100} \right) \times 100\%$$

$$= 21\%$$

- 5.** (1) C.P. of 5 pencils = ₹ 1.

$$\text{S.P. of 5 pencils} = ₹ \frac{5}{3}$$

$$\text{Gain} = \frac{5}{3} - 1 = \frac{2}{3}$$

$$\therefore \text{Gain \%} = \frac{\frac{2}{3}}{1} \times 100 = 66\frac{2}{3}\%$$

Aliter : Using Rule 13,

Here, a = 5, x = 1

b = 3, y = 1

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \times 100\% \right)$$

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

$$= \frac{200}{3} = 66\frac{2}{3}\%$$

- 6.** (4) C.P. of 100 oranges = ₹ 350

S.P. of 12 oranges = ₹ 48

∴ S.P. of 100 oranges

$$= \frac{48}{12} \times 100 = ₹ 400$$

$$\text{Profit} = ₹ (400 - 350) = ₹ 50$$

$$\therefore \text{Profit \%} = \frac{50}{350} \times 100 = \frac{100}{7}$$

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

Aliter : Using Rule 13,

Here, a = 100, x = 350

$$b = 100, y = \frac{48}{12} \times 100 = 400$$

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \frac{100 \times 400 - 100 \times 350}{100 \times 350} \times 100\%$$

$$= \frac{40 - 35}{35} \times 100\%$$

$$= \frac{100}{7}\% = 14\frac{2}{7}\%$$

- 7.** (3) Suppose the number of oranges bought

= LCM of 10 and 9 = 90

$$\text{C.P. of 90 oranges} = \frac{25}{10} \times 90$$

$$= ₹ 225$$

$$\text{S.P. of 90 oranges} = \frac{25}{9} \times 90$$

$$= ₹ 250$$

$$\text{Profit \%} = \frac{25}{225} \times 100$$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

Aliter : Using Rule 13,

Here, a = 10, x = 25

b = 9, y = 25

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{10 \times 25 - 9 \times 25}{9 \times 25} \right) \times 100\%$$

$$= \left(\frac{250 - 225}{9 \times 25} \right) \times 100\%$$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

PROFIT AND LOSS

8. (4) Using Rule 2,
Total C.P. = ₹ 32
Total S.P. = ₹ (18+2) = ₹ 20
Loss = ₹ (32-20) = ₹ 12
∴ Loss per cent

$$= \frac{12}{32} \times 100 = 37.5\%$$

9. (4) Let number of articles bought
= 6 × 5 = 30
C.P. of 30 articles

$$= ₹ \left(\frac{5}{6} \times 30 \right) = ₹ 25$$

S.P. of 30 articles

$$= ₹ \left(\frac{6}{5} \times 30 \right) = ₹ 36$$

∴ Gain %

$$= \frac{36-25}{25} \times 100 = 44\%$$

Aliter : Using Rule 13,

Here, a = 6, x = 5

b = 5, y = 6

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{6 \times 6 - 5 \times 5}{5 \times 5} \right) \times 100\%$$

$$= \left(\frac{36-25}{25} \right) \times 100\%$$

$$= \frac{11}{25} \times 100\% = 44\%$$

10. (4) Using Rule 2,
Total actual C.P.
= ₹ (500 × 10 + 2000) = ₹ 7000
And total S.P.
= ₹ (5 × 750 + 5 × 550)
= ₹ (3750 + 2750) = ₹ 6500
Loss = 7000-6500 = ₹ 500

$$\text{Loss percent} = \frac{500}{7000} \times 100$$

$$= \frac{50}{7} = 7\frac{1}{7}\%$$

11. (3) Let the CP of each ball
= x.
Then, clearly the cost price of (17
- 5) balls = ₹ 720
i.e., 12x = 720 ⇒ x = 60 i.e. ₹ 60

12. (2) Using Rule 1,
CP of 120 exercise books
= ₹ (120 × 3) = ₹ 360
SP of 40 at ₹ 4 each
= ₹ (40 × 4) = ₹ 160
SP of 60 at ₹ 5 each
= ₹ (60 × 5) = ₹ 300

SP of remaining 20 books
= ₹ (20 × 3) = ₹ 60
Total SP = ₹ (160 + 300 + 60)
= ₹ 520
Profit % = ₹ (520 - 360)
= ₹ 160

$$\therefore \text{Profit\%} = \frac{160}{360} \times 100$$

$$= \frac{400}{9} = 44\frac{4}{9}\%$$

13. (2) Let the person buy 10 articles.

$$\text{Total CP} = ₹ \left(1 + \frac{5}{4} \right) = ₹ \frac{9}{4}$$

SP of 10 articles

$$= ₹ \frac{2}{9} \times 10 = ₹ \frac{20}{9}$$

$$\therefore \text{Loss} = ₹ \left(\frac{9}{4} - \frac{20}{9} \right)$$

$$= ₹ \left(\frac{81-80}{36} \right) = ₹ \frac{1}{36}$$

Now, if loss is ₹ $\frac{1}{36}$, number of
articles = 10

∴ If loss is ₹ 3, number of ar-
ticles = 36 × 10 × 3 = 1080

14. (3) Let the number of pencils
bought = LCM of 4, 6 = 12
CP of 6 pencils = ₹ 4
∴ CP of 12 pencils = ₹ 8
S.P. of 4 pencils = ₹ 6
∴ S.P. of 12 pencils = ₹ 18
Profit = Rs. (18 - 8) = ₹ 10

$$\therefore \text{Profit \%} = \frac{10}{8} \times 100 = 125\%$$

Aliter :

Here, a = 6, x = 4

b = 4, y = 6

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{6 \times 6 - 4 \times 4}{4 \times 4} \right) \times 100\%$$

$$= \left(\frac{36-16}{16} \right) \times 100\%$$

$$= \frac{20}{16} \times 100\% = 125\%$$

15. (4) Let Ravi buy 10 toffees.

∴ C.P. = ₹ 5

S.P. = ₹ 2

$$\therefore \text{Loss \%} = \frac{5-2}{5} \times 100 = 60\%$$

Aliter :

Here, a = 2, x = 1

b = 5, y = 1

$$\text{Loss \%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{2 \times 1 - 5 \times 1}{5 \times 1} \right) \times 100\%$$

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

= 60% (-ve sign shows loss)

16. (3) Suppose, number of lemons
bought

= LCM of 2, 5, 3 = 30

$$\therefore \text{CP} = ₹ \left(\frac{1}{2} \times 30 \right) = ₹ 15$$

$$\text{SP} = ₹ \left(\frac{3}{5} \times 30 \right) = ₹ 18$$

∴ Gain = ₹ 3

∴ Gain per cent

$$= \frac{3}{15} \times 100 = 20\%$$

Aliter :

Using Rule 13,

Here, a = 2, x = 1

b = 5, y = 3

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{2 \times 3 - 5 \times 1}{5 \times 1} \right) \times 100\%$$

$$= \frac{1}{5} \times 100\%$$

$$= 20\%$$

17. (2) Using Rule 1,
C.P. of the tape recorder

$$= \frac{100}{95} \times 950 = ₹ 1000$$

$$\text{Gain} = 1040 - 1000 = ₹ 40$$

$$\% \text{ Gain} = \frac{40}{1000} \times 100 = 4\%$$

18. (2) Using Rule 2,
CP of 100 cups
= ₹ 100 × 10 = ₹ 1000
10 cups are broken.
∴ SP of 90 cups = ₹ (90 × 11)
= ₹ 990
Loss = ₹ (1000 - 990)
= ₹ 10
∴ Loss per cent

$$= \frac{10}{1000} \times 100 = 1\%$$

PROFIT AND LOSS

19. (1) Using Rule 1,
Let the SP of 1 book = x
 \therefore SP of 25 books = $25x$
According to the question,
 $25x - 2000 = 5x$
 $\Rightarrow 20x = 2000$

$$\Rightarrow x = \frac{2000}{20} = 100$$

$$\therefore \text{SP of 1 book} = ₹ 100$$

20. (3) S.P. of 7 pens = $\frac{10 \times 140}{100}$

$$= ₹ 14$$

$$\therefore \text{S.P. of 1 pen} = \frac{14}{7} = ₹ 2$$

Clearly, 5 pens were sold for ₹ 10

Aliter : Using Rule 13,
Here, $a = 7$, $x = 10$
 $b = ?$, $y = 10$, $\text{Gain}\% = 40\%$

$$\text{Gain}\% = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$40 = \left(\frac{7 \times 10 - b \times 10}{b \times 10} \right) \times 100\%$$

$$4b = 70 - 10b$$

$$14b = 70$$

$$b = \frac{70}{14} \quad \boxed{b = 5}$$

21. (3) C.P. of 12 oranges

$$= 60 \times \frac{100}{75} = ₹ 80$$

For a gain of 25%,
S.P. of 12 oranges

$$= \frac{80 \times 125}{100} = ₹ 100$$

Hence, 12 Orange has to sell,
[You can also check through options]

22. (2) Let the man buy 60 oranges (LCM of 20 and 30) of each kind. CP of the 60 oranges of the first

$$\text{kind} = \frac{60}{20} \times 60 = ₹ 180$$

CP of 60 oranges of second kind

$$\frac{60}{30} \times 60 = ₹ 120$$

Total CP of 120 oranges
 $= (180 + 120) = ₹ 300$

$$\text{Their SP} = \frac{60}{25} \times 120 = ₹ 288$$

$$\text{Loss} = ₹ (300 - 288) = ₹ 12$$

\therefore Loss Per cent

$$= \frac{12}{300} \times 100 = 4\%$$

23. (3) Let the vendor buy 20 (LCM of 5 and 4) bananas.

$$\therefore \text{CP of 20 bananas} = ₹ 4$$

$$\text{SP of 20 bananas} = ₹ 5$$

$$\therefore \text{Gain}\% = \frac{5 - 4}{4} \times 100 = 25\%$$

Aliter :

Using Rule 13,

Here, $a = 5$, $x = 1$

$b = 4$, $y = 1$

$$\text{His gain}\% = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{5 \times 1 - 4 \times 1}{4 \times 1} \right) \times 100\%$$

$$= \frac{1}{4} \times 100\% = 25\%$$

24. (3) If the CP of 20 apples be ₹ x , then

$$\frac{x \times 120}{100} = 100$$

$$\Rightarrow x = \frac{100 \times 100}{120} = ₹ \frac{250}{3}$$

$$\therefore ₹ \frac{250}{3} = 20 \text{ apples}$$

$$\therefore ₹ 100 = \frac{20 \times 3 \times 100}{250}$$

$$= 24 \text{ apples}$$

Aliter : Using Rule 13,

Here, $a = ?$, $x = 100$

$b = 20$, $y = 100$

$\text{Gain}\% = 20\%$

$$\text{Gain}\% = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$20\% = \left(\frac{a \times 100 - 20 \times 100}{20 \times 100} \right) \times 100\%$$

$$400 = 100a - 2000$$

$$2400 = 100a$$

$$a = 24$$

25. (3) Let he buy 15 eggs.

[LCM of 5 & 3]

$$\therefore \text{CP of 15 eggs} = ₹ 25$$

$$\therefore \text{SP of 15 eggs} = ₹ 36$$

$$\therefore \text{Gain} = 36 - 25 = ₹ 11$$

$$\therefore ₹ 11 = 15 \text{ eggs}$$

$$\therefore ₹ 143 = \frac{15}{11} \times 143$$

$$= 195 \text{ eggs}$$

26. (1) Let the man buys 24 (LCM of 8 and 12) oranges.

\therefore C.P. of 24 oranges

$$= \frac{34}{8} \times 24 = ₹ 102$$

S.P. of 24 oranges

$$= \frac{57}{12} \times 24 = ₹ 114$$

$$\text{Gain} = 114 - 102 = ₹ 12$$

$$\therefore ₹ 12 = 24 \text{ oranges}$$

$$\therefore ₹ 45 = \frac{24}{12} \times 45 = 90 \text{ oranges}$$

27. (4) C.P. of 50 pens = 50×50
 $= ₹ 2500$

For profit of 10%,

$$\text{S.P.} = \frac{2500 \times 110}{100} = ₹ 2750$$

S.P. of 40 pens at a loss of 5%

$$= \frac{40 \times 50 \times 95}{100} = ₹ 1900$$

\therefore S.P. of remaining 10 pens

$$= 2750 - 1900 = ₹ 850$$

\therefore Gain %

$$= \frac{850 - 500}{500} \times 100 = 70\%$$

28. (1) Loss = $5 - 4.50 = 0.50$

$$\therefore \text{Loss percent} = \frac{0.50}{5} \times 100$$

$$= 10\%$$

Aliter : Using Rule 13,

Here, $a = b$, $x = 5a$

$y = 4.50a$

$$\text{Loss \%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{4.50a^2 - 5a^2}{5a^2} \right) \times 100\%$$

$$= \left(\frac{-0.5a^2}{5a^2} \right) \times 100\%$$

$$= 10\% \text{ (-ve sign shows loss)}$$

29. (1) Using Rule 1,

Let the CP of each watch be x .

$$\therefore \text{CP of 14 watches} = 14x$$

$$\text{and SP of 14 watches} = ₹ 6300$$

According to the question,

$$6300 - 14x = 4x$$

$$\Rightarrow 18x = 6300$$

$$\Rightarrow x = \frac{6300}{18} = ₹ 350$$

30. (3) Using Rule 1,

CP of each article

$$= ₹ \frac{P}{12} \text{ and SP} = ₹ \frac{P}{8}$$

PROFIT AND LOSS

$$\text{Gain} = \frac{P}{8} - \frac{P}{12} = \frac{3P - 2P}{24} = \frac{P}{24}$$

$$\therefore \text{Gain per cent} =$$

$$\frac{\frac{P}{24}}{\frac{P}{12}} \times 100 = 50\%$$

31. (3) C.P. of 5 lemons

$$= \frac{100}{140} \times 14 = ₹ 10$$

\therefore C.P. of 12 lemons

$$= \frac{10}{5} \times 21 = ₹ 24$$

Aliter : Using Rule 13,

Here, $a = 12$, $x = ?$

$b = 5$, $y = 14$, Gain% = 40%

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$40\% = \left(\frac{12 \times 14 - 5 \times x}{5x} \right) \times 100\%$$

$$2x = 168 - 5x$$

$$7x = 168$$

$$x = 24$$

32. (4) If a articles are bought for ₹ x and b articles are sold for ₹ y , then

$$\text{Gain per cent} = \left(\frac{ya - xb}{xb} \right) \times 100$$

$$= \frac{(11 \times 110 - 10 \times 100)}{10 \times 100} \times 100$$

$$= \frac{1210 - 1000}{1000} \times 100 = 21\%$$

Aliter : Using Rule 13,

Here, $a = 11$, $x = 100$

$b = 10$, $y = 110$

$$\text{Gain\%} = \left(\frac{ay - bx}{bx} \right) \times 100\%$$

$$= \left(\frac{11 \times 110 - 10 \times 100}{10 \times 100} \right) \times 100\%$$

$$= \left(\frac{1210 - 1000}{1000} \right) \times 100\%$$

$$= 21\%$$

33. (4) Cost price of sewing machine

$$= 1080 \times \frac{100}{90}$$

$$= ₹ 1200$$

\therefore S.P. for a profit of 10%

$$= \frac{1200 \times 110}{100} = ₹ 1320$$

34. (2) Number of oranges bought = 100 (let)

C.P. = ₹ 100 (let)

S.P. of 40 oranges = ₹ 100

$$\therefore \text{Gain percent} = \frac{100 - 40}{40} \times 100$$

$$= 150\%$$

Remaining oranges = 60

$$\text{Their } 80\% = \frac{60 \times 80}{100} = 48$$

These are sold at a profit of 75 %

$$\therefore \text{Their S.P.} = \frac{48 \times 175}{100} = ₹ 84$$

$$\therefore \text{Gain per cent} = 84\%$$

35. (2) First S.P. of article

$$= \frac{200 \times 90}{100} = ₹ 180$$

After decrease of 5%,

$$\text{S.P.} = \frac{180 \times 95}{100} = ₹ 171$$

36. (1) Using Rule 3,

C.P. of article

$$= \frac{100}{100 - \text{loss per cent}} \times \text{S.P.}$$

$$= \frac{100}{100 - 15} \times 102 = ₹ 120$$

On selling at Rs. 134.40,

Gain = ₹ (134.4 - 120)

$$= ₹ 14.4$$

\therefore Gain per cent

$$= \frac{14.4}{120} \times 100 = 12\%$$

37. (1) C.P. of first toy = ₹ x

C.P. of second toy = ₹ y

$$\therefore \frac{x \times 112}{100} = 504$$

$$\Rightarrow x = \frac{504 \times 100}{112} = ₹ 450$$

$$\text{Again, } y \times \frac{96}{100} = 504$$

$$\Rightarrow y = \frac{504 \times 100}{96} = ₹ 525$$

Total C.P. = ₹ (450 + 525)

$$= ₹ 975$$

Total S.P. = 2 × 504

$$= ₹ 1008$$

$$\text{Gain} = 1008 - 975 = ₹ 33$$

$$\therefore \text{Profit per cent} = \frac{33 \times 100}{975}$$

$$= \frac{44}{13} = 3\frac{5}{13}\%$$

38. (4) For A,

$$\text{C.P. of horse} = 4800 \times \frac{100}{80}$$

$$= ₹ 6000$$

For B,

$$\text{S.P.} = \frac{6000 \times 115}{100} = ₹ 6900$$

B's profit = Rs. (6900 - 4800)

$$= ₹ 2100$$

39. (4) C.P. of each apple = $\frac{100}{10}$

$$= ₹ 10$$

S.P. of each apple

$$= ₹ \left(10 \times \frac{125}{100} \right) = ₹ 12.50$$

\therefore Number of apples sold for Rs.

$$100 = \frac{100}{12.5} = 8$$

40. (2) Cost price of table = ₹ x (let)

According to question,

$$\frac{113x}{100} + 25 = \frac{118x}{100}$$

[S. P. at R% profit

$$= \frac{(100 + R)}{100} \times \text{C.P.}]$$

$$\Rightarrow \frac{113x}{100} - \frac{113x}{100} = 25$$

$$\Rightarrow \frac{5x}{100} = 25 \Rightarrow \frac{x}{20} = 25$$

$$\Rightarrow x = 25 \times 20 = ₹ 500$$

Aliter : Using Rule 11,

Here, $x = 13\%$,

$R = 25$, $y = 18\%$

$$\text{C.P. of table} = \left(\frac{R}{y - x} \right) \times 100$$

$$= \left(\frac{25}{18 - 13} \right) \times 100$$

$$= \frac{25}{5} \times 100$$

$$= ₹ 500$$

41. (3) C.P. of watch = ₹ x (let)

$$\therefore \text{S.P. of watch} = \frac{x \times 95}{100}$$

$$= ₹ \frac{19x}{20}$$

Case II,

$$\text{S.P.} = ₹ \left(\frac{19x}{20} + 56.25 \right)$$

Profit percent = 10 %

$$\therefore \frac{x \times 110}{100} = \frac{19x}{20} + 56.25$$

$$\Rightarrow \frac{11x}{10} - \frac{19x}{20} = 56.25$$

$$\Rightarrow \frac{22x - 19x}{20} = 56.25$$

$$\Rightarrow \frac{3x}{20} = 56.25$$

$$\Rightarrow 3x = 56.25 \times 20$$

$$\Rightarrow x = \frac{56.25 \times 20}{3} = ₹ 375$$

Aliter : Using Rule 11,
Here, $x = 5\%$, $R = 56.25$,
 $y = 10\%$

$$\text{C.P.} = \left(\frac{R}{y+x} \right) \times 100$$

$$= \frac{56.25}{10+5} \times 100$$

$$= \frac{56.25}{15} \times 100$$

$$= \frac{5625}{15} = ₹ 375$$

42. (2) Using Rule 3,

C.P. of cycle = ₹ 1650

Loss = 8%

\therefore S.P. of cycle

$$= \left(\frac{100 - \text{loss}\%}{100} \right) \times \text{C.P.}$$

$$= \frac{100 - 8}{100} \times 1650$$

$$= \frac{92 \times 1650}{100} = ₹ 1518$$

43. (4) C.P. of table = Rs. x (let)

According to question,

$$\frac{x \times 90}{100} = 1800$$

$$\Rightarrow x = \frac{1800 \times 100}{90} = \text{Rs. } 2000$$

For a profit of 15%,

$$\text{S.P.} = \frac{2000 \times 115}{100} = \text{Rs. } 2300$$

Aliter : Using Rule 3,

S.P. = ₹ 1800, Loss% = 10%

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= 1800 \left(\frac{100}{100 - 10} \right)$$

$$= \frac{180000}{90} = \text{Rs. } 2000$$

Now New S.P.

$$= \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 2000 \left(\frac{100 + 15}{100} \right)$$

$$= 2000 \times \frac{115}{100}$$

$$= \text{Rs. } 2300$$

44. (2) Cost price for the manufacturer = Rs. x (let)

$$\therefore x \times \frac{118}{100} \times \frac{120}{100} \times \frac{125}{100}$$

$$= 15045$$

$$\Rightarrow x = \frac{15045 \times 1000000}{118 \times 120 \times 125}$$

$$= \text{Rs. } 8500$$

45. (4) Let C.P. of article be Rs. x .

According to the question,

108% of x - 105% of x = 240

$$\Rightarrow \frac{108x}{100} - \frac{105x}{100} = 240$$

$$\Rightarrow \frac{3x}{100} = 240$$

$$\Rightarrow x = \frac{24000}{3} = \text{Rs. } 8000$$

Note : In the original question it is Rs. 40, not Rs. 240.

Aliter : Using Rule 11,

Here, $x = 5\%$, $R = 240$, $y = 8\%$

$$\text{C.P.} = \frac{R}{y-x} \times 100$$

$$= \frac{240}{8-5} \times 100$$

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

46. (2) C.P. of radio = Rs. x (let)
According to the question,

$$\frac{130x}{100} - \frac{120x}{100} = 60$$

$$\Rightarrow \frac{10x}{100} = 60$$

$$\Rightarrow x = 60 \times 10 = \text{Rs. } 600$$

Aliter : Using Rule 11,

Here, $x = 20\%$,

$R = \text{Rs. } 60$, $y = 30\%$

$$\text{C.P.} = \frac{R}{(y-x)} \times 100$$

$$= \frac{60}{(30-20)} \times 100$$

$$= \text{Rs. } 600$$

47. (1) C.P. of cycle = Rs. x (let)

$$\therefore \text{S.P.} = \frac{110x}{100} = \text{Rs. } \frac{11x}{10}$$

Case II,

$$\text{New C.P.} = \text{Rs. } \frac{9x}{10}$$

$$\therefore \frac{11x}{10} + 60 = \frac{9x}{10} \times \frac{125}{100}$$

$$= \text{Rs. } \frac{9x}{8}$$

$$\Rightarrow \frac{9x}{8} - \frac{11x}{10} = 60$$

$$\Rightarrow \frac{90x - 88x}{80} = 60$$

$$\Rightarrow \frac{2x}{80} = 60$$

$$\Rightarrow \frac{x}{40} = 60$$

$$\Rightarrow x = 60 \times 40$$

$$= \text{Rs. } 2400$$

48. (3) Profit percent

$$= \frac{5-3}{3} \times 100$$

$$= \frac{200}{3} = 66\frac{2}{3}\%$$

49. (1) C.P. of watch for A = Rs. x (let).

According to the question,

$$x \times \frac{105}{100} \times \frac{104}{100} = 91$$

$$\Rightarrow x = \frac{91 \times 100 \times 100}{105 \times 104}$$

$$= \frac{250}{3} = \text{Rs. } 83.33$$

50. (2) C.P. for Swati

$$= \text{Rs.} \left(\frac{120 \times 125}{100} \right) = \text{Rs. } 150$$

C.P. for Divya

$$= \text{Rs.} \left(\frac{100}{110} \times 198 \right)$$

= Rs. 180

∴ S.P. for Swati = Rs. 180

∴ Profit percent

$$= \frac{180 - 150}{150} \times 100 = \frac{30 \times 2}{3}$$

= 20%

51. (1) C.P. of article = Rs. x (let).

According to the question,

$$\frac{94x}{100} + 64 = \frac{x \times 110}{100}$$

$$\Rightarrow \frac{110x}{100} - \frac{94x}{100} = 64$$

$$\Rightarrow \frac{16x}{100} = 64 \Rightarrow x = \frac{64 \times 100}{16}$$

= Rs. 400

52. (4) Initial profit on article

= Rs. $(78 - 69)$ = Rs. 9

∴ C.P. of article

= Rs. $(69 - 9)$ = Rs. 60

53. (2) C.P. of each article

$$= \frac{2400}{80} = \text{Rs. } 30$$

Profit = 16%

∴ S.P. of each article

$$= \text{Rs.} \left(\frac{30 \times 116}{100} \right) = \text{Rs. } 34.80$$

54. (2) Let the C.P. of the book be Rs. x .

$$\therefore \text{S.P. of the book} = \text{Rs.} \frac{70x}{100}$$

$$= \text{Rs.} \frac{7x}{10}$$

Case II,

$$\frac{140x}{100} = \frac{7x}{10} + 140$$

$$\Rightarrow \frac{14x}{10} - \frac{7x}{10} = 140$$

$$\Rightarrow \frac{7x}{10} = 140 \Rightarrow 7x = 1400$$

$$\Rightarrow x = \frac{1400}{7} = \text{Rs. } 200$$

55. (4) Let the C.P. of cloth be Rs. x per metre.

According to the question,

$$x \times \frac{90}{100} = 9$$

$$\Rightarrow x = \frac{900}{90} = 10$$

To gain 15%,

$$\text{S.P.} = \text{Rs.} \left(\frac{10 \times 115}{100} \right) \text{ per metre}$$

= Rs. 11.50 per metre

56. (3) Let total expenditure on repairing be Rs. x .

∴ Actual C.P. = Rs. $(1000 + x)$

∴ Total S.P. = Rs. (300×30)

= Rs. 9000

Total profit = Rs. (150×30)

= Rs. 4500

∴ $9000 - (1000 + x) = 4500$

$\Rightarrow 1000 + x = 9000 - 4500 = 4500$

$\Rightarrow x = 4500 - 1000 = \text{Rs. } 3500$

57. (3) Let Kamal eat x apples.

According to the question,

$$x \times \frac{140}{100} = 70 \Rightarrow \frac{14x}{10} = 70$$

$$\Rightarrow x = \frac{70 \times 10}{14} = 50$$

58. (2) Five crates out of 25 crates of oranges were lost.

∴ C.P. of 20 crates of oranges

= Rs. 10000

S.P. of 20 crates of oranges

$$= \text{Rs.} \left(\frac{10000 \times 125}{100} \right)$$

= Rs. 12500

$$\therefore \text{S.P. per crate} = \frac{12500}{20}$$

= Rs. 625

59. (3) Let the C.P. of article be Rs. x .

According to the question,

$(118 - 115)\%$ of $x = 6$

$$\Rightarrow \frac{x \times 3}{100} = 6$$

$$\Rightarrow x = \frac{600}{3} = \text{Rs. } 200$$

TYPE-IV

1. (1) According to the question

$$\frac{\text{Cost price}}{\text{Selling price}} = \frac{5}{4}$$

$$\therefore \text{Selling price} = \frac{4}{5} \times \text{Cost price}$$

Loss = Cost price - Selling price

$$= \text{Cost price} - \frac{4}{5} \text{ Cost price}$$

$$= \frac{1}{5} \text{ Cost price}$$

$$\therefore \text{Loss \%} = \frac{\frac{1}{5} \text{ Cost price} \times 100}{\text{Cost price}}$$

$$= \frac{100}{5} = 20\%$$

Method 2 : Tricky Approach

₹ 1 is loss on ₹ 5.

$$\therefore \text{loss \%} = \frac{1}{5} \times 100 = 20\%$$

Aliter : Using Rule 2,

Here, C.P. = $5x$, S.P. = $4x$

$$\text{Loss\%} = \frac{\text{Loss}}{\text{C.P.}} \times 100$$

$$= \frac{5x - 4x}{5x} \times 100$$

= 20%

2. (1) Using Rule 1,

Tricky Approach

$$\text{Gain\%} = \frac{(21 - 20)}{20} \times 100$$

$$= \frac{1}{20} \times 100 = 5\%$$

3. (2) Let the C.P. be x

∴ $(6 - 4)\%$ of $x = 3$

$\Rightarrow 2\%$ of $x = 3$

$$\Rightarrow x = \frac{300}{2} = 150$$

∴ S.P. at 4% gain

$$= \frac{150 \times 104}{100} = ₹ 156$$

and S.P. at 6% gain

$$= \frac{150 \times 106}{100} = ₹ 159$$

∴ The required ratio

= 156 : 159 = 52 : 53

PROFIT AND LOSS

4. (1) Let Milk : Water = K : 1

$$\therefore \text{S.P.} = (K + 1) \times 9$$

$$\text{C.P.} = 10K$$

$$\text{Gain} = 9 - K$$

$$\text{Gain \%} = \frac{9 - K}{10K} \times 100$$

$$\Rightarrow \frac{9 - K}{10K} \times 100 = 20$$

$$\Rightarrow 90 - 10K = 20K$$

$$\Rightarrow 30K = 90$$

$$\Rightarrow K = 3$$

$$\therefore \text{Ratio} = 3 : 1$$

5. (3) CP of refrigerator = ₹ 5x

$$\text{CP of television} = ₹ 3x$$

$$\therefore 2x = 5500$$

$$\Rightarrow x = \frac{5500}{2} = 2750$$

$$\therefore \text{CP of refrigerator} = 5 \times 2750 = ₹ 13750$$

6. (3) Gain per cent

$$\frac{210 \times (5 + 3) - [180 \times 5 + 200 \times 3]}{180 \times 5 + 200 \times 3} \times 100$$

$$= \frac{1680 - 1500}{1500} \times 100$$

$$= \frac{180}{1500} \times 100 = 12\%$$

7. (4) Let the first investment be 3x
Then second investment be 5x

$$\text{Combined loss \%}$$

$$= \frac{3x \times \frac{15}{100} - 5x \times \frac{10}{100}}{3x + 5x} \times 100$$

$$= \frac{45x - 50x}{8x} \times 100$$

$$= \frac{-5x}{8x} \times 100$$

$$= \frac{-5}{8} \text{ per cent or } \frac{5}{8} \% \text{ loss}$$

[–ve sign shows loss].

8. (3) Using Rule 1,

$$\text{Let the CP} = 8x \text{ and SP} = 9x$$

$$\therefore \text{Profit} = (9x - 8x) = x$$

$$\therefore \text{Profit \%}$$

$$= \frac{x}{8x} \times 100 = \frac{25}{2} = 12.5\%$$

9. (4) Let the printed price of the book be x.

$$\therefore \text{Selling price} = 90\% \text{ of } x$$

$$= x \times \frac{90}{100} = \frac{9x}{10}$$

If the CP of the book be y, then

$$y \times \frac{112}{100} = \frac{9x}{10}$$

$$\frac{y}{x} = \frac{9}{10} \times \frac{100}{112} = \frac{45}{56} \text{ or } 45 : 56$$

10. (3) If C.P. = ₹ 100

$$\text{S.P.} = ₹ 300 \text{ [gain being 200\%]}$$

$$\therefore \text{Required ratio} = 1 : 3$$

Aliter : Using Rule 3,

$$\frac{\text{C.P.}}{\text{S.P.}} = \frac{100}{100 + \text{Profit\%}}$$

$$= \frac{100}{100 + 200}$$

$$= \frac{100}{300} = 1 : 3$$

11. (3) Let C.P. be 100 then,

$$\text{S.P.} = 105 \text{ [gain being 5\%]}$$

$$\text{Required ratio}$$

$$= 105 : 100 = 21 : 20$$

Aliter : Using Rule 3,

$$\frac{\text{C.P.}}{\text{S.P.}} = \frac{100}{100 + \text{Profit\%}}$$

$$= \frac{100}{100 + 5}$$

$$= \frac{100}{105} = \frac{20}{21} = 20 : 21$$

12. (1) Using Rule 1,

Let the cost price = 5x and the selling price = 6x.

$$\text{Gain \%} = \frac{6x - 5x}{5x} \times 100 = 20\%$$

13. (1) Using Rule 1,

$$\text{Let Cost price} = 10x$$

$$\text{Selling price} = 11x$$

$$\therefore \text{Gain per cent}$$

$$= \frac{11x - 10x}{10x} \times 100$$

$$= \frac{x}{10x} \times 100 = 10\%$$

14. (3) $b = a \times \frac{200}{100} = 2a$

$$\frac{b}{a} = 2 \Rightarrow \frac{b}{a} - 1 = 2 - 1$$

$$\Rightarrow \frac{b - a}{a} = 1 \Rightarrow \frac{b - a}{a} \times 100 = 100$$

$$\therefore \text{Gain per cent} = 100\%$$

15. (2) B entered after x months.

Ratio of equivalent capitals for 1 month

$$= 64000 \times 12 : 48000 (12 - x)$$

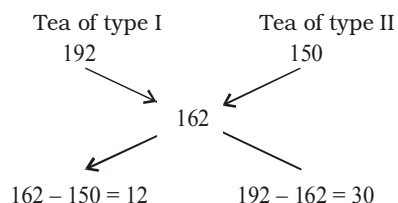
$$= 16 : (12 - x)$$

$$\therefore \frac{16}{12 - x} = \frac{2}{1} \Rightarrow 24 - 2x = 16$$

$$\Rightarrow 2x = 8 \Rightarrow x = 4 \text{ months}$$

16. (1) By the rule of alligation, CP of

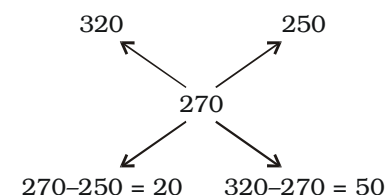
$$\begin{aligned} \text{mixed tea} &= \frac{100}{120} \times 194.40 \\ &= ₹ 162 / \text{kg} \end{aligned}$$



$$\therefore \text{Required ratio} = \frac{12}{30} = \frac{2}{5} \text{ or } 2 : 5$$

17. (4) CP of the mixture

$$= \frac{324 \times 100}{120} = ₹ 270$$



$$\therefore \text{Required ratio} = 2 : 5$$

18. (4) Let x kg of sugar costing ₹ 20/kg and y kg of sugar costing ₹ 15/kg are mixed.

According to the question,

$$20x + 15y = 16(x + y)$$

$$\Rightarrow 20x + 15y = 16x + 16y$$

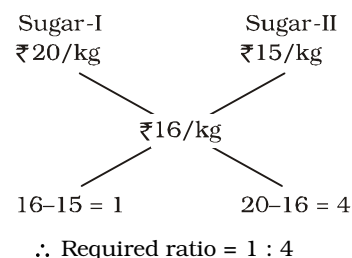
$$\Rightarrow 20x - 16x = 16y - 15y$$

$$\Rightarrow 4x = y$$

$$\therefore \frac{x}{y} = \frac{1}{4} \text{ or } 1 : 4$$

Method 2 :

By the rule of alligation,

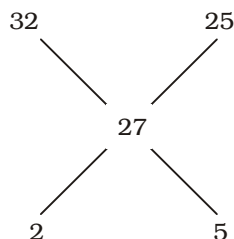


$$\therefore \text{Required ratio} = 1 : 4$$

19. (4) If the C.P. of the mixture be ₹ x per kg, then

$$x \times \frac{120}{100} = 32.40$$

$$\Rightarrow x = \frac{32.40 \times 100}{120} = 27$$

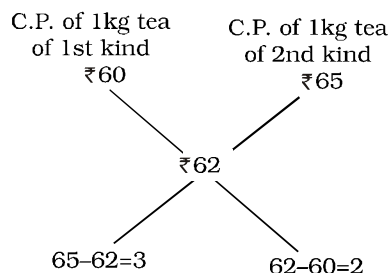


∴ Required ratio = 2 : 5

20. (1) S.P. of 1 kg mixture = ₹ 68.20, Gain = 10%
∴ C.P. of 1 kg mixture

$$= ₹ \left(68.20 \times \frac{100}{110} \right) = ₹ 62$$

By the rule of alligation,



∴ Required ratio = 3 : 2

21. (2) Average price of blended tea

$$= \frac{280 \times 7 + 240 \times 9}{16}$$

$$= \frac{1960 + 2160}{16}$$

$$= \frac{4120}{16} = ₹ 257.50 \text{ kg}$$

22. (4) C.P. of 40kg of mixture

$$= ₹ (15 \times 29 + 25 \times 20)$$

$$= ₹ (435 + 500) = ₹ 935$$

$$\text{S.P. of 40kg of mixture}$$

$$= 27 \times 40 = ₹ 1080$$

$$\therefore \text{Gain} = 1080 - 935 = ₹ 145$$

23. (2) Let the profit be x

According to question,

$$\left(1 - \frac{1}{3} - \frac{1}{4} \right) x = ₹ 5000$$

$$\text{or } \left(\frac{12 - 4 - 3}{12} \right) x = ₹ 5000$$

$$\frac{5}{12} x = ₹ 5000$$

$$\therefore x = \frac{5000 \times 12}{5}$$

$$\therefore \frac{1}{3} = \frac{5000 \times 12}{5 \times 3} = ₹ 4000$$

24. (1) Ratio of investment of A : B

$$= 2560 : 2000 = 32 : 25$$

$$\text{Now, A gained} = ₹ 320$$

$$\text{B gained} = ₹ 250$$

$$\text{Total Profit} = ₹ 110$$

$$\therefore \text{C gained} = ₹ 535$$

According to question,

$$\frac{250}{535} = \frac{2000}{\text{C's Capital}}$$

Hence, C's capital

$$= \frac{2000 \times 535}{250} = ₹ 4280$$

25. (3) Let the total profit be ₹ x .

$$\therefore \text{A's share in profit} = ₹ \frac{3x}{5}$$

$$\text{B's share in profit} = ₹ \frac{x}{5}$$

$$\text{and C's share in profit} = ₹ \frac{x}{5}$$

According to the question,

$$\left(\frac{3x}{5} - \frac{x}{5} \right) = 400$$

$$\Rightarrow \frac{2x}{5} = 400$$

$$\Rightarrow x = \frac{400 \times 5}{2} = ₹ 1000$$

26. (2) $8A = B \times 12 = 6C$

$$\Rightarrow \frac{8A}{24} = \frac{12B}{24} = \frac{6C}{24}$$

$$\Rightarrow \frac{A}{3} = \frac{B}{2} = \frac{C}{4}$$

$$\therefore A : B : C = 3 : 2 : 4$$

∴ B's share

$$= \frac{2}{3+2+4} \times 864$$

$$= \frac{2}{9} \times 864 = ₹ 192$$

27. (4) Initially, A's capital = ₹ x

$$\text{B's capital} = ₹ \frac{3x}{2}$$

Ratio of the equivalent capitals of A and B for 1 month

$$= \left(x \times 10 + \frac{3x}{4} \times 2 \right) : \left(\frac{3x}{2} \times 8 + \frac{3x}{4} \times 4 \right)$$

$$= \left(10x + \frac{3x}{2} \right) : (12x + 3x)$$

$$= 23 : 30$$

$$\text{A's share} = \frac{23}{53} \times 53000$$

$$= ₹ 23000$$

28. (1) Share of rent = (number of oxen \times time)

$$A : B : C$$

$$= (10 \times 7) : (12 \times 5) : (15 \times 30)$$

$$A : B : C = 70 : 60 : 45$$

$$A : B : C = 14 : 12 : 9$$

C's share of rent

$$= \frac{9}{14+12+9} \times 175$$

$$= \frac{9}{35} \times 175 = 45$$

∴ C's share of rent is ₹ 45

29. (1) Ratio of profit sharing among A, B and C

= Ratio of equivalent capitals of A, B and C for 1 month

$$= 320000 \times 4 : 510000 \times 3 : 270000 \times 5$$

$$= 32 \times 4 : 51 \times 3 : 27 \times 5$$

$$= 128 : 153 : 135$$

Sum of ratios

$$= 128 + 153 + 135 = 416$$

$$\text{Total profit} = ₹ 124800$$

$$\therefore \text{A's share} = \frac{128}{416} \times 124800$$

$$= ₹ 38400$$

30. (2) Ratio of equivalent capitals of A and B for 1 month

$$= 100000 \times 36 : 200000 \times 24$$

$$= 36 : 48 = 3 : 4$$

$$\text{Part of profit gained by A} = \frac{3}{7}$$

$$\text{Part of profit gained by B} = \frac{4}{7}$$

∴ Required difference

$$\left(\frac{4}{7} - \frac{3}{7} \right) \times 84000 = ₹ 12000$$

31. (4) Ratio of equivalent capitals of A, B and C for 1 month

$$= (40500 \times 6 + 45000 \times 6) : (45000$$

$$\times 12) : (60000 \times 6 + 45000 \times 6)$$

$$= (405 + 450) : (450 \times 2) : (600 +$$

$$450) = 855 : 900 : 1050$$

$$= 171 : 180 : 210$$

PROFIT AND LOSS

$$= 57 : 60 : 70$$

$$\text{Sum of the ratios} = 57 + 60 + 70 = 187$$

Required difference

$$= \frac{70 - 57}{187} \times 56100$$

$$= \frac{13}{187} \times 56100 = ₹ 3900$$

32. (3) A : B = 1 : 3

$$B : C = 1 : 3 = 3 : 9$$

$$C : D = 1 : 3 = 9 : 27$$

$$\therefore A : B : C : D = 1 : 3 : 9 : 27$$

$$\text{Sum of ratios} = 1 + 3 + 9 + 27 = 40$$

\therefore C's share in profit

$$= \frac{9}{40} \times 400000 = ₹ 90,000$$

33. (3) A's investment of ₹ 3500 is for 12 months

B's investment (let it be ₹ x) is for 7 months only.

At the end of the year the profit is divided in the ratio 2 : 3 and it must be equal to the ratio of the product, (Amount \times time)

$$\frac{12 \times 3500}{7x} = \frac{2}{3}$$

$$\text{or } x = \frac{12 \times 3500}{7} \times \frac{3}{2}$$

$$\text{or } x = 9000$$

\therefore B's investment is ₹ 9000.

34. (4) Let B remained in business for x months.

$$\begin{aligned} \text{Ratio of equivalent capitals} \\ = 45000 \times 12 : 54000 \times x \\ = 10 : x \end{aligned}$$

$$\therefore \frac{10}{x} = \frac{2}{1}$$

$$\Rightarrow 2x = 10 \Rightarrow x = 5$$

Clearly, B joined after (12 - 5) = 7 months.

35. (1) Initial investment :

$$A = ₹ 5x$$

$$B = ₹ 4x$$

$$C = ₹ 3x$$

\therefore Ratio of their equivalent capitals for 1 month

$$= 5x \times 12 : (4x \times 4 + (4x + 1000) \times 8) : (3x \times 8 + (3x + 2000) \times 4)$$

$$= 15x : (12x + 2000) : (9x + 2000)$$

$$\therefore \frac{15x}{12x + 2000} = \frac{15}{14}$$

$$\Rightarrow 14x = 12x + 2000$$

$$\Rightarrow 2x = 2000$$

$$\Rightarrow x = ₹ 1000$$

$$\therefore \text{C's investment} = ₹ 3000$$

36. (2) Ratio of equivalent capitals of A, B and C for 1 month

$$= \left(x \times 6 + \frac{3x}{2} \times 6 \right) : (2x \times 6 + 4x \times 6) : (4x \times 6 + 3x \times 6)$$

$$= 15x : 36x : 42x$$

$$= 5 : 12 : 14$$

37. (1) A : B = 5 : 4 = 10 : 8

$$B : C = 8 : 9$$

$$\therefore A : B : C = 10 : 8 : 9$$

$$\text{Sum of ratios} = 10 + 8 + 9 = 27$$

$$\therefore \text{C's share} = \frac{9}{27} \times 3600$$

$$= ₹ 1200$$

38. (4) C.P. of mixture

$$= \frac{320 \times 100}{120}$$

$$= \text{Rs. } \frac{800}{3} \text{ per kg.}$$

By rule of alligation,

Variety I Rs. 180	Variety II Rs. 280
$\frac{800}{3}$	
$\frac{280 - 800}{3}$ $= \frac{840 - 800}{3}$ $= \frac{40}{3}$	$\frac{800 - 180}{3}$ $= \frac{800 - 540}{3}$ $= \frac{260}{3}$

$$\therefore \text{Required ratio} = \frac{40}{3} : \frac{260}{3}$$

$$= 2 : 13$$

39. (3) C.P. of mobile = Rs. x (let)

$$\therefore \frac{x \times 112}{100} = P$$

$$\text{and, } \frac{96x}{100} = Q$$

$$\therefore Q : P = \frac{96x}{100} : \frac{112x}{100}$$

$$= 96 : 112 = 6 : 7$$

40. (3) Using Rule 1,

$$\text{Cost price} = \text{Rs. } 10x$$

$$\text{S.P.} = \text{Rs. } 11x$$

$$\therefore \text{Gain per cent}$$

$$= \frac{(11x - 10x)}{10x} \times 100$$

$$= \frac{100}{10} = 10\%$$

41. (2) Distribution among A, B and C :

$$\text{Actual ratio} = \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$$

$$= \left(\frac{1}{2} \times 12 \right) : \left(\frac{1}{3} \times 12 \right) : \left(\frac{1}{4} \times 12 \right)$$

$$= 6 : 4 : 3$$

$$\text{Wrong ratio} = 2 : 3 : 4$$

Clearly, C gained.

Gain

$$= \text{Rs. } \left(\frac{4}{9} \times 1170 - \frac{3}{13} \times 1170 \right)$$

$$= \text{Rs. } (520 - 270) = \text{Rs. } 250$$

42. (2) C.P. of first watch = Rs. 16x

$$\text{C.P. of second watch} = \text{Rs. } 23x$$

According to the question,

Ratio after corresponding in creases,

$$= \frac{11}{20}$$

$$\Rightarrow \frac{16x \times 110}{100} = \frac{11}{20}$$

$$\Rightarrow \frac{1760x}{100(23x + 477)} = \frac{11}{20}$$

$$\Rightarrow \frac{160x}{5(23x + 477)} = 1$$

$$\Rightarrow 160x = 115x + 2385$$

$$\Rightarrow 160x - 115x = 2385$$

$$\Rightarrow 45x = 2385$$

$$\Rightarrow x = \frac{2385}{45} = 53$$

\therefore Original C.P of second watch

$$= \text{Rs. } 23x$$

$$= \text{Rs. } (23 \times 53)$$

$$= \text{Rs. } 1219$$

43. (1) Let 3 litres of liquid X and 2 litres of liquid Y be mixed together.

$$\text{Cost of liquid Y} = \text{Rs. } x / \text{litre}$$

$$\text{Cost of liquid Y} = \text{Rs. } (x + 2) / \text{litre}$$

According to the question,

$$\text{Cost of the mixture}$$

$$= \text{Rs. } (3x + 6 + 2x) = \text{Rs. } (5x + 6)$$

- $$\therefore (5x + 6) \times \frac{110}{100} = 11 \times 5$$
- $$\Rightarrow 5x + 6 = \frac{11 \times 5 \times 10}{11} = 50$$
- $$\Rightarrow 5x = 50 - 6 = 44$$
- $$\Rightarrow x = \frac{44}{5} = \text{Rs. } 8.8$$
- $$\therefore \text{Cost of liquid X} = 8.8 + 2$$
- $$= \text{Rs. } 10.8/\text{litre}$$
- 44.** (1) If the cost of milk be Rs. 100, then S.P. = Rs. 120
 \therefore Required ratio = 20 : 100 = 1 : 5
- 45.** (4) Let total profit be Rs. x .
 Remaining profit after donations to charity
 $= \text{Rs. } \frac{95x}{100}$
 $= \text{Rs. } \frac{19x}{20}$
 $A : B = 3 : 2$
 Sum of the terms of the ratio
 $= 3 + 2 = 5$
 $\therefore A$'s share $= \frac{19x}{20} \times \frac{3}{5}$
 $\therefore \frac{19 \times 3x}{100} = 8550$
 $\Rightarrow x = \frac{8550 \times 100}{19 \times 3} = \text{Rs. } 15000$
- 46.** (2) C.P. of article = Rs. 10x
 Its S.P. = Rs. 11x
 Profit = Rs. (11x - 10x) = Rs. x
 \therefore Profit per cent
 $= \frac{x}{10x} \times 100 = 10\%$
- 47.** (2) Let B's profit be Rs. x .
 $\therefore A$'s profit = Rs. (1650 - x)
 According to the question,
 $\frac{1650 - x}{3} = \frac{2x}{5}$
 $\Rightarrow 6x = 1650 \times 5 - 5x$
 $\Rightarrow 6x + 5x = 8250$
 $\Rightarrow 11x = 8250$
 $\Rightarrow x = \frac{8250}{11} = \text{Rs. } 750$
- 48.** (3) C.P. of article = Rs. x (let)
 Its S.P. = Rs. y
 $\therefore x \times \frac{5}{100} = \frac{y \times 4}{100}$
 $\Rightarrow \frac{x}{y} = \frac{4}{5} = 4 : 5$
- 49.** (1) Ratio of the equivalent capitals of Anil and Vishal for 1 month
 $= 25000 \times 12 : 30000 \times 9$
 $= 25 \times 12 : 30 \times 9$

- $$= 10 : 9$$
- Sum of the terms of ratio
 $= 10 + 9 = 19$
- Anil's share $= \frac{10}{19} \times 19000$
 $= \text{Rs. } 10000$
- 50.** (3) Case I,
 $A : B : C = \frac{1}{5} : \frac{1}{4} : \frac{1}{8}$
 $= \left(\frac{1}{5} \times 40\right) : \left(\frac{1}{4} \times 40\right) : \left(\frac{1}{8} \times 40\right)$
 $[LCM \text{ of } 5, 4 \text{ and } 8 = 40]$
 $= 8 : 10 : 5$
 Sum of the terms of ratio
 $= 8 + 10 + 5 = 23$
 Case II
 $A : B : C = 5 : 4 : 8$
 Sum of the terms of ratio
 $= 5 + 4 + 8 = 17$
 Clearly C gains
 C's profit
 $= \left(\frac{8}{17} - \frac{5}{23}\right) \times 391$
 $= \frac{8}{17} \times 391 - \frac{5}{23} \times 391$
 $= 184 - 85 = 99 \text{ cookies}$
- 51.** (3) Let the profit be Rs. x .
 S.P. = Rs. 5x
 \therefore C.P. of article = Rs. (5x - x)
 $= \text{Rs. } 4x$
 \therefore Required ratio = 5x : 4x
 $= 5 : 4$
- 52.** (2) C.P. of article = Rs. 100 (let)
 On 15% loss,
 S.P. of article = Rs. 85
 \therefore Required ratio
 $= 100 : 85 = 20 : 17$
- 53.** (2) Total investment by B and C
 $= \text{Rs. } 5000$
 $B : C = 2 : 3$
 $\therefore B$'s investment
 $= \text{Rs. } \left(\frac{2}{5} \times 5000\right)$
 $= \text{Rs. } 2000$
 C's investment
 $= \text{Rs. } \left(\frac{3}{5} \times 5000\right)$
 $= \text{Rs. } 3000$
 Ratio of the equivalent capitals of A, B and C for 1 month
 $= 1000 : 2000 : 3000$
 $= 1 : 2 : 3$

- Sum of the terms of ratio
 $= 1 + 2 + 3 = 6$
- $\therefore C$'s share = Rs. $\left(\frac{3}{6} \times 2400\right)$
 $= \text{Rs. } 1200$
- 54.** (2) Let the C.P. of article be Rs. 4x.
 Its S.P. = Rs. 5x
 Profit = Rs. (5x - 4x) = Rs. x
 \therefore Profit per cent $= \frac{x}{4x} \times 100$
 $= 25\%$
- 55.** (2) Ratio of sharing of loss = Ratio of investments
 $= 3000 : 2400$
 $= 5 : 4$
 Sum of the terms of ratio
 $= 5 + 4 = 9$
 Total loss = Rs. 720
 \therefore Loss shared by B
 $= \text{Rs. } \left(\frac{4}{9} \times 720\right) = \text{Rs. } 320$
- 57.** (2) C.P. of article = Rs. 20x
 S.P. = Rs. 21x.
 \therefore Profit per cent
 $= \frac{(21x - 20x)}{20x} \times 100$
 $= \frac{100}{20} = 5\%$
- 58.** (4) Profit per cent
 $= \frac{26 - 25}{25} \times 100 = \frac{100}{25} = 4\%$

TYPE-V

- 1.** (4) Using Rule 1,
 The S.P. after the first discount
 of 5% on ₹ 80 = ₹ $\left(80 - \frac{5 \times 80}{100}\right)$
 $= ₹ (80 - 4) = ₹ 76$
 Again, after 5% discount on ₹ 76,
 S.P. = ₹ $\left(76 - \frac{5 \times 76}{100}\right)$
 $= ₹ (76 - 3.80) = ₹ 72.20$
- 2.** (1) Using Rule 3,
 C.P. of first buyer
 $= ₹ (840 + 10\% \text{ of } 840)$
 $= ₹ (840 + 84) = ₹ 924$
 Now, this item is sold to the second buyer at 5% loss.
 \therefore Final selling price
 $= ₹ \left(\frac{95}{100} \times 924\right) = ₹ 877.80$
- 3.** (3) Using Rule 3,
 For two consecutive gains of $x\%$ and $y\%$,

$$\text{Effective gain} = \left(x + y + \frac{xy}{100} \right) \%$$

His total gain per cent

$$= \left(20 + 30 + \frac{20 \times 30}{100} \right) = 56\%$$

4. (1) If the value of a number is first increased by $x\%$ and later decreased by $x\%$, the net change is always a decrease which is

$$\text{equal to } \frac{x^2}{100} \%$$

\therefore Required decrease

$$= \frac{20 \times 20}{100} = 4\%$$

5. (2) Gain per cent

$$= \left(10 + 10 + \frac{10 \times 10}{100} \right) \% = 21 \%$$

6. (2) Required percent

$$= \left(35 - 20 - \frac{35 \times 20}{100} \right) \% = 8\%$$

TYPE-VI

1. (4) 90% of C.P. = ₹ 240

$$\therefore \text{C.P.} = ₹ \frac{240 \times 100}{90}$$

New S.P. = 120% of C.P.

$$= ₹ 240 \times \frac{100}{90} \times \frac{120}{100} = ₹ 320$$

2. (3) According to question,

S.P. = ₹ 480

Loss% = 20%

$$\therefore \text{Cost price} = \frac{100}{80} \times 480$$

= ₹ 200

\therefore Required price

$$= \frac{120}{100} \times 600 = ₹ 720$$

3. (4) C.P. of that article

$$= 72 \times \frac{100}{100 - 10}$$

$$= \frac{72 \times 100}{90} = ₹ 80$$

\therefore S.P. of that article on 5% gain

$$= 80 \times \frac{105}{100} = ₹ 84$$

4. (4) 89% of the cost price

= ₹ 178

\therefore 111% of the cost price

$$= ₹ \frac{178}{89} \times 111 = ₹ 222$$

Aliter : Using Rule 3,

$$\text{C.P.} = 178 \times \frac{100}{100 - 11}$$

$$= \frac{17800}{89}$$

C.P. = 200

$$\text{S.P.} = 200 \times \left(\frac{100 + 11}{100} \right)$$

= R. 222

5. (3) **Tricky Approach**

Let C.P. = 100x

$$(100 - 9)x = 105$$

$$(100 + 30)\% x = \frac{105}{91} \times 130$$

= ₹ 150

Aliter : Using Rule 3,

$$\text{C.P.} = 105 \times \left(\frac{100}{100 - 9} \right)$$

$$= \frac{105 \times 100}{91}$$

$$\text{C.P.} = \frac{1500}{13}$$

$$\text{New S.P.} = \frac{1500}{13} \times \left(\frac{100 + 30}{100} \right)$$

= 15 × 10 = Rs 150

6. (1) CP of 200kg of sugar

$$= ₹ (80 \times 13.50 + 120 \times 16)$$

$$= ₹ (1080 + 1920) = ₹ 3000$$

\therefore CP of 1 Kg of sugar

$$= \frac{3000}{200} = ₹ 15$$

$$\therefore \text{To gain 20\% SP} = 15 \times \frac{120}{100}$$

= ₹ 18 /kg.

7. (2) Let the quantity of water mixed be x kg.

Let the CP of 1 kg of pure milk

= ₹ 1

$$\therefore \text{Gain percent} = \frac{x}{50} \times 100$$

$$\Rightarrow 2x = 10 \Rightarrow x = 5 \text{ kg.}$$

8. (2) SP of article = ₹ 69

Loss % = 8%

$$\therefore \text{CP} = ₹ \frac{100 \times 69}{92}$$

= ₹ 75

New SP = ₹ 78

\therefore Gain %

$$= \frac{78 - 75}{75} \times 100 = 4\%$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \times \frac{100}{100 - \text{Loss\%}}$$

$$= \frac{69 \times 100}{100 - 8}$$

$$= \frac{6900}{92} = \text{Rs. } 75$$

$$\text{New S.P.} = \text{C.P.} \left(\frac{100 + \text{Profit\%}}{100} \right)$$

$$78 = 75 \times \left(\frac{100 + \text{Profit\%}}{100} \right)$$

$$7800 = 7500 + 75 \text{ Profit\%}$$

$$\frac{7800 - 7500}{75} = \text{Profit \%}$$

$$\frac{300}{75} = \text{Profit\%}$$

Profit% = 4%

9. (4) 100% = 6

$$\text{C.P.} = 80\% = \frac{6}{100} \times 80 = \frac{24}{5}$$

$$\text{Now, } 120\% = \frac{24}{5}$$

$$100\% = \frac{24 \times 100}{5 \times 120} = 4$$

10. (3) Using Rule 3,

$$\text{C.P.} = \frac{100}{100 - \text{Loss\%}} \times \text{S.P.}$$

$$= \frac{100}{90} \times 45000 = ₹ 50000$$

\therefore S.P. = 115% of ₹ 50000

$$= ₹ \frac{50000 \times 115}{100} = ₹ 57,500$$

11. (1) C.P. of radio = $\frac{100}{110} \times 990$

= ₹ 900

\therefore Loss = 900 - 890 = ₹ 10

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 + \text{Profit\%}} \right)$$

$$= 990 \left(\frac{100}{100+10} \right)$$

$$= \frac{99000}{110}$$

$$\text{C.P.} = 900$$

$$\text{Loss} = \text{C.P.} - \text{S.P.}$$

$$= 900 - 890$$

$$= ₹ 10$$

12. (1) C.P. of table

$$= 1140 \times \frac{100}{95} = ₹ 1200$$

$$\text{S.P. at 5% gain}$$

$$= \frac{1200 \times 105}{100} = ₹ 1260$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= 1140 \left(\frac{100}{100 - 5} \right)$$

$$= \frac{114000}{95} = \text{Rs } 1200$$

$$\text{S.P.} = \text{C.P.} \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 1200 \left(\frac{100 + 5}{100} \right)$$

$$= 1200 \times \frac{105}{100}$$

$$= ₹ 1260$$

13. (2) If C.P. of radio be ₹ x, then

$$10\% \text{ of } x = 100$$

$$\Rightarrow x = 1000$$

$$\text{For a gain of } 12\frac{1}{2}\%$$

$$\text{S.P.} = 1000 \times \left(\frac{100 + \frac{25}{2}}{100} \right)$$

$$= \frac{1000 \times 225}{200} = ₹ 1125$$

Aliter : Using Rule 11,

$$\text{Here, } x = 2.5\%,$$

$$R = 100, y = 7\frac{1}{2}\%$$

$$\text{C.P.} = \frac{R}{y+x} \times 100$$

$$= \frac{100 \times 100}{2.5 + 7.5}$$

$$= \text{Rs } 1000$$

Now New S.P.

$$= \text{C.P.} \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 1000 \left(\frac{100 + 12.5}{100} \right)$$

$$= 10 \times 112.5$$

$$= ₹ 1125$$

14. (4) C.P. of fan

$$= ₹ \left(\frac{600 \times 100}{90} \right)$$

$$\therefore \text{Required S.P.}$$

$$= \frac{600 \times 100}{90} \times \frac{120}{100} = ₹ 800$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= \frac{600 \times 100}{100 - 10}$$

$$\text{C.P.} = \frac{60000}{90}$$

$$\text{C.P.} = \frac{6000}{9}$$

New S.P.

$$= \text{C.P.} \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= \frac{6000}{9} \left(\frac{100 + 20}{100} \right)$$

$$= \frac{60 \times 120}{9} = ₹ 800$$

15. (4) If the initial C.P. of car be Rs. x, then

$$\therefore \text{First S.P.} = \frac{9x}{10}$$

$$\therefore \frac{9x}{10} \times \frac{120}{100} = 54000$$

$$\Rightarrow x = \frac{54000 \times 1000}{9 \times 120}$$

$$= ₹ 50000$$

16. (3) C.P. of article = $\frac{170 \times 100}{85}$

$$= ₹ 200$$

$$\therefore \text{Required S.P.} = \frac{200 \times 120}{100}$$

$$= ₹ 240$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$\text{C.P.} = \frac{170 \times 100}{100 - 15}$$

$$= \frac{17000}{85}$$

$$\text{C.P.} = \text{Rs. } 200$$

$$\text{New S.P.} = \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 200 \left(\frac{100 + 20}{100} \right)$$

$$= \frac{200 \times 120}{100} = ₹ 240$$

17. (1) CP of chair

$$= \frac{100}{75} \times 720 = ₹ 960$$

$$\text{To gain 25\%, SP}$$

$$= \frac{125}{100} \times 960 = ₹ 1200$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= \frac{720 \times 100}{100 - 25}$$

$$= \frac{72000}{75} = \text{Rs. } 960$$

$$\text{New S.P.} = \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= \frac{960 \times 125}{100}$$

$$= ₹ 1200$$

18. (1) Let CP of basket be ₹ x.

$$\therefore 130\% \text{ of } x = 19.50$$

$$\Rightarrow \frac{130 \times x}{100} = 19.50$$

$$\Rightarrow x = \frac{19.50 \times 100}{130} = ₹ 15$$

$$\text{For 40\% gain,}$$

$$\text{SP} = \frac{140 \times 15}{100} = ₹ 21$$

Aliter : Using Rule 3

$$\text{C.P.} = \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= \frac{19.50 \times 100}{100 + 30}$$

$$= \frac{1950}{130} = \text{Rs. } 15$$

New S.P.

$$= \text{C.P.} \times \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 15 \left(\frac{100 + 40}{100} \right)$$

$$= \frac{15 \times 140}{100}$$

$$= \frac{210}{10} = \text{₹ } 21$$

19. (4) Using Rule 1,

$$\text{CP of 1 egg} = \frac{720}{20 \times 12} = \text{₹ } 3$$

∴ Required SP of 1 egg

$$= 3 \times \frac{120}{100} = \text{₹ } 3.60$$

20. (4) Using Rule 3,

CP of the article

$$\frac{100}{100 - \text{loss}\%} \times \text{S.P.}$$

$$= \text{₹ } \left(\frac{100}{95} \times 665 \right) = \text{₹ } 700$$

For the gain of 12%

SP of the article = 112% of 700

$$= \frac{700 \times 112}{100} = \text{₹ } 784$$

21. (4) Using Rule 3,

C.P. of article

$$= \frac{100}{100 - \text{Loss}\%} \times \text{S.P.}$$

$$= \frac{100}{100 - 30} \times 700 = \text{₹ } 1000$$

S.P. for a profit of 30%

$$= 1000 \times \frac{130}{100} = \text{₹ } 1300$$

22. (4) C.P. of wrist watch

$$= \frac{720 \times 100}{75} = \text{₹ } 960$$

∴ Required S.P.

$$= \frac{960 \times 125}{100} = \text{₹ } 1200$$

23. (3) C.P. of article = ₹ x

$$\therefore \text{S.P.} = \frac{112x}{100}$$

$$\text{New C.P.} = \frac{9x}{10}$$

$$\text{S.P.} = \frac{9x}{10} \times \frac{130}{100} = \frac{117x}{100}$$

$$\therefore \frac{117x}{100} - \frac{112x}{100} = 5.75$$

$$\Rightarrow \frac{5x}{100} = 5.75$$

$$\Rightarrow x = \frac{5.75 \times 100}{5} = \text{₹ } 115$$

$$\therefore \text{Required S.P.} = \frac{115 \times 120}{100}$$

$$= \text{₹ } 138$$

24. (1) Using Rule 3,

C.P. of 80 ball pens

$$= 140 \times \frac{100}{70} = \text{₹ } 200$$

For a gain of 30%

$$\text{S.P.} = \frac{200 \times 130}{100} = \text{₹ } 260$$

$$\therefore \text{₹ } 260 = 80 \text{ ball pens}$$

$$\therefore \text{₹ } 104 = \frac{80}{260} \times 104 = 32$$

25. (1) Using Rule 3,

C.P. of 90 ball pens

$$= \frac{100}{80} \times 160 = \text{₹ } 200$$

S.P. for a gain of 20%

$$= \frac{200 \times 120}{100} = \text{₹ } 240$$

$$\therefore \text{₹ } 240 = 90 \text{ ball pens}$$

$$\therefore \text{₹ } 96 = \frac{90}{240} \times 96 = 36$$

26. (3) Total cost of rice

$$= \text{₹ } (3 \times 10 + 35 \times 11)$$

$$= \text{₹ } (300 + 385) = \text{₹ } 685$$

Required S.P. = Rs.

$$\left(\frac{685 \times 130}{100} \right)$$

$$\text{Rate per kg} = \frac{685 \times 130}{65 \times 100}$$

$$= \text{₹ } 13.7$$

27. (4) Actual cost price of flat

$$= \text{₹ } (925000 + 35000)$$

$$= \text{₹ } 960000$$

$$\text{S.P.} = \text{₹ } 1080000$$

Profit

$$= \text{₹ } (1080000 - 960000)$$

$$= \text{₹ } 120000$$

Profit percent

$$= \frac{120000}{960000} \times 100 = 12.5\%$$

28. (3) C.P. of article = Rs. x

$$\therefore \text{Its S.P.} = \text{Rs. } \frac{8x}{5}$$

$$\text{Profit} = \frac{8x}{5} - x = \frac{8x - 5x}{5}$$

$$= \text{Rs. } \frac{3x}{5}$$

$$\therefore \text{Profit per cent} = \frac{\frac{3x}{5}}{x} \times 100$$

$$= \frac{3}{5} \times 100 = 60\%$$

29. (1) Let the C.P. of each book be Rs. x.

According to the question,

$$\text{S.P. of 12 copies} = \text{Rs. } (12x + 3x)$$

$$= \text{Rs. } 15x$$

$$\therefore 15x = 1800$$

$$\Rightarrow x = \frac{1800}{15} = \text{Rs. } 120$$

30. (2) Let the total quantity of sugar be x kg.

According to the question,

$$(100 - 5)\% \text{ of } x = 5$$

$$\Rightarrow x \times \frac{95}{100} = 5$$

$$\Rightarrow x = \frac{500}{95} = \frac{100}{19} = 5\frac{5}{19} \text{ kg.}$$

TYPE-VII

1. (3) Difference in percentage of sales tax

$$= \frac{7}{2} - \frac{10}{3} = \frac{21 - 20}{6} = \frac{1}{6}\%$$

∴ Required difference

$$= \frac{1}{6}\% \text{ of } 8400$$

$$= \frac{1}{6} \times \frac{1}{100} \times 8400 = \text{₹ } 14$$

2. (3) Using Rule 3,

Suppose marked price = ₹ x

$$\therefore \text{S.P.} = \text{₹ } \frac{2x}{3}$$

$$\text{CP} = \frac{2x}{3 \times 90} \times 100 = \frac{20x}{27}$$

Profit at marked price

$$= x - \frac{20x}{27} = \frac{7x}{27}$$

$$\therefore \text{Per cent profit} = \frac{\frac{7x}{27} \times 100}{\frac{20x}{27}}$$

$$= \frac{7x}{27} \times \frac{27}{20x} \times 100 = 35\%$$

3. (2) Let the CP of the article be ₹ 100.

$$\therefore \text{SP} = \text{Rs. } 119$$

If the marked price be ₹ x , then,

$$\frac{85}{100} \text{ of } x = 119$$

$$\Rightarrow \frac{85}{100} \times x = 119$$

$$\Rightarrow x = \frac{119 \times 100}{85} = 140$$

Clearly, the marked price is 40% above the cost price.

4. (2) Let the marked price of the television be ₹ x .

$$\text{CP for Rita} = ₹ (16800 - 800) = ₹ 16000$$

$$\therefore 80\% \text{ of } x = 16000$$

$$\Rightarrow x = \frac{16000 \times 100}{80}$$

$$= ₹ 20000$$

5. (1) Let the marked price of the article be ₹ x .

$$\therefore \frac{90x}{100} = \frac{800 \times 112.5}{100}$$

$$\Rightarrow \frac{9x}{10} = 900$$

$$\Rightarrow x = \frac{900 \times 10}{9} = ₹ 1000$$

6. (4) Let the advertised price be x .

$$\Rightarrow \text{S.P.} = \frac{77x}{100}$$

$$\Rightarrow \text{C.P.} = \left(\frac{77x}{100} - 56 \right)$$

$$\therefore \frac{77x - 5600}{100} \times \frac{110}{100} = \frac{77x}{100}$$

$$\Rightarrow \frac{77x - 5600}{100} = \frac{77x}{110} = \frac{7x}{10}$$

$$\Rightarrow 77x - 5600 = 70x$$

$$\Rightarrow 7x = 5600$$

$$\Rightarrow x = ₹ 800$$

7. (3) Let the CP be ₹ 100. Then, SP = ₹ 120.

Let the marked price be x .
Then, 90% of $x = 120$

$$\Rightarrow x = \frac{120 \times 100}{90} = \frac{400}{3}$$

$$= 133\frac{1}{3}\%$$

It means he should mark $33\frac{1}{3}\%$ higher than CP.

8. (4) Let the CP of article be 100.

$$\therefore \text{Marked price} = ₹ 110$$

After 10% discount,

$$\text{SP} = 90\% \text{ of } ₹ 110 = ₹ 99$$

$$\therefore \text{Loss} = ₹ 1 \text{ i.e. } 1\% \text{ of loss}$$

9. (2) Let the original S.P. be x .
C.P. of the article

$$= \frac{300 \times 100}{150} = ₹ 200$$

After corresponding increases

$$\frac{x \times 120}{100} - 200 = 2(x - 200)$$

$$\Rightarrow \frac{6x}{5} - 200 = 2x - 400$$

$$\Rightarrow 6x - 1000 = 10x - 2000$$

$$\Rightarrow 4x = 1000 \Rightarrow x = ₹ 250$$

10. (4) Marked price of tape recorder

$$= \frac{1500 \times 120}{100} = ₹ 1800$$

$$\text{Gain} = \frac{1500 \times 8}{100} = ₹ 120$$

$$\text{Discount} = 1800 - (1500 + 120) = ₹ 180$$

Let Discount per cent = $x\%$, then

$$\frac{1800 \times x}{100} = 180$$

$$\Rightarrow x = 10\%$$

Method 2 :

If the discount be $x\%$, then

$$20 - x - \frac{20x}{100} = 8$$

$$\Rightarrow 20 - \frac{6x}{5} = 8$$

$$\Rightarrow \frac{6x}{5} = 20 - 8 = 12$$

$$\Rightarrow x = \frac{12 \times 5}{6} = 10\%$$

11. (1) Let the C.P. be ₹ 100 and the marked price be ₹ x .

$$\therefore x \times \frac{88}{100} = 132$$

$$\Rightarrow x = \frac{132 \times 100}{88}$$

$$= 150 \text{ i.e., more by } 50\%$$

12. (1) If the marked price of the washing machine be ₹ x , then

$$\frac{x \times 88}{100} = \frac{7660 \times 110}{100}$$

$$\Rightarrow x = \frac{7660 \times 110}{88} = ₹ 9575$$

13. (1) S.P. of each book = $\frac{75 \times 70}{100}$

$$= ₹ 52.50$$

$$\text{Total S.P.} = 1600 \times 52.50$$

$$= ₹ 84000$$

$$\text{Gain} = 84000 - 70000 = ₹ 14000$$

$$\therefore \text{Gain}\% = \frac{14000}{70000} \times 100 = 20\%$$

14. (1) Let list price of article = ₹ 100

\therefore CP for Richa

$$= 100 \times \frac{4}{5} = ₹ 80$$

$$\therefore \text{S.P. for Richa} = ₹ 120$$

$$\therefore \text{Gain} = 120 - 80 = ₹ 40$$

$$\therefore \text{Gain per cent} = \frac{40}{80} \times 100$$

$$= 50\%$$

15. (4) Let the cost price be 100 and marked price be ₹ x .

$$\text{Then, } \frac{x \times 90}{100} = 108$$

$$\Rightarrow \frac{9x}{10} = 108$$

$$\Rightarrow x = \frac{108 \times 10}{9} = 120$$

$$\therefore \text{Required percentage} = 20\%$$

16. (4) Let C.P. of each sari = ₹ x

$$\text{Marked price} = \left(\frac{112x}{100} \right)$$

$$\therefore \frac{95}{100} \times \frac{112x}{100} = 266$$

$$\Rightarrow x = \frac{266 \times 100 \times 100}{95 \times 112} = ₹ 250$$

17. (1) Let Marked price = ₹ x

$$\therefore \text{C.P.} = \frac{7x}{10}$$

$$\text{S.P.} = \frac{7x}{10} \times \frac{140}{100} = \frac{98x}{100}$$

$$\therefore \text{Loss} = x - \frac{98x}{100} = \frac{2x}{100}$$

\therefore Loss per cent

$$= \frac{2x}{100 \times x} \times 100 = 2\%$$

- 18.** (4) If the marked price be Rs. 100, then

C.P. = ₹ 75

S.P. = ₹ 100

$$\therefore \text{Gain per cent} = \frac{25}{75} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

- 19.** (3) S.P. of article = $\frac{450 \times 90}{100}$

= ₹ 405

- 20.** (3) C.P. of the article = ₹ 100 and marked price = x

$$\therefore x \times \frac{90}{100} = 117$$

$$\Rightarrow x = \frac{117 \times 100}{90}$$

= 130 i.e. 30% above C.P.

- 21.** (3) C.P. of article = ₹ 100

\therefore Marked price = ₹ 130

Selling price

$$= \frac{130 \times \left(100 - \frac{25}{4}\right)}{100}$$

$$= \frac{130 \times 375}{400} = ₹ \frac{975}{8}$$

$$= ₹ \left(121\frac{7}{8}\right)$$

$$\therefore \text{Gain} = 21\frac{7}{8}\%$$

- 22.** (3) C.P. of article = ₹ 100

Marked price = ₹ 125

$$\text{S.P.} = \frac{125 \times 84}{100} = ₹ 105$$

Gain per cent = 5%

Method 2 :

Gain per cent

$$= \left(25 - 16 - \frac{25 \times 16}{100}\right)\% = 5\%$$

$$\text{Gain \%} = \frac{x - y - xy}{100}$$

- 23.** (4) Marked price = ₹ x

$$\therefore \text{C.P.} = \frac{70x}{100} = ₹ \frac{7x}{10}$$

$$\therefore \frac{7x}{10} \times \frac{125}{100} = 8750$$

$$\Rightarrow x = \frac{8750 \times 1000}{7 \times 125} = ₹ 10000$$

- 24.** (2) Marked price of article = ₹ x

$$\therefore x \times (100 - 12)\% = 440$$

$$\Rightarrow x \times \frac{88}{100} = 440$$

$$\Rightarrow x = \frac{440 \times 100}{88} = ₹ 500$$

- 25.** (*) Let the marked price of watch be Rs. x

$$\therefore \text{S.P.} = \text{Rs. } \frac{4x}{5} = \text{C.P. of Pratap}$$

S.P. for Pratap

$$= \text{Rs. } \frac{117 \times x}{100} = \text{Rs. } \frac{117x}{100}$$

$$\therefore \text{Gain} = \frac{117x}{100} - \frac{4x}{5}$$

$$= \frac{117x - 80x}{100}$$

$$= \text{Rs. } \frac{37x}{100}$$

$$\therefore \text{Gain percent} = \frac{\frac{37x}{100}}{\frac{4x}{5}} \times 100$$

$$= \frac{37 \times 5}{4} = 46.25\%$$

- 26.** (2) Let the marked price be Rs. 100.

Mohan's C.P. = Rs. 80

$$\text{Mohan's S.P.} = \frac{80 \times 140}{100}$$

= Rs. 112

\therefore Required profit percent = 12%

- 27.** (1) Let the C.P. for Mr. X = Rs. x
According to the question,

$$\left(100 + \frac{100}{9}\right)\% \text{ of } x = 5000$$

$$\Rightarrow x \times \frac{1000}{900} = 5000$$

$$\Rightarrow x = \frac{5000 \times 9}{10} = \text{Rs. } 4500$$

\therefore Discount

= Rs. (5000 - 4500) = Rs. 500

\therefore Discount per cent

$$= \frac{500}{5000} \times 100 = 10\%$$

TYPE-VIII

- 1.** (3) Let the cost price of the commodity = ₹ x

According to the question,

$$524 - x = x - 452$$

$$\text{or } 2x = 524 + 452$$

$$\text{or } 2x = 976$$

$$\text{or } x = \frac{976}{2} = 488$$

The required price = ₹ 488

- 2.** (2) Let the cost price be x .

$$\therefore (100 + x)\% \text{ of } x = 144$$

$$\Rightarrow (100 + x)x = 14400$$

$$\Rightarrow x^2 + 100x - 14400 = 0$$

$$\Rightarrow x^2 + 180x - 80x - 14400 = 0$$

$$\Rightarrow x(x + 180) - 80(x + 180) = 0$$

$$\Rightarrow (x + 180)(x - 80) = 0$$

$$\Rightarrow x = ₹ 80 [x \neq -180]$$

- 3.** (1) CP of 144 hens - SP of 144 hens = Loss = SP of 6 hens

\therefore SP of 150 hens

= CP of 144 hens

Let CP of each hen = ₹ 1

CP of 150 hens = ₹ 150

SP of 150 hens = ₹ 144

$$\therefore \text{Loss\%} = \frac{6}{150} \times 100 = 4\%$$

Aliter : Using Rule 9,

Here, $x = 144$, $y = 6$

$$\text{Loss\%} = \frac{y \times 100}{x + y}$$

$$= \frac{600}{144 + 6}$$

$$= \frac{600}{150} = 4\%$$

- 4.** (4) Using Rule 3,

Let the CP of the article be x

Gain % = $x\%$

$$\therefore \frac{39 - x}{x} \times 100 = x$$

$$\Rightarrow 3900 - 100x = x^2$$

$$\Rightarrow x^2 + 100x - 3900 = 0$$

$$\Rightarrow x^2 + 130x - 30x - 3900 = 0$$

$$\Rightarrow x(x + 130) - 30(x + 130) = 0$$

$$\Rightarrow (x - 30)(x + 130) = 0$$

$$\Rightarrow x = 30 \text{ as } x \text{ cannot be negative}$$

5. (1) SP of 12 ball pens = CP of 12 ball pens + SP of 4 ball pens.
 \Rightarrow SP of 8 ball pens = CP of 12 ball pens
 \therefore Gain per cent

$$= \frac{4}{8} \times 100 = 50\%$$

Aliter : Using Rule 9,
 Here, $x = 12$, $y = 4$

$$\begin{aligned} \text{Profit\%} &= \frac{y \times 100}{x - y} \\ &= \frac{4 \times 100}{12 - 4} = 50\% \end{aligned}$$

6. (2) Using Rule 3,
 Let the cost price of article be ₹ x .

$$\begin{aligned} \therefore \left(\frac{100 + x}{100} \right) \text{ of } x &= 75 \\ \Rightarrow x^2 + 100x - 7500 &= 0 \\ \Rightarrow x^2 + 150x - 50x - 7500 &= 0 \\ \Rightarrow x(x + 150) - 50(x + 150) &= 0 \\ \Rightarrow (x - 50)(x + 150) &= 0 \\ \Rightarrow x = 50 \text{ as } x \text{ can't be negative} \end{aligned}$$

7. (3) Let the C.P. of article be x ,
 then, $425 - x = x - 355$
 $\Rightarrow 2x = 425 + 355 = 780$

$$\Rightarrow x = \frac{780}{2} = ₹ 390$$

8. (3) S.P. of 3 articles
 = C.P. of 21 articles - S.P. of 21 articles
 \Rightarrow S.P. of 24 articles
 = C.P. of 21 articles

$$\therefore \text{Loss percent} = \frac{24 - 21}{24} \times 100$$

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

Aliter : Using Rule 9,
 Here, $x = 21$, $y = 3$

$$\begin{aligned} \text{Loss\%} &= \frac{y \times 100}{x + y} \\ &= \frac{3 \times 100}{21 + 3} \\ &= \frac{100}{8} = \frac{25}{2} = 12\frac{1}{2}\% \end{aligned}$$

9. (2) S.P. of 250 chairs - C.P. of 250 chairs
 = S.P. of 50 chairs
 \Rightarrow S.P. of 200 chairs
 = C.P. of 250 chairs
 \therefore profit%

$$= \frac{250 - 200}{200} \times 100 = 25\%$$

Aliter : Using Rule 9,
 Here, $x = 250$, $y = 50$

$$\begin{aligned} \text{Profit\%} &= \frac{y \times 100}{x - y} \\ &= \frac{50 \times 100}{250 - 50} \\ &= \frac{50}{2} = 25\% \end{aligned}$$

10. (4) Let C.P. of a ball = x
 S.P. of 17 balls = ₹ 720
 $\therefore 17x - 720 = 5x$
 $\Rightarrow 12x = 720$
 $\Rightarrow x = ₹ 60$

11. (3) S.P. of 36 oranges = C.P. of 36 oranges - S.P. of 4 oranges
 \Rightarrow S.P. of 40 oranges
 = C.P. of 36 oranges
 \therefore Loss per cent

$$= \frac{4}{40} \times 100 = 10\%$$

Aliter : Using Rule 9,
 Here, $x = 36$, $y = 4$

$$\text{Here, loss \%} = \frac{y \times 100}{x + y}$$

$$= \frac{4 \times 100}{36 + 4} = 10\%$$

12. (1) C.P. of first painting

$$\begin{aligned} &= \frac{20000 \times 100}{125} \\ &= \text{Rs. } 16000 \\ \text{C.P. of second painting} \\ &= \frac{20000 \times 100}{75} = \text{Rs. } 26666.7 \end{aligned}$$

$$\begin{aligned} \text{Loss} &= \text{Rs. } (16000 + 26666.7 - 40000) \\ &= \text{Rs. } 2666.7 \end{aligned}$$

13. (2) Let the C.P. of each article be Re. 1.

$$\begin{aligned} \therefore \text{C.P. of 21 articles} &= \text{Rs. } 21 \\ \text{S.P. of 21 articles} &= \text{Rs. } 28 \\ \therefore \text{Profit per cent} \end{aligned}$$

$$= \frac{28 - 21}{21} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

14. (2) Let the C.P. of article be Rs. x .
 According to the question,

$$x \times \frac{120}{100} = 390$$

$$\Rightarrow x = \frac{390 \times 100}{120} = \text{Rs. } 325$$

$$15. (3) \frac{20}{100} = \frac{1}{5} = \frac{\text{C.P.} - \text{S.P.}}{\text{S.P.}}$$

$$\begin{aligned} \Rightarrow 5x_1 - 5y &= y \\ \text{Where C.P.} &= \text{Rs. } x_1, \\ \text{S.P.} &= \text{Rs. } y \\ \Rightarrow 5x_1 &= 6y \end{aligned}$$

$$\Rightarrow y = \text{Rs. } \frac{5}{6}x_1$$

$$\therefore x = \frac{x_1 - \frac{5}{6}x_1}{x_1} \times 100$$

$$= \frac{x_1}{6x_1} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$$

16. (2) Let the C.P. of article be Rs. 100 and its S.P. be Rs. x .
 According to the question.

$$\text{When S.P.} = \text{Rs. } \frac{x}{2}$$

$$\text{Loss per cent} = \frac{100 - \frac{x}{2}}{100} \times 100$$

$$\Rightarrow 100 - \frac{x}{2} = \frac{51}{2}$$

$$\Rightarrow \frac{x}{2} = 100 - \frac{51}{2} = \frac{200 - 51}{2}$$

$$\Rightarrow x = \text{Rs. } 149$$

$$\therefore \text{Required profit percent} = 49\%$$

TYPE-IX

1. (1) Let the cost price of the article = ₹ x

S.P. at 10% loss

$$= x \times \frac{90}{100} = \frac{9x}{10}$$

S.P. at $12\frac{1}{2}\%$ gain

$$= x \times \frac{100 + 12\frac{1}{2}}{100} = \frac{225x}{200}$$

According to the question

$$\frac{9x}{10} + 9 = \frac{225x}{200}$$

$$\Rightarrow 180x + 1800 = 225x$$

$$\Rightarrow 225x - 180x = 1800$$

$$\Rightarrow 45x = 1800$$

$$\therefore x = ₹ 40$$

Aliter : Using Rule 11,

Here, $x = 10\%$, $R = 9$, $y = 12.5\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{9 \times 100}{12.5 + 10}$$

$$= \frac{900}{22.5} = ₹ 40$$

2. (2) Tricky Approach

$$80\% x + 12 = 110\%$$

Let x be the cost price

$$\Rightarrow 30\% x = 12$$

$$= \frac{12}{30} \times 100 = ₹ 40$$

Aliter : Using Rule 11,

Here, $x = 20\%$, $R = 12$, $y = 10\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{12 \times 100}{20 + 10} = ₹ 40$$

3. (3) The article is sold at 11% loss.

$$\therefore 89\% \text{ of CP} = ₹ 178$$

$$\Rightarrow \text{CP} = ₹ \frac{178 \times 100}{89} = ₹ 200$$

To gain 11%,

$$\text{S.P.} = 111\% \text{ of } ₹ 200$$

$$= ₹ \frac{111}{100} \times 200 = ₹ 222$$

4. (1) Let the C.P be ₹ x .

First selling price

$$= 90\% \text{ of } x = ₹ \frac{9x}{10}$$

Second selling price

$$= \left(\frac{9x}{10} + 10 \right)$$

$$\therefore 110\% \text{ of } x = \left(\frac{9x}{10} + 10 \right)$$

$$\Rightarrow \frac{11x}{10} = \frac{9x}{10} + 10 \Rightarrow \frac{2x}{10} = 10$$

$$\Rightarrow x = \frac{10 \times 10}{2} = 50 = ₹ 50$$

Aliter : Using Rule 11,

Here, $x = 10\%$, $R = 10$, $y = 10\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{10 \times 100}{10 + 10} = ₹ 50$$

5. (3) Let the CP of the book be ₹ x .

$$\text{Initial SP} = \frac{110}{100} \times x = 1.1x$$

$$\text{New CP} = 0.96x$$

New SP

$$= \left(100 + \frac{75}{4} \right) \% \text{ of } 0.96x$$

$$= \frac{475}{400} \times 0.96x$$

$$= 1.14x$$

Therefore,

$$1.14x - 1.1x = 6$$

$$\Rightarrow 0.04x = 6$$

$$\Rightarrow x = \frac{6}{0.04} = \frac{600}{4} = 150$$

$$\therefore \text{CP} = ₹ 150$$

6. (4) Let the CP of the typewriter be ₹ x .

$$\text{At 5\% loss, SP} = \frac{95x}{100}$$

$$\text{Now, } \frac{95x}{100} + 80 = \frac{105x}{100}$$

$$\Rightarrow \frac{105x}{100} - \frac{95x}{100} = 80$$

$$\Rightarrow \frac{105x - 95x}{100} = 80$$

$$\Rightarrow x = \frac{8000}{10} = ₹ 800$$

Aliter : Using Rule 11,

Here, $x = 5\%$, $R = 80$, $y = 5\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{80 \times 100}{5 + 5} = ₹ 800$$

7. (3) Let the first CP of the commodity be ₹ 100.

$$\therefore \text{First SP} = ₹ 110$$

$$\text{Second CP} = ₹ 90$$

$$\text{Gain\%} = \frac{50}{3} \%$$

\therefore Second SP

$$= \left(100 + \frac{50}{3} \right) \% \text{ of } 90$$

$$= ₹ \left(90 \times \frac{350}{300} \right) = ₹ 105$$

Difference of first and second S.P.

$$= ₹ (110 - 105) = ₹ 5$$

\therefore If the difference is ₹ 5, the CP = ₹ 100.

\therefore If the difference be ₹ 2, the

$$\text{CP} = \frac{100}{5} \times 2 = ₹ 40$$

8. (3) Let the CP of the cooker be ₹ x .

$$\therefore \text{Initial SP} = \frac{116x}{100}$$

$$\text{Again, SP} = \left(\frac{116x}{100} + 20 \right)$$

$$\therefore \frac{116x}{100} + 20 = \frac{120x}{100}$$

$$\Rightarrow 116x + 2000 = 120x$$

$$\Rightarrow 4x = 2000$$

$$\Rightarrow x = \frac{2000}{4} = ₹ 500$$

Aliter : Using Rule 11,

Here, $x = 16\%$, $R = 20$, $Y = 20\%$

$$\text{C.P.} = \frac{R \times 100}{y - x}$$

$$= \frac{20 \times 100}{20 - 16}$$

$$= ₹ 500$$

9. (3) CP of the article

$$= \left(\frac{100}{112} \times 2576 \right) = ₹ 2300$$

$$\text{New CP} = ₹ 2200$$

\therefore Gain per cent

$$= \frac{2576 - 2200}{2200} \times 100 = 17 \frac{1}{11}$$

10. (4) Let the CP of the article be ₹ x
SP of the article at 20% loss

$$= x \times \frac{80}{100} = \frac{4x}{5}$$

In second case,

$$\frac{4x}{5} + 50 = \frac{105x}{100}$$

$$\Rightarrow \frac{4x}{5} + 50 = \frac{21x}{20}$$

$$\Rightarrow \frac{21x}{20} - \frac{4x}{5} = 50$$

$$\Rightarrow \frac{21x - 16x}{20} = 50$$

$$\Rightarrow \frac{5x}{20} = 50$$

$$\Rightarrow x = ₹ 200$$

PROFIT AND LOSS

Aliter : Using Rule 11,
Here, $x = 20\%$, $R = ₹ 50$, $y = 5\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y + x} \\ &= \frac{50 \times 100}{20 + 5} \\ &= \frac{50 \times 100}{25} = ₹ 200 \end{aligned}$$

11. (2) Let the CP of the article be ₹ x .

$$\begin{aligned} \therefore \frac{120x}{100} - \frac{80x}{100} &= 60 \\ \Rightarrow 40x &= 60 \times 100 \\ \Rightarrow x &= \frac{60 \times 100}{40} = ₹ 150 \end{aligned}$$

Aliter : Using Rule 11,
Here, $x = 20\%$, $R = ₹ 60$, $y = 20\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y + x} \\ &= \frac{60 \times 100}{20 + 20} \\ &= \frac{6000}{40} = ₹ 150 \end{aligned}$$

12. (2) Let the CP of cycle be ₹ x .

$$\begin{aligned} \text{S.P.} &= \frac{108x}{100} \\ \frac{108x}{100} + 75 &= \frac{114x}{100} \\ \Rightarrow 108x + 7500 &= 114x \\ \Rightarrow 114x - 108x &= 7500 \\ \Rightarrow 6x &= 7500 \\ \Rightarrow x &= \frac{7500}{6} = ₹ 1250 \end{aligned}$$

Aliter : Using Rule 11,
Here, $x = 8\%$, $R = ₹ 75$, $y = 14\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y - x} \\ &= \frac{75 \times 100}{14 - 8} \\ &= \frac{7500}{6} = ₹ 1250 \end{aligned}$$

13. (1) If the cost price of the book be ₹ x , then

$$\begin{aligned} \therefore \frac{x \times 80}{100} + 108 &= \frac{x \times 130}{100} \\ \Rightarrow \frac{5x}{10} &= 108 \Rightarrow x = ₹ 216 \end{aligned}$$

Aliter : Using Rule 11,

Here, $x = 20\%$, $R = ₹ 108$, $y = 30\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y + x} \\ &= \frac{108 \times 100}{30 + 20} \\ &= \frac{10800}{50} = ₹ 216 \end{aligned}$$

14. (3) Let the C.P. be ₹ x
 $x(5\% + 5\%) = 5$ [Being 5% gain]

$$100\% = \frac{5}{10} \times 100 = ₹ 50$$

Aliter : Using Rule 11,
Here, $x = 5\%$, $R = ₹ 5$, $y = 5\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y + x} \\ &= \frac{5 \times 100}{5 + 5} = ₹ 50 \end{aligned}$$

15. (3) Let the C.P. of article be ₹ x , then

$$\begin{aligned} \frac{120x}{100} - \frac{115x}{100} &= 27 \\ \Rightarrow \frac{5x}{100} &= 27 \\ \Rightarrow x &= \frac{27 \times 100}{5} = ₹ 540 \end{aligned}$$

Aliter : Using Rule 11,
Here, $x = 15\%$, $R = ₹ 27$, $y = 20\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y - x} \\ &= \frac{27 \times 100}{20 - 15} \\ &= \frac{27 \times 100}{5} = ₹ 540 \end{aligned}$$

16. (3) C.P. of article be ₹ x
S.P. at 15% gain

$$\begin{aligned} &= \frac{115x}{100} = \frac{23x}{20} \\ \text{New C.P.} &= ₹ \frac{90x}{100} \\ \text{New S.P.} &= ₹ \frac{90x}{100} \times \frac{125}{100} = ₹ \frac{9x}{8} \\ \therefore \frac{23x}{20} - \frac{9x}{8} &= 4 \\ \Rightarrow \frac{46x - 45x}{40} &= 4 \\ \Rightarrow x &= 40 \times 4 = ₹ 160 \end{aligned}$$

17. (1) If the C.P. of article be ₹ x , then

$$\begin{aligned} \frac{105x}{100} - \frac{90x}{100} &= 90 \\ \Rightarrow \frac{15x}{100} &= 90 \Rightarrow x = \frac{90 \times 100}{15} \\ x &= ₹ 600 \end{aligned}$$

$$\begin{aligned} \therefore \text{Original S.P.} &= \frac{600 \times 90}{100} \\ &= ₹ 540 \end{aligned}$$

18. (2) C.P. of article = ₹ x

$$\therefore \text{First S.P.} = \frac{80x}{100} = ₹ \frac{4x}{5}$$

According to question,

$$\begin{aligned} \frac{4x}{5} + 200 &= \frac{105x}{100} = \frac{21x}{20} \\ \Rightarrow \frac{21x}{20} - \frac{4x}{5} &= 200 \\ \Rightarrow \frac{21x - 16x}{20} &= 200 \\ \Rightarrow \frac{5x}{20} &= 200 \Rightarrow x = 4 \times 200 \\ &= ₹ 800 \end{aligned}$$

Aliter : Using Rule 11,
Here, $x = 20\%$, $R = ₹ 200$, $y = 5\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y + x} \\ &= \frac{200 \times 100}{5 + 20} \\ &= \frac{20000}{25} = ₹ 800 \end{aligned}$$

19. (3) C.P. of the article be ₹ x

$$\therefore \text{First S.P.} = \frac{19x}{20}$$

$$\text{C.P.} = \frac{9x}{10}$$

$$\begin{aligned} \therefore \frac{19x}{20} + 33 &= \frac{9x}{10} \\ \Rightarrow \frac{9x \times 130}{1000} &= \frac{117}{100}x \\ \Rightarrow \frac{117x}{100} - \frac{19x}{20} &= 33 \\ \Rightarrow \frac{117x - 95x}{100} &= 33 \\ \Rightarrow 22x &= 33 \times 100 \\ \Rightarrow x &= \frac{33 \times 100}{22} = ₹ 150 \end{aligned}$$

PROFIT AND LOSS

20. (1) If the C.P. of article be ₹ x , then

$$x \times \frac{116}{100} + 200 = \frac{x \times 120}{100}$$

$$\Rightarrow x \times \frac{4}{100} = 200$$

$$\Rightarrow x = \frac{200 \times 100}{4} = ₹ 5000$$

Aliter : Using Rule 11,
Here, $x = 16\%$, $R = 200$, $y = 20\%$

$$\begin{aligned} \text{C.P.} &= \frac{R \times 100}{y - x} \\ &= \frac{200 \times 100}{20 - 16} = ₹ 5000 \end{aligned}$$

21. (4) Required S.P. of 150 pens.

$$= 150 \times 12 \times \frac{115}{100} = ₹ 2070$$

S.P. of first 50 pens

$$= \frac{50 \times 12 \times 110}{100} = ₹ 660$$

∴ Required S.P. of 100 pens
= $2070 - 660 = ₹ 1410$

C.P. of 100 pens = ₹ 1200

$$\therefore \text{Gain per cent} = \frac{210}{1200} \times 100$$

$$= \frac{35}{2} = 17\frac{1}{2}\%$$

22. (2) C.P. of 1 article = $\frac{1}{4} \times \frac{100}{96}$

$$= ₹ \frac{25}{96}$$

$$\therefore \text{C.P. of 3 articles} = ₹ \frac{75}{96}$$

$$\therefore \text{Gain} = 1 - \frac{75}{96} = \frac{96 - 75}{96}$$

$$= \frac{21}{96} = \frac{7}{32}$$

$$\therefore \text{Gain per cent} = \frac{\frac{7}{32}}{\frac{75}{96}} \times 100$$

$$= \frac{7}{32} \times \frac{96}{75} \times 100 = 28\%$$

23. (1) Let the C.P. of article be ₹ x .

$$\therefore \text{S.P.} = \frac{175x}{200}$$

New S.P.

$$= ₹ \left(\frac{7x}{8} + 51.80 \right)$$

$$\therefore \frac{175x}{200} + 51.8 = \frac{106}{100} \times x$$

$$\Rightarrow \frac{106x}{100} - \frac{175x}{200} = 51.8$$

$$\Rightarrow \frac{212x - 175x}{200} = 51.8$$

$$\Rightarrow 37x = 51.8 \times 200$$

$$\Rightarrow x = \frac{51.8 \times 200}{37} = ₹ 280$$

Aliter : Using Rule 11,

Here, $x = 12.5\%$,
 $R = ₹ 51.80$, $y = 6\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{51.80 \times 100}{12.5 + 6}$$

$$= \frac{5180}{18.5} = ₹ 280$$

24. (4) If the C.P. of watch be ₹ x , then

$$\text{First S.P.} = \frac{9x}{10}$$

$$\therefore \frac{105x}{100} - \frac{9x}{10} = 45$$

$$\Rightarrow \frac{105x - 90x}{100} = 45$$

$$\Rightarrow \frac{15x}{100} = 45$$

$$\Rightarrow x = \frac{45 \times 100}{15} = ₹ 300$$

$$\therefore \text{S.P.} = \frac{300 \times 9}{10} = ₹ 270$$

Aliter : Using Rule 11,

Here, $x = 10\%$, $R = ₹ 45$, $y = 5\%$

$$\text{C.P.} = \frac{R \times 100}{y + x}$$

$$= \frac{4500}{10 + 5}$$

$$= \frac{4500}{15} = 300$$

$$\Rightarrow \text{S.P.} = 300 - 300 \times \frac{10}{100}$$

$$\text{S.P.} = ₹ 270$$

25. (2) C.P. of T.V. for Yogita

$$= ₹ x \text{ (let)}$$

According to question,

$$x \times \frac{120}{100} \times \frac{110}{100} = 33000$$

$$\Rightarrow x = \frac{33000 \times 100 \times 100}{120 \times 110}$$

$$= ₹ 25000$$

Aliter : Using Rule 15,

Here, $r_1 = 20\%$, $r_2 = 10\%$

C.P. for Deepa = C.P. for Yogita

$$\left(1 + \frac{r_1}{100} \right) \left(1 + \frac{r_2}{100} \right)$$

$$33000 = \text{C.P. for Yogita}$$

$$\left(1 + \frac{20}{100} \right) \left(1 + \frac{10}{100} \right)$$

$$\text{C.P. for Yogita} =$$

$$\frac{33000 \times 100 \times 100}{120 \times 110}$$

$$= ₹ 25,000$$

26. (4) C.P. for A = Rs. x (let)

According to the question,

$$\frac{x \times 120}{100} \times \frac{75}{100} = P$$

$$\Rightarrow x = \frac{P \times 100 \times 100}{120 \times 75}$$

$$= \text{Rs. } \frac{10}{9}$$

Aliter : Using Rule 15,

Here, $r_1 = 20\%$, $r_2 = 25\%$ (Loss)

C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100} \right) \left(1 - \frac{r_2}{100} \right)$$

$$P = \text{C.P. for A}$$

$$\left(1 + \frac{20}{100} \right) \left(1 - \frac{25}{100} \right)$$

$$\text{C.P. for A} = \frac{P \times 100 \times 100}{120 \times 75}$$

$$= \frac{10P}{9}$$

- 27.** (3) Let C.P. of article be Rs. x .

According to the question,

$$625 - x = x - 545$$

$$\Rightarrow 2x = 625 + 545 = 1170$$

$$\Rightarrow x = \frac{1170}{2} = \text{Rs. } 585$$

\therefore Required S.P.

$$= \text{Rs. } (585 + 65)$$

$$= \text{Rs. } 650$$

- 28.** (4) C.P. of rice per kg

$$= \frac{54 \times 100}{90} = \text{Rs. } 60$$

For 20% profit,

S.P. per kg,

$$= \frac{60 \times 120}{100} = \text{Rs. } 72$$

Aliter : Using Rule 3,

$$\text{C.P.} = \text{S.P.} \left(\frac{100}{100 - \text{Loss}\%} \right)$$

$$= 54 \left(\frac{100}{100 - 10} \right)$$

$$\text{C.P.} = \text{Rs. } 60$$

New S.P.

$$= \text{C.P.} \left(\frac{100 + \text{Profit}\%}{100} \right)$$

$$= 60 \times \left(\frac{100 + 20}{100} \right) = ₹ 72$$

- 29.** (4) Let the quantity of sugar at 8% profit be x kg.

\therefore Quantity of sugar sold at 18%

$$= (100 - x) \text{ kg}$$

According to the question,

$$x \times \frac{108}{100} + (1000 - x) \times \frac{118}{100}$$

$$= \frac{1000 \times 114}{100}$$

$$\Rightarrow 108x + 118000 - 118x$$

$$= 114000$$

$$\Rightarrow 10x = 118000 - 114000$$

$$\Rightarrow 10x = 4000 \Rightarrow x = 400 \text{ kg}$$

- 30.** (1) C.P. of 12 kg of potatoes

$$= \text{Rs.} \left(\frac{63 \times 100}{105} \right)$$

$$= \text{Rs. } 60$$

\therefore C.P. of 50 kg of potatoes

$$= \frac{60}{12} \times 50 = \text{Rs. } 250$$

$$\text{Loss} = \text{Rs. } (250 - 247.50)$$

$$= \text{Rs. } 2.5$$

$$\therefore \text{Loss percent} = \frac{2.5}{250} \times 100$$

$$= 1\%$$

- 31.** (1) Let the C.P. of article be Rs. x .

According to the question,

$$\frac{x \times 105}{100} - \frac{x \times 80}{100} = 200$$

$$\Rightarrow 105x - 80x = 20000$$

$$\Rightarrow 25x = 20000$$

$$\Rightarrow x = \frac{20000}{25} = \text{Rs. } 800$$

Aliter : Using Rule 11,

Here, $x = 20\%$, $R = 200$, $y = 5\%$

$$\text{C.P.} = \frac{100 \times R}{y + x}$$

$$= \frac{100 \times 200}{20 + 5}$$

$$= \frac{100 \times 200}{25} = \text{Rs. } 800$$

- 32.** (1) C.P. of article sold at loss = Rs. x .

\therefore C.P. of article sold at profit = Rs. $(520 - x)$

According to the question,

$$x \times \frac{10}{100} = (520 - x) \times \frac{16}{100}$$

$$\Rightarrow 5x = 520 \times 8 - 8x$$

$$\Rightarrow 13x = 520 \times 8$$

$$\Rightarrow x = \frac{520 \times 8}{13} = \text{Rs. } 320$$

$$\therefore \text{Its S.P.} = \frac{320 \times 90}{100}$$

$$= \text{Rs. } 288$$

- 33.** (3) C.P. of article = Rs. x

$$\text{First S.P.} = \text{Rs.} \frac{9x}{10}$$

Case II,

$$\text{C.P.} = \frac{80x}{100} = \text{Rs.} \frac{4x}{5}$$

According to the question,

$$\frac{4x}{5} \times \frac{140}{100} - \frac{9x}{10} = 55$$

$$\Rightarrow \frac{56x}{50} - \frac{9x}{10} = 55$$

$$\Rightarrow \frac{56x - 45x}{50} = 55$$

$$\Rightarrow 11x = 50 \times 55$$

$$\Rightarrow x = \frac{50 \times 55}{11} = \text{Rs. } 250$$

- 34.** (1) Let the C.P. of television be Rs. x .

According to the question,

$$(10 - 5)\% \text{ of } x = 1000$$

$$\Rightarrow x \times \frac{5}{100} = 1000$$

$$\Rightarrow x = \frac{1000 \times 100}{5} = \text{Rs. } 20000$$

- 35.** (3) C.P. of watch = Rs. x (let)

Difference between selling prices = Rs. $(350 - 340)$

$$= \text{Rs. } 10$$

According to the question,

$$5\% \text{ of } x = 10$$

$$\Rightarrow \frac{5x}{100} = 10$$

$$\Rightarrow 5x = 1000$$

$$\Rightarrow x = \frac{1000}{5} = \text{Rs. } 200$$

- 36.** (3) Let the C.P. of bucket be Rs. x .

According to the question,

$$\frac{108x}{100} - \frac{92x}{100} = 28$$

$$\Rightarrow \frac{16x}{100} = 28$$

$$\Rightarrow x = \frac{28 \times 100}{16} = \text{Rs. } 175$$

TYPE-X

- 1.** (4) Let the cost price of the bicycle for A be ₹ x

Cost price for B = selling price for A = $1.20x$

Cost price for C = selling price for B = $(1.25)(1.20x) = 1.5x$

$$\text{But } 1.5x = 225$$

$$\therefore x = \frac{225}{1.5} = ₹ 150$$

\therefore The cost price of the bicycle for A = ₹ 150

Aliter : Using Rule 15,

Here, $r_1 = 20\%$, $r_2 = 25\%$

C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100} \right) \left(1 + \frac{r_2}{100} \right)$$

$$225 = \text{C.P. for A}$$

$$\left(1 + \frac{20}{100} \right) \left(1 + \frac{25}{100} \right)$$

$$\text{C.P. for A} = \frac{225 \times 100 \times 100}{120 \times 125}$$

$$= ₹ 150$$

PROFIT AND LOSS

2. (1) Let the actual C.P. be ₹ x

$$x \times \frac{125}{100} \times \frac{125}{100} \times \frac{125}{100} = 250$$

$$\Rightarrow x = ₹ 128$$

3. (3) SP for Mr. X

$$= 150000 \times \frac{105}{100} = ₹ 157500$$

CP for Mr. Y = ₹ 157500

Y sells the article to X at a loss of 2%.

∴ SP for Mr. Y

$$= 157500 \times \frac{98}{100} = ₹ 154350$$

∴ CP for Mr. X = ₹ 154350

∴ Gain of Mr. X

$$= ₹ (157500 - 154350)$$

$$= ₹ 3150$$

4. (3) Let the required cost price be ₹ x , then

$$x \times \frac{110}{100} \times \frac{120}{100} \times \frac{85}{100} = 56100$$

$$\Rightarrow x \times \frac{11}{10} \times \frac{6}{5} \times \frac{17}{20} = 56100$$

$$\Rightarrow x = \frac{56100 \times 10 \times 5 \times 20}{11 \times 6 \times 17}$$

$$= ₹ 50000$$

5. (2) If the C.P. for A be ₹ x , then

$$x \times \left(1 + \frac{1}{5}\right) \times \frac{120}{100} \times \left(1 - \frac{1}{6}\right) = 600$$

$$\Rightarrow x \times \frac{6}{5} \times \frac{6}{5} \times \frac{5}{6} = 600$$

$$\Rightarrow x = \frac{600 \times 5}{6} = ₹ 500$$

6. (1) Let the C.P. for A be ₹ x , then

$$x \times \frac{105}{100} \times \frac{110}{100} = 2310$$

$$\Rightarrow x = \frac{2310 \times 100 \times 100}{105 \times 110}$$

$$= ₹ 2000$$

Aliter : Using Rule 15,
Here, $r_1 = 5\%$, $r_2 = 10\%$
C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100}\right) \left(1 + \frac{r_2}{100}\right)$$

2310 = C.P. for A

$$\left(1 + \frac{5}{100}\right) \left(1 + \frac{10}{100}\right)$$

$$\text{C.P. for A} = \frac{2310 \times 100 \times 100}{105 \times 110} = 2000$$

7. (1) Let the C.P. of A be ₹ x , then

$$x \times \frac{110}{100} \times \frac{120}{100} = 264$$

$$\Rightarrow x = \frac{264 \times 100 \times 100}{110 \times 120}$$

$$= ₹ 200$$

Aliter : Using Rule 15,
Here, $r_1 = 10\%$, $r_2 = 20\%$
C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100}\right) \left(1 + \frac{r_2}{100}\right)$$

264 = C.P. for A

$$\left(1 + \frac{10}{100}\right) \left(1 + \frac{20}{100}\right)$$

$$\text{C.P. for A} = \frac{264 \times 100 \times 100}{110 \times 120}$$

$$= ₹ 200$$

8. (3) Let the C.P. of A be ₹ x , then

$$\frac{x \times 125}{100} \times \frac{90}{100} = 675$$

$$\Rightarrow x = \frac{675 \times 100 \times 100}{125 \times 90} = ₹ 600$$

Aliter : Using Rule 15,
Here, $r_1 = 25\%$, $r_2 = 10\%$, (Loss)
C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100}\right) \left(1 - \frac{r_2}{100}\right)$$

675 = C.P. for A

$$\left(1 + \frac{25}{100}\right) \left(1 - \frac{10}{100}\right)$$

$$\text{C.P. for A} = \frac{675 \times 100 \times 100}{125 \times 90}$$

$$= ₹ 600$$

9. (3) C.P. of tape recorder for A

$$= \frac{4860 \times 100}{(100 - 19)} = \frac{4860 \times 100}{81}$$

$$= ₹ 6000$$

$$\therefore \text{S.P. for B} = \frac{6000 \times 117}{100}$$

$$= ₹ 7020$$

$$\therefore \text{B's gain} = 7020 - 4860$$

$$= ₹ 2160$$

∴ Required profit percent

$$= \frac{2160}{4860} \times 100 = 44 \frac{4}{9} \%$$

10. (4) Let the original cost of the land be ₹ x

According to the question,

$$345600 = P \left(1 + \frac{20}{100}\right)^3$$

$$\Rightarrow 345600 = P \left(\frac{6}{5}\right)^3 = \frac{216P}{125}$$

$$\Rightarrow P = \frac{345600 \times 125}{216} = ₹ 200000$$

11. (4) Let the C.P. for A be ₹ x , then

$$x \times \frac{110}{100} \times \frac{105}{100} = 462$$

$$\Rightarrow x = \frac{462 \times 100 \times 100}{110 \times 105} = ₹ 400$$

Aliter : Using Rule 15,
Here, $r_1 = 10\%$, $r_2 = 5\%$
C.P. for C = C.P. for A

$$\left(1 + \frac{r_1}{100}\right) \left(1 + \frac{r_2}{100}\right)$$

462 = C.P. for A

$$\left(1 + \frac{10}{100}\right) \left(1 + \frac{5}{100}\right)$$

$$\text{C.P. for A} = \frac{462 \times 100 \times 100}{110 \times 105} = ₹ 400$$

12. (4) Using Rule 15,

Price obtained by C

$$= 3200 \times \frac{110}{100} \times \frac{215}{200} \times \frac{75}{100}$$

$$= ₹ 2838$$

13. (3) Using Rule 15,

Let C.P. for A be ₹ x

$$\therefore x \times \frac{120}{100} \times \frac{110}{100} \times \frac{225}{200} = 29.70$$

$$\Rightarrow x = \frac{29.70 \times 100 \times 100 \times 200}{120 \times 110 \times 225}$$

$$= ₹ 20$$

14. (3) Using Rule 15,

Let the C.P. of the suitcase for A be ₹ x , then

$$x \times \frac{110}{100} \times \frac{130}{100} = 2860$$

$$\Rightarrow x = \frac{2860 \times 100 \times 100}{110 \times 130}$$

$$= ₹ 2000$$

TYPE-XI

1. (3) Total S.P. = ₹ 2 lakhs
C.P. of house

$$= ₹ \left(\frac{100}{80} \times 1 \right) \text{ lakh}$$

$$= ₹ \frac{5}{4} \text{ lakhs}$$

C.P. of shop

$$= ₹ \left(\frac{100}{120} \times 1 \right) \text{ lakh}$$

$$= ₹ \frac{5}{6} \text{ lakh}$$

Total C.P.

$$= ₹ \left(\frac{5}{4} + \frac{5}{6} \right) \text{ lakhs}$$

$$= ₹ \frac{25}{12} \text{ lakhs}$$

$$\therefore \text{Loss} = ₹ \left(\frac{25}{12} - 2 \right) \text{ lakh}$$

$$= ₹ \frac{1}{12} \text{ lakh}$$

2. (4) Using Rule 10,
If a man sells two articles at same price and makes a profit of $x\%$ on first and $x\%$ loss on second,

there is always a loss of $\frac{x^2}{100}\%$

$$\therefore \text{Loss}\% = \frac{(20)^2}{100} = \frac{400}{100} = 4\%$$

3. (1) Using Rule 10,

$$\text{Loss \%} = x\% \text{ of } x \text{ or } \frac{x^2}{100}$$

Here, $x = 10$

$$\therefore \text{Loss}\% = \frac{10 \times 10}{100} = 1\%$$

4. (3) Using Rule 10,
Required loss%

$$= \frac{(20)^2}{100} = \frac{400}{100} = 4\%$$

$$\therefore (100 - 4)\% = 96\%$$

$$\therefore 4\% = \frac{24}{96} \times 4 = \text{Loss of ₹1}$$

5. (2) Using Rule 10,
Note : When S.P. of each of two items is same, on one of them there is $x\%$ loss and on the other there is $x\%$ gain, then there is

always a loss given by $(x\% \text{ of } x)\%$

$$= \frac{x^2}{100}\%$$

\therefore The required loss %

$$= \frac{10 \times 10}{100} = 1\%$$

6. (2) Using Rule 10,
Here, the S.P. is same for both the machines. Hence, there will be always a loss in this situation.
Required loss %

$$= \frac{10 \times 10}{100} = 1\%$$

7. (4) Using Rule 10,
Here, S.P. is same. Hence there is always a loss.

$$\text{Loss per cent} = \frac{20 \times 20}{100} = 4\%$$

8. (2) CP of Television

$$= \frac{12,000}{80} \times 100 = ₹ 15,000$$

CP of refrigerator

$$= \frac{12,000}{120} \times 100 = ₹ 10,000$$

Total C.P.

$$= 15,000 + 10,000 = ₹ 25,000$$

SP of both = ₹ 24,000

$$\therefore \text{Loss} = 25,000 - 24,000$$

$$= ₹ 1,000$$

9. (4) Let the amount of sugar sold at 7% profit be x kg. and let C.P. per kg be ₹1.

Total C.P. = ₹ 100

Total S.P. = 107% of x + 117% of $(100 - x)$

$$= 1.07x + 1.17(100 - x)$$

$$= 1.07x + 117 - 1.17x$$

$$= 117 - 0.1x$$

$$\therefore 117 - 0.1x$$

$$= 110\% \text{ of } 100$$

$$\Rightarrow 0.1x = 117 - 110 = 7$$

$$\Rightarrow x = \frac{7}{0.1} = 7 \times 10$$

$$= 70 \text{ kg.}$$

10. (1) If x and y be the cost price of two goats, then,
80% of x = 144% of y

$$\Rightarrow \frac{x}{y} = \frac{144}{80} = \frac{9}{5}$$

$$\text{i.e., } x : y = 9 : 5$$

$$\text{Sum of the ratios} = 9 + 5 = 14$$

\therefore Cost of first goat

$$= ₹ \left(\frac{9}{14} \times 1008 \right) = ₹ 648$$

11. (4) Using Rule 10,
In such a situation, there is always a loss.
The selling price is immaterial.
Loss %

$$= \left(\frac{\text{Common loss or gain}\%}{10} \right)^2$$

$$= \left(\frac{5}{10} \right)^2 \% = 0.25\%$$

12. (4) Using Rule 10,
Required loss %

$$= \frac{(20)^2}{100} = \frac{400}{100} = 4\%$$

13. (4) Using Rule 7,
Required per cent effect

$$= \left(20 - 25 - \frac{20 \times 25}{100} \right) \%$$

$$= (-5 - 5)\% = -10\% \text{ (10\% decrease)}$$

Negative sign shows decrease

14. (1) Total CP = ₹ 100

Total SP

$$= ₹ \left(\frac{50 \times 120}{100} + \frac{25 \times 80}{100} + 25 \right)$$

$$= ₹ (60 + 20 + 25) = ₹ 105$$

$$\therefore \text{Gain}\% = 5\%$$

$$\left[\frac{105 - 100}{100} \times 100 \right]$$

15. (1) Let the cost price of first watch which sold on 16 per cent be x .

Then cost price of second watch = $(840 - x)$

According to the question,

$$x \times \frac{116}{100} + (800 - x) \times \frac{88}{100} = 840$$

$$\Rightarrow \frac{116}{100} + \frac{73920 - 88x}{100} = 840$$

$$\Rightarrow 116x - 88x$$

$$= 84000 - 73920$$

$$\Rightarrow 28x = 10080$$

$$\therefore x = \frac{10080}{28} = ₹ 360$$

16. (3) Total SP = ₹ 240,000
CP of car

$$= ₹ \left(\frac{100}{80} \times 120,000 \right) = ₹ 150,000$$

$$\text{CP of jeep} = ₹ \left(\frac{100}{120} \times 120,000 \right)$$

$$= ₹ 1,00,000$$

$$\text{Total CP} = ₹ 250,000$$

$$\therefore \text{Loss} = ₹ (250,000 - 240,000)$$

$$= ₹ 10,000$$

- 17.** (1) Let the price of the sent items be x .

According to the question,

$$\frac{2x}{3} \times \frac{5}{100} - \frac{x}{3} \times \frac{2}{100} = 400$$

$$\Rightarrow \frac{10x}{3} - \frac{2x}{3} = 400 \times 100$$

$$\Rightarrow \frac{8x}{3} = 40000$$

$$\Rightarrow x = \frac{40000 \times 3}{8} = ₹ 15000$$

- 18.** (3) SP of total agricultural field

$$= ₹ \left(360000 \times \frac{110}{100} \right) = ₹ 396000$$

SP of one-third of the field

$$= \frac{1}{3} \times 360000 \times \frac{80}{100}$$

$$= ₹ 96000$$

SP of $\frac{2}{5}$ th of the field

$$= \frac{2}{5} \times 360000 \times \frac{125}{100}$$

$$= ₹ 180000$$

\therefore SP of the remaining field

$$= ₹ (396000 - 96000 - 180000)$$

$$= ₹ 120000$$

- 19.** (2) The sum of cost prices of two articles is x . One of them is sold at a loss of $a\%$ and other is sold at a gain of $b\%$ and their S.P. is same.

\therefore C.P. of article sold at a loss of $a\%$

$$= \frac{100 + b}{200 - a + b} \times x$$

$$= \frac{100 + 15}{200 - 20 + 15} \times 19500$$

$$= \frac{115}{195} \times 19500 = ₹ 11500$$

\Rightarrow C.P. of second article

$$= ₹ 8000$$

- 20.** (3) Let the CP of article A be ₹ x

\therefore CP of article B = ₹ $(5000 - x)$

According to the question,

$$120\% \text{ of } x + 90\% \text{ of } (5000 - x)$$

$$= 102\% \text{ of } 5000$$

$$\Rightarrow 120x + 450000 - 90x$$

$$= 510000$$

$$\Rightarrow 30x = 510000 - 450000$$

$$= 60000$$

$$\Rightarrow x = \frac{60000}{30} = ₹ 2000$$

- 21.** (4) Using Rule 10,

Here, both the articles are sold at the same price.

Hence, there is always loss.

\therefore Loss per cent

$$= \frac{25 \times 25}{100} = \frac{25}{4} = 6\frac{1}{4}\%$$

- 22.** (2) If the C.P. of horse be ₹ x , then

C.P. of carriage = ₹ $(40000 - x)$

Then,

$$\frac{110 \times x}{100} + \frac{(40000 - x) \times 95}{100}$$

$$= \frac{40000 \times 101}{100}$$

$$\Rightarrow 110x + 3800000 - 95x$$

$$= 4040000$$

$$\Rightarrow 15x = 4040000 - 3800000$$

$$\Rightarrow 15x = 240000$$

$$\Rightarrow x = \frac{240000}{15} = ₹ 16000$$

- 23.** (1) If the C.P. of first cycle be

₹ x , then C.P. of second cycle

= ₹ $(1600 - x)$. Then,

$$\frac{x \times 120}{100} + \frac{(1600 - x) \times 110}{100}$$

$$= \frac{x \times 110}{100} + \frac{(1600 - x) \times 120}{100} = 5$$

$$\Rightarrow 12x + 17600 - 11x - 11x - 19200 + 12x = 50$$

$$\Rightarrow 2x = 50 + 19200 - 17600$$

$$\Rightarrow 2x = 1650 \Rightarrow x = 825$$

C.P. of second cycle

$$= 1600 - 825 = ₹ 775$$

$$\text{Difference} = 825 - 775 = ₹ 50$$

- 24.** (3) C.P. of article be ₹ x

$$\therefore (118 - 115)\% \text{ of } x = 18$$

$$\Rightarrow \frac{x \times 3}{100} = 18$$

$$\Rightarrow x = \frac{18 \times 100}{3} = ₹ 600$$

$$\Rightarrow x = \frac{18 \times 100}{3} = ₹ 600$$

Aliter : Using Rule 11,

Here, $x = 15\%$, $R = 18$, $y = 18\%$

$$\text{C.P.} = \frac{R \times 100}{y - x}$$

$$= \frac{18 \times 100}{18 - 15} = ₹ 600$$

- 25.** (3) Check through option

10% of 3000

$$= \frac{3000 \times 10}{100} = ₹ 300$$

15% of 2000

$$= \frac{2000 \times 15}{100} = ₹ 300$$

- 26.** (3) Let the merchant bought 100

metres of cloth for ₹ 100.

\therefore Total S.P.

$$= ₹ \left(\frac{50 \times 140}{100} + \frac{25 \times 60}{100} + 25 \right)$$

$$= ₹ (70 + 15 + 25) = ₹ 110$$

$$\therefore \text{Gain per cent} = 10\%$$

- 27.** (2) C.P. of first chair

$$= \frac{100}{125} \times 120 = ₹ 96$$

C.P. of second chair

$$= \frac{100}{75} \times 120 = ₹ 160$$

$$\therefore \text{Loss} = 160 + 96 - 240$$

$$= ₹ 16$$

- 28.** (3) Let the C.P. of fans be ₹ x and ₹ y respectively.

$$\frac{x \times 15}{100} = \frac{y \times 9}{100}$$

$$\Rightarrow \frac{x}{y} = \frac{9}{15} = \frac{3}{5}$$

$$\text{C.P. of first fan} = \frac{3}{8} \times 2160$$

$$= ₹ 810$$

$$\& \text{ C.P. of second fan} = \frac{5}{8} \times 2160$$

$$= ₹ 1350$$

- 29.** (2) S.P. of TV = $2000 \times \frac{120}{100}$

$$= ₹ 2400$$

$$\text{S.P. of radio} = \frac{750 \times 95}{100}$$

$$= ₹ 712.5$$

$$\text{Total S.P.} = 2400 + 712.5$$

$$= ₹ 3112.50$$

$$\therefore \text{Gain} = 3112.5 - 2000 - 750$$

$$= ₹ 362.50$$

- 30.** (1) For the sake of convenience, Let the number of toffees of each type

bought be 99 (LCM 11 and 9).

CP of first kind of 99 toffees

$$= ₹ 90$$

CP of second kind of 99 toffees

$$= ₹ 110$$

$$\therefore \text{CP of 198 toffees} = ₹ 200$$

$$\therefore \text{SP of 198 toffees} = ₹ 198$$

$$\text{Loss} = ₹. 2$$

$$\text{Loss \%} = \frac{2}{200} \times 100 = 1\%$$

- 31.** (1) Let 20 apples of each type be

bought.

C.P. of an apple of first type

$$= ₹ \frac{10}{4}$$

C.P. of an apple of second type

$$= ₹ \frac{10}{5}$$

C.P. of 40 apples

$$= ₹ \left(20 \times \frac{10}{4} + 20 \times \frac{10}{5} \right) = ₹ 90$$

$$\text{Total S.P.} = \frac{40 \times 20}{9} = ₹ \frac{800}{9}$$

$$\text{Loss} = 90 - \frac{800}{9} = \frac{10}{9}$$

$$\therefore \text{Loss per cent} = \frac{\frac{10}{9}}{90} \times 100$$

$$= \frac{100}{81} = 1\frac{19}{81}\%$$

- 32.** (1) C.P. of 700 gm of tea at ₹18 per 100 gm

$$= 7 \times 18 = ₹ 126$$

C.P. of 300 gm of tea at ₹ 13 per 100 gm

$$= 3 \times 13 = ₹ 39$$

Total cost of 1000 gm

$$= 126 + 39 = ₹ 165$$

Total S.P. of 1000 gm

$$= 18.15 \times 10 = ₹ 181.5$$

$$\text{Gain} = 181.5 - 165 = ₹ 16.5$$

Gain percent

$$= \frac{16.5}{165} \times 100 = 10\%$$

- 33.** (1) Total CP of 70 kg of wheat

$$= ₹ (30 \times 9.5 + 40 \times 8.5)$$

$$= ₹ (285 + 340) = ₹ 625$$

Total S.P. of 70kg of wheat

$$= ₹ (8.90 \times 70) = ₹ 623$$

$$\therefore \text{Loss} = ₹ (625 - 623) = ₹ 2$$

- 34.** (4) Let 10 articles of each kind be bought.

\therefore Total cost

$$= ₹ (10 \times 10 + 14 \times 10) = ₹ 240$$

Total selling price

$$= 13 \times 20 = ₹ 260$$

\therefore Gain percent

$$= \frac{260 - 240}{240} \times 100$$

$$= \frac{20 \times 100}{240} = 8\frac{1}{3}\%$$

- 35.** (4) C.P. of 40kg of mixture

$$= ₹ (15 \times 29 + 25 \times 20)$$

$$= ₹ (435 + 500) = ₹ 935$$

S.P. of 40kg of mixture

$$= 27 \times 40 = ₹ 1080$$

$$\therefore \text{Gain} = 1080 - 935 = ₹ 145$$

- 36.** (2) Let total C.P. = ₹ 100 and number of articles = 100.

\therefore Total S.P.

$$= ₹ \left(\frac{75 \times 124}{100} + 25 \right)$$

$$= ₹ (93 + 25) = ₹ 118$$

$$\therefore \text{Gain per cent} = 18\%$$

- 37.** (1) Using Rule 1,

Profit per cent

$$= \frac{30 - 25}{25} \times 100$$

$$= \frac{500}{25} = 20\%$$

- 38.** (3) Let the C.P. of chair be Rs. x .

\therefore C.P. of table = Rs. $(500 - x)$

According to the question,

$$\frac{110x}{100} + (500 - x) \times \frac{90}{100} = 510$$

$$\Rightarrow \frac{11x}{10} + 500 \times \frac{9}{10} - \frac{9x}{10} = 510$$

$$\Rightarrow \frac{2x}{10} + 450 = 510$$

$$\Rightarrow \frac{2x}{10} = 510 - 450 = 60$$

$$\Rightarrow x = \frac{60 \times 10}{2} = \text{Rs. } 300$$

OR

$$10\% \text{ of } x - (500 - x) \times \frac{10}{100} = 10$$

$$\Rightarrow \frac{x}{10} - 50 + \frac{x}{10} = 10$$

$$\Rightarrow \frac{2x}{10} = 50 + 10 = 60$$

$$\Rightarrow 2x = 60 \times 10$$

$$\Rightarrow x = \frac{60 \times 10}{2} = \text{Rs. } 300$$

- 39.** (2) Total profit in sales

$$= \text{Rs. } \left(\frac{750 \times 6}{100} - \frac{750 \times 4}{100} \right)$$

$$= \text{Rs. } (45 - 30) = \text{Rs. } 15$$

$$\left[\text{or, Profit} = (6 - 4)\% \text{ of } 750 \right]$$

$$= \frac{750 \times 2}{100} = \text{Rs. } 15$$

$$\therefore \text{Profit per cent} = \frac{15}{1500} \times 100$$

$$= 1\%$$

- 40.** (3) At the rate of 50 paise per metre,

C.P. of 250 metre of wire

$$= \text{Rs. } \left(\frac{250 \times 50}{100} \right)$$

$$= \text{Rs. } 125$$

C.P. of 500 metre of wire

$$= \text{Rs. } 250$$

\therefore For 10% overall profit,

$$\text{Total S.P.} = \text{Rs. } \left(\frac{250 \times 110}{100} \right)$$

$$= \text{Rs. } 275$$

S.P. of 250 metre of wire

$$= \text{Rs. } \left(\frac{125 \times 105}{100} \right)$$

$$= \text{Rs. } 131.25$$

\therefore S.P. of remaining 250 metre wire

$$= \text{Rs. } (275 - 131.25)$$

$$= \text{Rs. } 143.75$$

\therefore Required profit per cent

$$= \left(\frac{143.75 - 125}{125} \right) \times 100$$

$$= \frac{18.75 \times 100}{125} = 15\%$$

- 41.** (1) Let C.P. of all goods be Rs. 300.

\therefore S.P. of one third goods = Rs. 85

Required S.P. of all the goods

$$= \frac{300 \times 110}{100} = \text{Rs. } 330$$

\therefore S.P. of goods of worth Rs. 200

$$= \text{Rs. } (330 - 85) = \text{Rs. } 245$$

\therefore Required profit per cent

$$= \frac{45}{200} \times 100$$

$$= \frac{45}{2} = 22\frac{1}{2}\%$$

TYPE-XII

- 1.** (4) Let the CP of the article be x .

$$\therefore \frac{115x}{100} - \frac{110x}{100} = 10$$

$$\Rightarrow \frac{5x}{100} = 10$$

$$\Rightarrow x = \frac{10 \times 100}{5} = ₹ 200$$

- 2.** (2) Using Rule 3,

$$\frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100 = 25 \text{ [given]}$$

$$\Rightarrow \frac{210}{\text{C.P.}} \times 100 = 25$$

$$\Rightarrow \text{CP} = \frac{100 \times 210}{25} = 840$$

$$\therefore \text{S.P.} = \frac{125}{100} \text{ of } 840$$

$$= \frac{840 \times 125}{100} = ₹ 1050$$

- 3.** (2) If the cost price of article be x , then

$$2\% \text{ of } x = 3$$

$$\Rightarrow x = \frac{3 \times 100}{2} = ₹ 150$$

- 4.** (3) Let the C.P. of article be Rs. x .

According to the question,

$$(104 - 103)\% \text{ of } x = 3$$

$$\Rightarrow \frac{x}{100} = 3 \Rightarrow x = \text{Rs. } 300$$

5. (2) Profit per cent at C.P.

$$= \frac{\text{Profit}}{\text{Cost Price}} \times 100$$

$$= \frac{100}{400} \times 100 = 25\%$$

Profit per cent at S.P.

$$= \frac{\text{Profit}}{\text{S.P.}} \times 100$$

$$= \frac{100}{500} \times 100 = 20\%$$

$$\therefore \text{Required difference}$$

$$= 25 - 20 = 5\%$$

TYPE-XIII

1. (2) Selling price = $405 \times 110\%$
 $= ₹ 445.50$
 Remaining apples = $10 - 1 = 9$ kg
 Therefore, the remaining apples (per kg) cost
 $= \frac{445.50}{9} = ₹ 49.50$

2. (2) Due to fall in price, there is a saving of 20% of ₹ 100 i.e., ₹ 20. With this amount the purchaser purchases 4 kg. of salt.
 \therefore Reduced price of salt per kg
 $= \frac{20}{4} = ₹ 5$

3. (2) Let the original price = x per dozen
 New price
 $= (x - 4)$ per dozen
 Original number of pins
 $= \frac{48}{x}$ dozens
 New number of pins
 $= \frac{48}{x-4}$ dozens

According to the question,

$$\frac{48}{x-4} - \frac{48}{x} = 1$$

$$\Rightarrow 48 \left(\frac{x-x+4}{x(x-4)} \right) = 1$$

$$\Rightarrow x(x-4) = 48 \times 4$$

$$\Rightarrow x^2 - 4x - 192 = 0$$

$$\Rightarrow x^2 - 16x + 12x - 192 = 0$$

$$\Rightarrow x(x-16) + 12(x-16) = 0$$

$$\Rightarrow (x-16)(x+12) = 0$$

$$\Rightarrow x = 16, \text{ because the price of pins can not be negative.}$$

$$\therefore x \neq -12$$

$$\therefore \text{New price} = 16 - 4$$

$$= ₹ 12 \text{ per dozen}$$

4. (3) Let the C.P. of article be x .
 $\therefore 105\%$ of $x - 80\%$ of $x = 100$
 $\Rightarrow 25\%$ of $x = 100$

$$\Rightarrow x = \frac{100 \times 100}{25} = ₹ 400$$

5. (1) Cost of 2 erasers
 $= 25\%$ of 1

$$= \frac{25}{100} \times 1 = ₹ \frac{1}{4}$$

$$\Rightarrow \text{Cost of one eraser} = ₹ \frac{1}{8}$$

\therefore 8 erasers will be available for ₹ 1

6. (2) Let the original rate = x per kg.
 New rate = 85% of x

$$= \frac{85x}{100} = \frac{17x}{20}$$

Original quantity for ₹ 240

$$= \frac{240}{x}$$

$$\text{New quantity} = 240 \times \frac{20}{17x} = \frac{4800}{17x}$$

$$\therefore \frac{4800}{17x} - \frac{240}{x} = 2$$

$$\Rightarrow \frac{4800 - 4080}{17x} = 2$$

$$\Rightarrow \frac{720}{17x} = 2 \Rightarrow x = \frac{720}{2 \times 17}$$

$$\therefore \text{Original rate per kg} = ₹ \frac{720}{34}$$

$$\therefore \text{Reduced rate} = ₹ \frac{17x}{20}$$

$$= ₹ \left(\frac{17}{20} \times \frac{720}{34} \right) = ₹ 18$$

7. (4) Let the original price of 1 mango be x .

New rate = 120% of x

$$= \frac{6x}{5}$$

Number of mangoes bought in ₹

$$40 = \frac{40}{x}$$

$$\text{New quantity} = \frac{40 \times 5}{6x} = \frac{100}{3x}$$

$$\therefore \frac{40}{x} - \frac{100}{3x} = 4$$

$$\Rightarrow \frac{120 - 100}{3x} = 4 \Rightarrow \frac{20}{3x} = 4$$

$$\Rightarrow 3x = 5 \Rightarrow x = ₹ \frac{5}{3}$$

\therefore Price of 15 mangoes before

$$\text{increase} = \frac{5}{3} \times 15 = ₹ 25$$

8. (2) If the C.P. of article be ₹ x , then

$$x \times \left(105 - \frac{195}{2} \right) \% = 12$$

$$\Rightarrow x \times \frac{15}{200} = 12 \Rightarrow x = \frac{12 \times 200}{15}$$

$$= ₹ 160$$

9. (1) Required profit percent

$$= \left(x + y + \frac{xy}{100} \right) \%$$

by Here, $x = 25\%$

$$y = -\frac{25}{2} \%$$

$$= \left(25 - \frac{25}{2} - \frac{25 \times 25}{200} \right) \%$$

$$= \left(\frac{25}{2} - \frac{25}{8} \right) \%$$

$$= \left(\frac{100 - 25}{8} \right) \%$$

$$= \frac{75}{8} \% = 9 \frac{3}{8} \%$$

10. (3) Let the cost price of fan be Rs. x .

According to the question,

$$10\% \text{ of } x = 1250 - 1000$$

$$\Rightarrow \frac{x \times 10}{100} = 250$$

$$\Rightarrow x = \frac{250 \times 100}{10} = \text{Rs. } 2500$$

Note : Here, increase in loss should be 10%.

11. (2) Cost of production of article = Rs. 100 (let)

$$\therefore \text{S.P.} = \text{Rs. } 133$$

New cost of production = Rs. 112

$$\therefore \text{S.P.} = \frac{133 \times 110}{100}$$

$$= \text{Rs. } 146.30$$

\therefore Profit per cent

$$= \left(\frac{146.3 - 112}{112} \right) \times 100$$

$$= \frac{34.3 \times 100}{112} = \frac{3430}{112}$$

$$= \frac{245}{8} = 30 \frac{5}{8} \%$$

12. (3) Original price of rice = Rs. x per kg.

New price

$$= \frac{80x}{100} = \text{Rs. } \frac{4x}{5} \text{ per kg}$$

According to the question,

$$\frac{1200}{\frac{4x}{5}} - \frac{1200}{x} = 5$$

$$\Rightarrow \frac{1200 \times 5}{4x} - \frac{1200}{x} = 5$$

$$\Rightarrow \frac{1500}{x} - \frac{1200}{x} = 5$$

$$\Rightarrow \frac{300}{x} = 5 \Rightarrow 5x = 300$$

$$\Rightarrow x = \frac{300}{5} = \text{Rs. 60 per kg}$$

\therefore New price of rice

$$= \text{Rs. } \left(\frac{4 \times 60}{5} \right) \text{ per kg}$$

$$= \text{Rs. 48 per kg}$$

TYPE-XIV

- (1) Let the cost price of article be x .
 $\therefore 80\% \text{ of } x = 480$
 $\therefore x = \left(\frac{480 \times 100}{80} \right) = ₹ 600$
 \therefore S.P. for 20% profit
 $= ₹ \left(\frac{600 \times 120}{100} \right) = ₹ 720$
- (4) Let the C.P. be ₹ 100
 $\therefore \text{C.P.} - \text{S.P.} = \frac{1}{5} \text{ S.P.}$
 $\Rightarrow 100 = \left(1 + \frac{1}{5} \right) \text{ S.P.}$
 $\Rightarrow 100 = \frac{6}{5} \times \text{S.P.}$
 $\Rightarrow \text{S.P.} = \frac{100 \times 5}{6} = \frac{250}{3}$
 $\therefore \text{Loss \%} = \frac{100 - \frac{250}{3}}{100} \times 100$
 $= \frac{50}{3} \%$
- (2) Let the cost price of each toy be x
 \therefore Cost price of 4 toys
 $=$ Selling price of 3 toys $= 4x$
 \therefore Selling price of 4 toys
 $= \frac{4}{3} \times 4x = \frac{16}{3}x$
 $\therefore \text{profit} = \frac{\frac{16}{3}x - 4x}{4x} \times 100$

$$= \left(\frac{16}{3} - 4 \right) \times 25\%$$

$$= \frac{4}{3} \times 25\% = \frac{100}{3}\% = 33\frac{1}{3}\%$$

4. (3) Cost price of house for Y

$$= \frac{105}{100} \times 150000 = ₹ 157500$$

S.P. of house for Y

$$= \frac{98}{100} \times \text{Rs. 157500} = ₹ 154350$$

- \therefore Gain for X
- $$= ₹ (157500 - 154350)$$
- $$= ₹ 3150$$
5. (1) Cost price of a book
- $$= \frac{12000}{200} = ₹ 60$$
- \therefore Total profit $= ₹ 60 \times 20$
- $$= ₹ 1200$$
- \therefore Profit per cent
- $$= \frac{1200}{12000} \times 100 = 10\%$$
6. (4) Let the C.P. of table be x
 \therefore According to the question
- $$\left(\frac{x - 350}{x} - \frac{x - 400}{x} \right) \times 100 = 5$$
- $$\Rightarrow \frac{x - 350 - x + 400}{x} \times 100 = 5$$
- $$\therefore x = \frac{50 \times 100}{5} = ₹ 1000$$
- $\therefore 5\% \text{ of C.P.} = ₹ 50$
- $\therefore \text{C.P.} = \frac{50 \times 100}{50} = ₹ 1000$
7. (4) Let the C.P. be x
- $$\therefore \text{S.P.} = \frac{8}{5}x$$
- $$\therefore \text{Gain} = \frac{8x - 5x}{5} = \frac{3x}{5}$$
- Now, Gain $\% = \frac{\frac{3x}{5}}{x} \times 100$
- $$= \frac{3}{5} \times 100 = 60\%$$
8. (3) Let the C.P. of the jewel be ₹ 100
 S.P. for the first person $= ₹ 120$
 S.P. for the second person
- $$= ₹ 120 \times \frac{125}{100} = ₹ 150$$

Now, let the profit earned by the third person be $x\%$

- $$\therefore 150 \times \frac{100 + x}{100} = 165$$
- $$\Rightarrow 100 + x = \frac{165 \times 10}{15} = 110$$
- $$\Rightarrow x = 110 - 100 = 10\%$$
9. (2) Let the cost price be ₹ 100.
 \therefore Marked price $= ₹ (100 + 15\% \text{ of } 100) = ₹ 115$
 The goods are sold at the discount of 12%.
 $\therefore \text{S.P.} = (115 - 12\% \text{ of } 115)$
 $= ₹ (115 - 13.80) = ₹ 101.20$
 Profit $= ₹ (101.20 - 100)$
 $= ₹ 1.20$
 $\therefore \text{Profit \%} = \frac{1.20}{100} \times 100 = 1.2\%$
 $= 1\frac{2}{10} = 1\frac{1}{5}\%$
10. (3) Suppose CP of table be x
- $$\text{SP} = \frac{x \times 110}{100} = \frac{11x}{10}$$
- CP at 5% less
- $$= \frac{x \times 95}{100} = \frac{19x}{20}$$
- According to question
- $$\frac{19x}{20} \times \frac{120}{100} = \frac{11x}{10} + 80$$
- $$\Rightarrow \frac{57x}{50} - \frac{11x}{10} = 80$$
- $$\Rightarrow \frac{2x}{50} = 80$$
- $$\Rightarrow x = \frac{80 \times 50}{2} = ₹ 2000$$
11. (2) Required per cent increase
- $$= \frac{10}{90} \times 100 = 11\frac{1}{9}\%$$
12. (4) Let 10 quintals of rice be bought.
 \therefore Actual C.P. of 8kg of rice
 $= 650 \times 10 = ₹ 6500$
 \therefore Required S.P.
 $= \frac{6500 \times 120}{100} = ₹ 7800$
 $\therefore \text{Rate of selling} = \frac{7800}{8} = ₹ 975$

PROFIT AND LOSS

13. (3) Let the cost price be x

\therefore Gain % = $x\%$

\therefore S.P. = C.P. + $x\%$ of C.P.

$$\Rightarrow 75 = x + \frac{x^2}{100}$$

$$\Rightarrow x^2 + 100x - 7500 = 0$$

$$\Rightarrow x^2 + 150x - 50x - 7500 = 0$$

$$\Rightarrow x(x + 150) - 50(x + 150) = 0$$

$$\Rightarrow (x + 150)(x - 50) = 0$$

$$\Rightarrow x = ₹ 50$$

[as x cannot be negative]

14. (2) Let the cost price be x .

\therefore 125% of x - 120% of x = 35

$$\Rightarrow 5\% \text{ of } x = 35$$

$$\therefore x = ₹ \frac{35 \times 100}{5} = ₹ 700$$

15. (2) Let the CP be ₹ 100.

\therefore SP = ₹ 120

New SP = ₹ 240

Profit = ₹ (240 - 100) = ₹ 140

$$\therefore \text{Profit \%} = \frac{140}{100} \times 100 = 140\%$$

16. (3) Let the advertised price be ₹ 100.

\therefore S.P. = ₹ 90, Profit = 20%

$$\therefore \text{C.P.} = ₹ \left(90 \times \frac{100}{120} \right) = ₹ 75$$

Profit = ₹ (90 - 75) = ₹ 15

Since for a profit of ₹ 15, the advertised price = ₹ 100

\therefore For a profit of ₹ 7500, the advertised price

$$= ₹ \frac{100 \times 7500}{15} = ₹ 50000$$

17. (3) Let the C.P. of article be x .

According to the question,

$$\left(100 + \frac{25}{2} \right) \% \text{ of } x - \left(100 - \frac{25}{2} \right) \% \text{ of } x = 13$$

$$\Rightarrow \frac{x}{100} \left(100 + \frac{25}{2} - 100 + \frac{25}{2} \right) = 13$$

$$\Rightarrow \frac{x}{100} \times 25 = 13$$

$$\Rightarrow x = 13 \times 4 = ₹ 52$$

18. (4) Difference of SP

$$= ₹ (400 - 350) = ₹ 50$$

Now, 50 = 5% of CP

$$\Rightarrow \text{CP} = \frac{50 \times 100}{5} = ₹ 1000$$

19. (2) Let the C.P. be x

According to the question,

$$\frac{x - 50}{x} \times 100 = \frac{70 - x}{x} \times 100$$

$$\Rightarrow x - 50 = 70 - x$$

$$\Rightarrow 2x = 120 \Rightarrow x = \frac{120}{2} = 60$$

$$\therefore \text{Loss \%} = \frac{60 - 50}{60} \times 100$$

$$= \frac{50}{3} = 16\frac{2}{3} \%$$

20. (3) Let the C.P. of article = x

According to the question,

$$\frac{105x}{100} - \frac{95x}{100} = 5$$

$$\Rightarrow 105x - 95x = 500$$

$$\Rightarrow 10x = 500$$

$$\Rightarrow x = \frac{500}{10} = ₹ 50$$

21. (4) Let marked price be x

$$\therefore \text{C.P.} = \frac{13}{15}x$$

$$\text{S.P.} = \frac{112x}{100}$$

$$\therefore \text{Profit} = \left(\frac{112x}{100} - \frac{13x}{15} \right)$$

$$= \left(\frac{336x - 260x}{300} \right) = \frac{76x}{300}$$

\therefore Profit %

$$= \frac{76x}{300} \times \frac{15}{13x} \times 100$$

$$= \frac{380}{13} = 29\frac{3}{13} \%$$

22. (1) Let the profit per cent made by the second person be x .

$$\therefore 38 = \left(x + 20 + \frac{20x}{100} \right) \%$$

$$\Rightarrow 38 = x + 20 + \frac{x}{5}$$

$$\Rightarrow \frac{6x}{5} = 38 - 20$$

$$\Rightarrow x = \frac{18 \times 5}{6} = 15\%$$

23. (3) Production cost

$$= 1265 \times \frac{100}{125} \times \frac{100}{115} \times \frac{100}{110}$$

$$= ₹ 800$$

24. (3) Gain percent

$$= \left(\frac{110}{100} \times 110 - 100 \right) \%$$

$$= (121 - 100)\% = 21 \text{ per cent}$$

25. (1) By selling 100 pencils, shop-keeper gains the SP of 20 pencils.

Clearly, CP of 100 pencils

= SP of 80 pencils

Let CP of each pencil = ₹ 1.

CP of 80 pencils = ₹ 80

SP of 80 pencils = ₹ 100

\therefore Gain per cent

$$= \frac{20}{80} \times 100 = 25\%$$

Aliter : Using Rule 9,

Here, $x = 100$, $y = 20$

$$\text{Profit \%} = \frac{y \times 100}{x - y}$$

$$= \frac{20 \times 100}{100 - 20}$$

$$= \frac{20 \times 100}{80} = 25\%$$

26. (3) Let 100 articles be sold and the CP of each article be ₹ 1.

\therefore SP. of 75 articles

$$= ₹ \left(\frac{120}{100} \times 75 \right) = ₹ 90$$

Profit = ₹ (90 - 75) = ₹ 15

$$\therefore \text{Profit per cent} = \frac{15}{100} \times 100$$

$$= 15\%$$

27. (2) 15% of CP of article = ₹ 3

\therefore CP of the article

$$= \frac{3 \times 100}{15} = ₹ 20$$

28. (3) For the first trader,

Let the CP of the article be 100

\therefore SP = ₹ 120

For the second trader,

SP of the article = ₹ 120

Gain = 20%

Let the CP be x .

$$\therefore \frac{120 - x}{120} \times 100 = 20$$

$$\Rightarrow 120 - x = 20 \times \frac{6}{5} = 24$$

$$\Rightarrow x = 120 - 24 = ₹ 96$$

\therefore Gain = ₹ 24

Difference of Gain = 24 - 20

$$= ₹ 4$$

∴ If the difference of gains be ₹ 4, then SP = ₹. 120
∴ When the difference be ₹ 85,

$$SP = \frac{120}{4} \times 85 = ₹ 2550$$

29. (2) Let the CP of the article for A be ₹ 100
∴ CP for B = ₹ 110
Again CP for A

$$= 110 \times \frac{90}{100} = ₹ 99$$

Gain of A = 110 - 99 = ₹ 11
or 11%

30. (3) Let the CP of the article be Rs. 100 and its SP be x

$$\frac{100 - x}{100} \times 100$$

$$= \frac{2x - 100}{100} \times 100$$

$$\Rightarrow 100 - x = 2x - 100$$

$$\Rightarrow 3x = 200 \Rightarrow x = \frac{200}{3}$$

$$\therefore \text{Loss\%} = 100 - \frac{200}{3}$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

[because CP of the article = ₹ 100]

31. (1) Loss% = $\frac{10 \times 10}{100} = 1\%$

32. (3) Let the CP of the article be x and SP be y.

According to the question,

$$y - x = \frac{20y}{100}$$

$$\Rightarrow y - \frac{y}{5} = x$$

$$\Rightarrow 4y = 5x \quad \dots (i)$$

$$\text{Actual profit \%} = \frac{y - x}{x} \times 100$$

$$= \frac{4y - 4x}{4x} \times 100 = \frac{5x - 4x}{4x} \times 100$$

$$= 25\%$$

33. (1) Let CP of each TV be x.
According to the question,
 $2(x - 9400) = 10600 - x$
 $\Rightarrow 2x - 18800 = 10600 - x$
 $\Rightarrow 3x = 10600 + 18800$
 $= 29400$

$$\Rightarrow x = \frac{29400}{3} = ₹ 9800$$

34. (2) Tricky approach

C.P. of bicycle

$$= \frac{100}{114} \times 2850 = ₹ 2500$$

S.P. for a profit of 8%

$$= \frac{108}{100} \times 2500 = ₹ 2700$$

35. (3) $\frac{S.P. - C.P.}{S.P.} \times 100 = 20$

$$\Rightarrow 5. S.P. - 5. C.P. = S.P.$$

$$\Rightarrow 4. S.P. = 5. C.P.$$

∴ Required percentage

$$= \frac{5 - 4}{4} \times 100 = 25\%$$

36. (4) If cost price be x and selling price be y, then

$$\text{Profit \%} = \left(\frac{y - x}{x} \right) \times 100$$

$$= \left(\frac{y}{x} - 1 \right) \times 100$$

$$\text{Selling price} = \frac{2y}{5}$$

$$\text{Loss} = \left(x - \frac{2y}{5} \right)$$

$$\therefore \frac{x - \frac{2y}{5}}{x} \times 100 = 10$$

$$\Rightarrow 10x - 4y = x$$

$$\Rightarrow 9x = 4y$$

$$\Rightarrow \frac{y}{x} = \frac{9}{4}$$

∴ Initial profit percent

$$= \left(\frac{9}{4} - 1 \right) \times 100 = 125\%$$

Method 2 :

Shorter way is to go through options

From the given alternatives (4),

Gain = 125%

If C.P. = ₹100 then

original S.P. = ₹ 225

New S.P. = ₹ 90

Loss% = 10

37. (4) S.P. of first article = ₹ 4,000
gain % of first article = 25%
∴ C.P. of first article

$$= 4,000 \times \frac{100}{125} = ₹ 3200$$

∴ Loss on second article
= 4000 - 3200 = ₹ 800
Now C.P. of second article
= 4000 + 800 = ₹ 4800
& S.P. of second article = ₹ 4000
∴ Loss of second article
= 4800 - 400 = ₹ 800

$$\therefore \text{Loss \%} = \frac{800 \times 100}{4800} = \frac{50}{3}$$

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

38. (3) Actual gain percent

$$= \left(5 + 5 + \frac{5 \times 5}{100} \right) \% = 10.25\%$$

39. (2) CP of first article

$$= 5000 \times \frac{100}{125} = ₹ 4000$$

∴ Loss on second article = ₹ 1000

∴ CP of second article = ₹ 6000

∴ If the loss percent be x%, then

$$\frac{6000 \times x}{100} = 1000$$

$$\Rightarrow x = \frac{50}{3} = 16\frac{2}{3}\%$$

40. (2) Let the S.P. of 60 articles be x.

$$\therefore \text{S.P. of 15 articles} = \frac{x}{4}$$

∴ C.P. of 60 articles

$$= x - \frac{x}{4} = \frac{3x}{4}$$

$$\therefore \text{Gain \%} = \frac{x}{4} \times \frac{4}{3x} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

Aliter : Using Rule 9,

Here, x = 60, y = 15

$$\text{Gain\%} = \frac{y \times 100}{x - y}$$

$$= \frac{15 \times 100}{60 - 15}$$

$$= \frac{15 \times 100}{45}$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

41. (3) CP of 73 articles = ₹ 5110
 \therefore CP of 89 articles

$$= \frac{5110}{73} \times 89 = ₹ 6230$$

Total SP of 89 articles
 = ₹ 5607

$$\text{Loss} = ₹ (6230 - 5607) = ₹ 623$$

\therefore Loss percent

$$= \frac{623}{6230} \times 100 = 10\%$$

42. (4) Let the C.P. of article be x .

$$\text{Then, } \left(\frac{78 - x}{x} \right) \times 100$$

$$= 2 \times \left(\frac{69 - x}{x} \right) \times 100$$

$$\Rightarrow 78 - x = 2 \times 69 - 2x$$

$$\Rightarrow 2x - x = 138 - 78$$

$$\Rightarrow x = ₹ 60$$

43. (3) Let the merchant bought 100 metres of cloth for ₹ 100.

\therefore Total S.P.

$$= ₹ \left(\frac{50 \times 140}{100} + \frac{25 \times 60}{100} + 25 \right)$$

$$= ₹ (70 + 15 + 25) = ₹ 110$$

\therefore Gain per cent = 10%

44. (2) Gain per cent = $\frac{\text{Gain}}{\text{S.P.}} \times 100$

$$\Rightarrow 20 = \frac{\text{S.P.} - \text{C.P.}}{\text{S.P.}} \times 100$$

$$\Rightarrow \text{S.P.} = 5 (\text{S.P.} - \text{C.P.})$$

$$\Rightarrow 5 \text{ C.P.} = 5 \text{ S.P.} - \text{S.P.} = 4 \text{ S.P.}$$

$$\Rightarrow \text{S.P.} = \frac{5}{4} \text{ C.P.} = \left(1 + \frac{1}{4} \right) \text{ C.P.}$$

\therefore Required gain per cent = 25%

45. (1) $\therefore (40 - 20)\% = ₹ 1$

$$\therefore 120\% = \frac{1}{20} \times 120 = ₹ 6$$

46. (2) Let C.P. of radio sold on gain

= x

C.P. of radio sold on loss

$$= ₹ (1920 - x)$$

$$\therefore x \times \frac{120}{100}$$

$$= (1920 - x) \times \left(\frac{100 - 20}{3} \right)$$

$$\Rightarrow x \times 120 = (1920 - x) \times \frac{280}{3}$$

$$\Rightarrow 3x = (1920 - x) \times \frac{7}{3}$$

$$\Rightarrow 9x + 7x = 1920 \times 7$$

$$\Rightarrow 16x = 1920 \times 7$$

$$\Rightarrow x = ₹ 840$$

\therefore C.P. of second radio

$$= ₹ 1080$$

47. (2) Actual cost price

$$= 450 + 30 = ₹ 480$$

\therefore Gain percent

$$= \frac{600 - 480}{480} \times 100 = 25\%$$

48. (1) If the C.P. of article be x , then

$$\frac{117x}{100} - \frac{81x}{100} = 162$$

$$\Rightarrow \frac{36x}{100} = 162$$

$$\Rightarrow x = \frac{162 \times 100}{36} = ₹ 450$$

49. (3) If the C.P. of wrist watch be x , then

C.P. of wall clock = ₹ $(390 - x)$

$$\therefore \frac{x \times 10}{100} + \frac{(390 - x) \times 15}{100}$$

$$= 51.50$$

$$\Rightarrow 10x + 5850 - 15x = 5150$$

$$\Rightarrow 5x = 5850 - 5150 = 700$$

$$\Rightarrow x = \frac{700}{5} = ₹ 140$$

\therefore C.P. of wall clock
 = $390 - 140 = ₹ 250$

\therefore Required difference
 = $250 - 140 = ₹ 110$

50. (2) C.P. of the article

$$= \frac{700 \times 100}{140} = ₹ 500$$

\therefore New selling price

$$= \frac{500 \times 110}{100} = ₹ 550$$

51. (2) Let number of books sold in 2008 = 100

Number of books sold in 2009 = 20

Number of books sold in 2010

$$= 100$$

\therefore Required percentage increase

$$= \frac{100 - 20}{20} \times 100 = 400\%$$

52. (2) Gain percent = $\frac{100}{900} \times 100$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

Aliter : Using Rule 14,

$$\text{Gain}\% = \frac{1000 - 900}{900} \times 100$$

$$= \frac{100}{900} \times 100\%$$

$$= \frac{100}{9}\% = 11\frac{1}{9}\%$$

53. (4) C.P. of each article = ₹ 1

\therefore Total C.P. = ₹ 200

Total S.P.

$$= \frac{60 \times 120}{100} + \frac{140 \times 110}{100}$$

$$= 72 + 154 = ₹ 226$$

$$\text{Gain} = 226 - 200 = ₹ 26$$

When gain = ₹ 26, C.P. = ₹ 1

When gain = ₹ 2600,

$$\text{C.P.} = ₹ 100$$

54. (3) Profit per cent

$$= \left(20 - 5 - \frac{20 \times 5}{100} \right)\% = 14\%$$

Second Method

Let original price of article

$$= ₹ 100$$

$$\text{C.P.} = ₹ 95$$

$$\text{S.P.} = \frac{95 \times 120}{100} = ₹ 114$$

\therefore Required gain per cent = 14%

55. (1) Gain by false weight

$$= \frac{200}{800} \times 100 = 25\%$$

\therefore Required gain

$$= \left(25 + 10 + \frac{25 \times 10}{100} \right)\%$$

$$= 37.5\%$$

56. (3) C.P. of first bullock

$$= \frac{100 \times 8400}{120} = ₹ 7000$$

\therefore Gain = ₹ 1400

\therefore Loss = ₹ 1400

\therefore C.P. of second bullock

$$= 8400 + 1400 = ₹ 9800$$

If loss be $x\%$, then

$$\therefore 9800 \times \frac{x}{100} = 1400$$

$$\Rightarrow x = \frac{100}{7} = 14\frac{2}{7}\%$$

PROFIT AND LOSS

57. (2) Net gain per cent

$$= \left(20 - 15 - \frac{20 \times 15}{100} \right) \%$$

$$= (20 - 18)\% = 2\%$$

58. (2) The C.P. of a cow = be x and that of a goat y .

$$3x + 8y = 47200 \quad \dots(i)$$

$$8x + 3y = 100200 \quad \dots(ii)$$

By equation (i) $\times 3 -$ (ii) $\times 8$,

$$9x + 24y - 64x - 24y$$

$$= 141600 - 801600$$

$$\Rightarrow 55x = 660000$$

$$\Rightarrow x = \frac{660000}{55} = ₹ 12000$$

59. (4) Marked price of a radio set

$$= \frac{400 \times 130}{100} = ₹ 520$$

$$\text{S.P.} = \frac{520 \times 92}{100} = ₹ 478.4$$

$$\therefore \text{Gain per cent} = \frac{78.4}{400} \times 100$$

$$= 19.6\%$$

60. (2) Profit percent

$$= \frac{150}{1000 - 150} \times 100$$

$$\frac{150 \times 100}{850} = \frac{300}{17} = 17 \frac{11}{17} \%$$

Aliter : Using Rule 14,

Gain% =

$$\frac{\text{True weight} - \text{False weight}}{\text{False weight}} \times 100\%$$

$$= \frac{1000 - 850}{850} \times 100\%$$

$$= \frac{150}{850} \times 100\%$$

$$= \frac{300}{17} = 17 \frac{11}{17} \%$$

61. (3) C.P. of article be x

$$\therefore \text{First S.P.} = \frac{80x}{100} = ₹ \frac{4x}{5}$$

$$\frac{4x}{5} + 100 = \frac{x \times 105}{100} = \frac{21x}{20}$$

$$\Rightarrow \frac{21x}{20} - \frac{4x}{5} = 100$$

$$\Rightarrow \frac{21x - 16x}{20} = 100$$

$$\Rightarrow 5x = 2000$$

$$\Rightarrow x = \frac{2000}{5} = ₹ 400$$

62. (1) S.P. of 25m of cloth - C.P. of 25m of cloth

= S.P. of 5m of cloth

\therefore C.P. of 25m of cloth = S.P. of 20m of cloth

\therefore C.P. = ₹ 20, S.P. = ₹ 25 (let)

\therefore Gain per cent

$$= \frac{5}{20} \times 100 = 25\%$$

Aliter : Using Rule 9,

Here, $x = 25$, $y = 5$

$$\text{Gain\%} = \frac{y \times 100}{x - y} \%$$

$$= \frac{5 \times 100}{25 - 5} \%$$

$$= \frac{5 \times 100}{20} \%$$

$$= \frac{100}{20} \times 5\%$$

$$= 25\%$$

63. (2) Total expected S.P.

$$= \frac{96000 \times 110}{100} = ₹ 105600$$

S.P. of first part

$$= \frac{2}{5} \times 96000 \times \frac{94}{100} = ₹ 36096$$

S.P. of remaining part

$$= 105600 - 36096 = ₹ 69504$$

C.P. of remaining part

$$= \frac{3}{5} \times 96000 = ₹ 57600$$

$$\text{Gain} = 69504 - 57600$$

$$= ₹ 11904$$

If the gain per cent be x , then

$$\frac{57600 \times x}{100} = 11904$$

$$\Rightarrow x = \frac{11904 \times 100}{57600} = 20 \frac{2}{3} \%$$

$$64. (2) \text{Gain} = X \times \frac{25}{100} = ₹ \frac{X}{4}$$

$$\text{Taxes} = \frac{X}{4} \times \frac{1}{2} = ₹ \frac{X}{8}$$

65. (2) C.P. of 1 litre of milk = ₹ 1

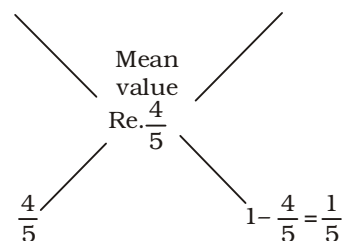
S.P. of 1 litre of mixture = ₹ 1

\therefore C.P. of 1 litre of mixture

$$= \frac{100}{125} \times 1 = ₹ \frac{4}{5}$$

C.P. of 1
litre of
milk Re. 1

C.P. of 1 litre
of mixture
Re. 0



$$\text{Milk : Water} = \frac{4}{5} : \frac{1}{5} = 4 : 1$$

$$\text{Volume of water mixed} = \frac{1}{5}$$

66. (2) Let. C.P. of 200 eggs be Rs. x , 38 eggs are broken.

\therefore S.P. of remaining $200 - 38$

$$= 162 \text{ eggs}$$

$$= \text{Rs. } \frac{1}{12} (162 \times 4.80)$$

$$= \text{Rs. } \left(\frac{777.6}{12} \right) = \text{Rs. } 64.8$$

$$\therefore 108\% \text{ of } x = 64.8$$

$$\Rightarrow \frac{x \times 108}{100} = 64.8$$

$$\Rightarrow x = \frac{64.8 \times 100}{108} = \text{Rs. } 60$$

67. (3) C.P. of article = Rs. 100 (let)

\therefore Marked price = Rs. 120

$$\therefore \text{S.P.} = \frac{120 \times 90}{100} = \text{Rs. } 108$$

\therefore If S.P. = Rs. 108,

C.P. = Rs. 100

\therefore If S.P. = Rs. 216,

$$\text{CP} = \frac{100}{108} \times 216 = \text{Rs. } 200$$

68. (3) C.P. of an apple

$$= \frac{600}{240} = \text{Rs. } 2.5$$

S.P. of an apple = Rs. 3.5

Total profit = Rs. 198

Total S.P. = Rs. (600 + 198)

= Rs. 798

\therefore Number of apples sold

$$= \frac{798}{3.5} = 228$$

PROFIT AND LOSS

- ∴ Bad apples = $240 - 228 = 12$
 ∴ Required per cent

$$= \frac{12}{240} \times 100 = 5\%$$
- 69.** (3) Original price of car = Rs. x (let)
 C.P. of car for Amit

$$= \frac{90 \times x}{100} = \text{Rs. } \frac{9x}{10}$$

 Actual C.P.

$$= \text{Rs. } \left(\frac{9x}{10} + 5000 \right)$$

 According to the question,

$$\left(\frac{9x}{10} + 5000 \right) \times \frac{120}{100} = 100000$$

$$\Rightarrow \frac{9x}{10} + 5000$$

$$= \frac{100000 \times 100}{120} \approx 83300$$

$$\Rightarrow \frac{9x}{10} \approx 83300 - 5000 \approx 78300$$

$$\Rightarrow x \approx \frac{78300 \times 10}{9}$$

$$\approx \text{Rs. } 87000$$
- 70.** (3) Marked price of article = Rs. x (let)
 ∴ C.P. of article = Rs. $\frac{5x}{9}$
 If the rate of discount be $y\%$, then

$$\therefore x \times (100 - y)\% = 120\% \text{ of } \frac{5x}{9}$$

$$\Rightarrow 100 - y = \frac{5}{9} \times 120$$

$$\Rightarrow 300 - 3y = 200$$

$$\Rightarrow 3y = 300 - 200 = 100$$

$$\Rightarrow y = \frac{100}{3} = 33\frac{1}{3}\%$$
- 71.** (2) C.P. of 50 kg of rice = Rs. $(30 \times 70 + 20 \times 70.75)$
 = Rs. $(2100 + 1415)$
 = Rs. 3515
 S.P. of 50 kg. of rice = Rs. $(50 \times 80.50) = \text{Rs. } 4025$
 Profit = Rs. $(4025 - 3515)$
 = Rs. 510

- 72.** (3) C.P. of article = Rs. 100 (let)
 ∴ Marked price = Rs. 140
 At 12% gain, S.P. = Rs. 112
 ∴ Discount = $140 - 112 = \text{Rs. } 28$
 If the rate of discount be $x\%$, then

$$140 \times x\% = 28$$

$$\Rightarrow \frac{140 \times x}{100} = 28$$

$$\Rightarrow x = \frac{28 \times 100}{140} = 20\%$$
- 73.** (4) Discount percent = $x\%$ (let).
 According to the question

$$\frac{975 \times x}{100} = 975 - 897$$

$$\Rightarrow \frac{975x}{100} = 78$$

$$\Rightarrow x = \frac{78 \times 100}{975} = 8\%$$
- 74.** (4) Let the C.P. of article be Rs. 100.
 ∴ Marked price = Rs. 120
 According to the question,
 After a discount of 10%,

$$\text{S.P.} = \frac{120 \times 90}{100} = \text{Rs. } 108$$

 ∴ Profit = $108 - 100 = \text{Rs. } 8$
 ∴ Profit per cent = 8
- 75.** (1) C.P. for Y

$$= \frac{150000 \times 105}{100} = \text{Rs. } 157500$$

 S.P. for Y

$$= \frac{157500 \times 98}{100} = \text{Rs. } 154350$$

 ∴ X's gain
 = Rs. $(157500 - 154350)$
 = Rs. 3150
- 76.** (2) C.P. of article = Rs. x (let)
 S.P. at 5% profit

$$= \text{Rs. } \left(\frac{105x}{100} \right) = \text{Rs. } \frac{21x}{20}$$

 New C.P. of article = $\frac{95x}{100}$

$$= \text{Rs. } \frac{19x}{20}$$

$$\text{S.P.} = \text{Rs. } \left(\frac{19x}{20} \times \frac{110}{100} \right)$$

$$= \text{Rs. } \left(\frac{209x}{200} \right)$$

According to the question,

$$\frac{21x}{20} - \frac{209x}{200} = 2$$

$$\Rightarrow \frac{210x - 209x}{200} = 2$$

$$\Rightarrow \frac{x}{200} = 2$$

$$\Rightarrow x = \text{Rs. } 400$$

- 80.** (1) C.P. of umbrella

$$= \frac{100}{120} \times 30 = \text{Rs. } 25$$

S.P. of umbrella after 10% discount

$$= \text{Rs. } \left(\frac{30 \times 90}{100} \right) = \text{Rs. } 27$$

∴ Required gain per cent

$$= \left(\frac{27 - 25}{25} \right) \times 100\%$$

$$= \frac{200}{25} = 8\%$$

- 81.** (3) C.P. of vegetables = Rs. 100 per kg.

∴ S.P. of 900 gm. of vegetables = Rs. 120

∴ S.P. of 1000 gm. of vegetables

$$= \frac{120}{900} \times 1000$$

$$= \text{Rs. } 133.33$$

∴ Gain% = 33.33%

- 82.** (1) C.P. of petrol = Rs. 100 litre

∴ C.P. of kerosene = Rs. 40 litre

Price of 1 litre petrol and 200 ml kerosene

$$= \text{Rs. } 100 + 8 = 108$$

$$\text{Gain} = \text{Rs. } (120 - 108) = \text{Rs. } 12$$

$$\therefore \text{Gain percent} = \frac{12}{108} \times 100$$

$$= 11.11\%$$

- 83.** (3) Cost price of article at place A = Rs. x (let).

∴ Price at place B

$$= \text{Rs. } \frac{85x}{100} = \text{Rs. } \frac{17x}{20}$$

According to the question,

$$x - \left(\frac{17x}{20} + 150 \right) = 150$$

$$\Rightarrow x - \frac{17x}{20} = 300$$

$$\Rightarrow \frac{20x - 17x}{20} = 300$$

$$\Rightarrow \frac{3x}{20} = 300$$

$$\Rightarrow x = \frac{300 \times 20}{3} = \text{Rs. } 2000$$

∴ Price at place B

$$= \frac{17}{20} \times 2000 = \text{Rs. } 1700$$

Actual price

$$= \text{Rs. } (1700 + 150) = \text{Rs. } 1850$$

$$\text{Profit} = \text{Rs. } (2000 - 1850)$$

$$= \text{Rs. } 150$$

∴ Profit percent

$$= \text{Rs. } \left(\frac{150}{2000} \times 100 \right)$$

$$= 7.5\%$$

- 84.** (3) Profit per cent

$$= \frac{\text{Error}}{(1000 - \text{Error})} \times 100$$

$$= \frac{125}{875} \times 100$$

$$= \frac{100}{7} = 14\frac{2}{7}\%$$

- 85.** (2) 30 eggs out of 510 eggs were broken.

∴ C.P. of 480 eggs i.e. 40 dozen of eggs =

$$\frac{510}{12} \times 20$$

$$= \text{Rs. } 850$$

$$\therefore \text{C.P. of 1 dozen eggs} = \frac{850}{40} =$$

$$\text{Rs. } 21.25$$

∴ For a profit of 20%,

Required S.P. per dozen

$$= \text{Rs. } \left(\frac{21.25 \times 120}{100} \right)$$

$$= \text{Rs. } 25.50$$

- 86.** (1) C.P. for A = Rs. 100

C.P. for B = Rs. 88

$$\text{C.P. for C} = 88 \times \frac{225}{200} = \text{Rs. } 99$$

∴ Required loss per cent

$$= \frac{100 - 99}{100} \times 100 = 1\%$$

- 87.** (2) Let the C.P. of each cake of type-I be Rs. x and that of type-II be Rs. y .

$$\therefore 3x + 6y = 900$$

$$\Rightarrow x + 2y = 300 \quad \dots (i)$$

$$\text{Again, } 3 \times \frac{115x}{100} + \frac{6 \times y \times 90}{100} =$$

$$930$$

$$\Rightarrow 115x + 180y = 31000$$

By equation (i) $\times 2 -$ (ii),

$$115x + 230y = 34500$$

$$115x + 180y = 31000$$

$$\hline 50y = 3500$$

$$\Rightarrow y = \frac{3500}{50} = \text{Rs. } 70$$

From equation (i),

$$x + 2 \times 70 = 300$$

$$\Rightarrow x = \text{Rs. } (300 - 140) = \text{Rs. } 160$$

- 88.** (3) C.P. of 30 litre mixture of milk and water = Rs. $(25 \times 12) =$ Rs. 300

S.P. of 30 litre mixture

$$= \text{Rs. } (30 \times 10.40)$$

$$= \text{Rs. } 312$$

$$\text{Profit} = \text{Rs. } (312 - 300)$$

$$= \text{Rs. } 12$$

$$\therefore \text{Profit per cent} = \frac{12}{300} \times 100 = 4\%$$

- 89.** (3) Let the C.P. of 1 quintal of wheat be Re.1.

Let the quantity of wheat sold at 33% profit be x quintals.

∴ Quantity of wheat sold at 23% profit = $(22 - x)$ quintals

According to the question,

$$x \times \frac{33}{100} + (22 - x) \times \frac{23}{100}$$

$$= 22 \times \frac{27}{100}$$

$$\Rightarrow 33x + 22 \times 23 - 23x$$

$$= 22 \times 27$$

$$\Rightarrow 10x + 506 = 594$$

$$\Rightarrow 10x = 594 - 506 = 88$$

$$\Rightarrow x = \frac{88}{10} = 8.8 \text{ quintals}$$

$$= (8.8 \times 100) \text{ kg.} = 880 \text{ kg.}$$

- 90.** (4) Let the shopkeeper buy 100 kg. of product.

∴ C.P. of 100 kg. of product

$$= \text{Rs. } (150 \times 100)$$

$$= \text{Rs. } 15000$$

15% of products is damaged.

∴ S.P. of 85 kg. of product

$$= \left(\frac{15000 \times 120}{100} \right)$$

$$= \text{Rs. } 18000$$

∴ S.P. of 1 kg. of product

$$= \text{Rs. } \left(\frac{18000}{85} \right)$$

$$= \frac{3600}{17} = \text{Rs. } 211\frac{13}{17}$$

TEST YOURSELF

1. A salesman mixes two varieties of tea, whose costs are Rs. 60 and Rs. 45 per kg respectively. In what proportion the two varieties are to be mixed so as to make a profit of 25% if the sale price be Rs. 62.50 per kg ?
 (1) 2 : 3 (2) 1 : 2
 (3) 1 : 3 (4) 2 : 5
2. A publisher printed 3000 copies of a book for sale, the cost of each book being Rs. 7.00. He distributed 500 copies to different institutions free of cost. He allowed a book free of cost for each 24 books purchased. If the price of each book is fixed at Rs. 14.50. determine the rate of profit or loss of the publisher.
 (1) 66% loss (2) 66% profit
 (3) 60% profit (4) 60% loss
3. Bimalbabu sells two cars each of Rs. 99,000. He makes a profit of 10% on the first car, but incurs a loss of 10% on the second. What will be his percentage of profit or loss on the whole transaction ?
 (1) 1% profit (2) 1% loss
 (3) 4% profit (4) 4% loss
4. A man purchased some eggs at the rate of Rs. 10 per dozen and again purchased $\frac{3}{4}$ of them at the rate of Rs. 12 per dozen. Then he sold all eggs at the rate of Rs. 13 per dozen and made a profit of Rs. 30. Find the total number of eggs he purchased altogether.
 (1) 8 dozens (2) 9 dozens
 (3) 10 dozens (4) None of these
5. A soap manufacturer supplies soap to wholesaler at 15% profit, wholesaler supplies these to retailer at 20% profit and retailer sells it to the consumer at 25% profit. If for the consumer the price of soap be Rs. 17.25, what is the manufacturing cost of the soap ?
 (1) Rs. 10 (2) Rs. 9
 (3) Rs. 12 (4) Rs. 8
6. A man sold an article at a loss of 12%. If he had sold for Rs. 56 more he would have gained 4%. What was the cost price of the article?
 (1) Rs. 320 (2) Rs. 330
 (3) Rs. 340 (4) Rs. 350
7. A dishonest tradesman marks his goods at an advance of 5 per cent on the cost price, and uses a fraudulent balance whose beam is horizontal when the weight in one scale is one-fifth more than the weight in the other. What is his actual gain per cent ?
 (1) 30.25 % (2) 32.25 %
 (3) 33.25 % (4) 31.25 %
8. A man sells a television set at a profit of 10%. If he had bought it for 10% less and sold it for Rs. 360 less, he would have gained 20%. Find the cost price of the television set.
 (1) Rs. 18000 (2) Rs. 18500
 (3) Rs. 17000 (4) Rs. 19000
9. The C.P. of two shirts taken together is ₹ 840. If by selling one at a profit of 16% and the other at a loss of 12%, there is no loss or gain in the whole transaction, then the C.P. of the two shirts are respectively :
 (1) ₹ 360, ₹ 480 (2) ₹ 480, ₹ 360
 (3) ₹ 380, ₹ 460 (4) None of these
10. If sweets are bought at 15 for a rupee, how many must be sold for a rupee to gain 25%?
 (1) 10 (2) 11
 (3) 12 (4) 8
11. A compact disc player when sold for ₹ 13,600 incurred a loss of 15 per cent. At what price should it have been sold to make a profit of 35 per cent on the cost?
 (1) ₹ 21,600 (2) ₹ 20,400
 (3) ₹ 19,600 (4) None of these
12. If the selling price of 20 articles is the same as the cost price of 23 articles, find the profit per cent.
 (1) 15% (2) 16%
 (3) 8% (4) 12%
13. Ramesh bought two boxes for ₹ 1300. He sold one box at a profit of 20% and the other box at a loss of 12%. If the selling price of both boxes is the same, find the cost price of each box.
 (1) ₹ 650, ₹ 650 (2) ₹ 550, ₹ 750
 (3) ₹ 450, ₹ 850 (4) None of these
14. A trader sells an article at a profit of 15%. If he had bought it for 15% less and had sold it for ₹ 7.80 less, he would have gained 20%. Find the cost price of the article.
 (1) ₹ 65 (2) ₹ 80
 (3) ₹ 60 (4) ₹ 70
15. Ram Kumar sold his motor cycle to Mohan at a loss of 28%. Mohan spent ₹ 1680 on its repairs and sold the motor cycle to Sohan for ₹. 35910, thereby, making a profit of 12.5%. Find the cost of the motor cycle for Ram Kumar.
 (1) ₹ 38000 (2) ₹ 35000
 (3) ₹ 40000 (4) ₹ 42000
16. A shopkeeper reduces the price of his goods by 50% at the time of sale. Initially the price was fixed to get a profit of 25% on selling price after allowing 10% cash discount. Find out his approximate percentage of profit or loss.
 (1) 26% loss (2) 28% profit
 (3) 30% loss (4) 26% profit
17. A wholesaler sells 20 pens at the marked price (printed on the article) of 16 pens to a retailer. The retailer in turn sells them at the marked price. Determine the gain or loss per cent to the retailer.
 (1) 25% loss (2) 25% profit
 (3) 20% loss (4) 20% profit
18. A defective briefcase costing ₹ 800 is being sold at a loss of 8%. If the price is further reduced by 5%, find its approximate selling price.
 (1) ₹ 600 (2) ₹ 650
 (3) ₹ 700 (4) ₹ 725
19. A shopkeeper buys 40 bicycles and marks them at 25% above the cost price. He allows a discount of 10% on the marked price for cash sales, and 5% for credit sales. If three-fourth of the stock is sold for cash and the rest for credit, and if the total profit be ₹ 20250, what is the cost price of a bicycle ?
 (1) ₹ 4000 (2) ₹ 3500
 (3) ₹ 3200 (4) ₹ 3600
20. A dealer sold two coolers at ₹ 2,970 each. On selling one cooler, he gained 10%, on selling the other he lost 10%. Find the dealer's gain or loss per cent.
 (1) 1% loss (2) 1% gain
 (3) 2% loss (4) 2% gain

PROFIT AND LOSS

- 21.** A man buys some quantity of wheat for ₹ 2400. He sells one-third of it at a profit of 5%. At what per cent gain should he sell the remaining two-third so as to make an overall profit of 10% on the whole transaction?
 (1) 11.5% (2) 12.5%
 (3) 13% (4) 13.5%
- 22.** A man purchases some mangoes at the rate of 3 for ₹ 4 and the same quantity at 5 for ₹ 6. If he sells all the mangoes at the rate of 3 for ₹ 5, find his approximate gain or loss per cent.
 (1) 35% loss (2) 32% loss
 (3) 32% profit (4) 35% gain
- 23.** What per cent above cost price should goods be marked for sale so that after allowing $12\frac{1}{2}\%$ trade discount and 5% cash discount, a net gain of 33% may be earned?
 (1) 45% (2) 40%
 (3) 50% (4) 60%
- 24.** A, B and C invest ₹ 15000, ₹ 20000 and ₹ 25000 respectively in a business. The profit earned is ₹ 1200. Find the share of A in the profit.
 (1) ₹ 300 (2) ₹ 400
 (3) ₹ 500 (4) ₹ 600
- 25.** ₹ 52000 is to be divided among the partners A, B and C. The ratio of their investments is $\frac{1}{12} : \frac{1}{18} : \frac{1}{24}$. Find the share of A.
 (1) ₹ 16000 (2) ₹ 24000
 (3) ₹ 12000 (4) ₹ 18000
- 26.** A, B and C invest ₹ 1000, ₹ 4000 and ₹ 5000 respectively in a business. At the end of the year the balance sheet shows a loss of 20% of the total initial investment. Find the share of loss of B.
 (1) ₹ 1000 (2) ₹ 200
 (3) ₹ 800 (4) ₹ 1200
- 27.** A, B and C enter into a partnership. A invests ₹ 2400 for 4 years, B ₹ 2800 for 8 years and C ₹ 2000 for 10 years. They earn ₹ 1170. Find the share of each.
 (1) ₹ 420 (2) ₹ 540
 (3) ₹ 108 (4) ₹ 216
- 28.** A and B are partners in a firm. A invests ₹ 15000 and B ₹ 25000. A is the working partner and gets 20% of the profit for his contribution in the management of the firm. B is the sleeping partner. If the profit is ₹ 475, find the share of B.
 (1) ₹ 237.5 (2) ₹ 257.5
 (3) ₹ 247.5 (4) ₹ 238.5
- 29.** A starts an industry with ₹ 20 lakhs. After 4 months he enters into a partnership with B who contributes ₹ 40 lakhs. C joins them after another 3 months with a capital of ₹ 60 lakhs. At the year end, the balance sheet shows a profit of ₹ 74000. Find the share of A in the profit.
 (1) ₹ 32000 (2) ₹ 24000
 (3) ₹ 18000 (4) ₹ 16000
- 30.** Ravi and Shyam enter into a partnership and together start a business with contributions of Rs. 15000 and ₹ 20000. After 4 months Mohan also joins them with contribution of ₹ 22500. After 9 months Shyam withdraws his contribution. At the end of the year there is a profit of ₹ 9000. Find the share of each in the profit.
 (1) ₹ 4000 (2) ₹ 3000
 (3) ₹ 3500 (4) ₹ 3600
- 31.** A, B and C invest their capital into a partnership business in the following manner; A invests one-half of the capital for three-fourth of the time, B invests one-third of the capital for one-half of the time and C invests the remaining capital for the whole time. If the profit earned is ₹ 510, how should A get?
 (1) ₹ 260 (2) ₹ 250
 (3) ₹ 270 (4) ₹ 280
- 32.** Ravi starts a business with ₹ 45000. After a certain period of time he is joined by Mohan who invests ₹ 30000. At the end of the year they divide the profit in the ratio 9 : 4. When did Mohan join Ravi?
 (1) After 3 months
 (2) After 5 months
 (3) After 6 months
 (4) After 4 months
- 33.** A, B and C enter into partnership with capital contribution of ₹ 25,000, ₹ 30,000 and ₹ 15,000 respectively. A is the working partner and he gets 30% of the profit for managing the business. The balance profit is distributed in proportion to the capital investment. At the year-end, A gets Rs. 200 more than B and C together. Find the total profit.
 (1) ₹ 2500 (2) ₹ 2000
 (3) ₹ 2200 (4) ₹ 2400
- 34.** A and B enter into partnership with capital contribution of ₹ 5000 and ₹ 4000 respectively. After $\frac{1}{6}$ th of the time A contributes additional ₹ 2000. Four months after the start B withdraws $\frac{1}{4}$ th his capital, then C joins the business with a capital investment of ₹ 5000. At the end of the year the company's balance-sheet shows a profit of ₹ 2804. Find the share of A in the profit.
 (1) ₹ 1402 (2) ₹ 701
 (3) ₹ 1420 (4) ₹ 820
- 35.** A and B enter into partnership and invest in stock market trading. Their investments initially were ₹ 50000 and ₹ 45000. After 4 months A withdraws half his capital. At the end of 8 months B withdraws half his capital and C joins them with a capital of ₹ 70000. What should be the ratio in which the profit will be divided at the year-end?
 (1) 40 : 35 : 21 (2) 40 : 45 : 28
 (3) 40 : 28 : 21 (4) None of these
- 36.** A, B and C together hold a pasture for which they pay a rent at the rate of ₹ 160 per month. They put on it 70, 50 and 40 cows respectively. A sells $\frac{2}{7}$ th of his stock to B after 4 months and further 3 months later C sells $\frac{2}{5}$ th of his stock to A. How much of the rent should A pay in one year?
 (1) ₹ 500 (2) ₹ 400
 (3) ₹ 760 (4) ₹ 560
- 37.** Ram and Shyam enter into a partnership by contributing capitals in the ratio 16 : 7. After 5 months Ram withdraws. If finally they share profit in the ratio of 5 : 7, find how long Shyam's capital was used?
 (1) 15 months (2) 14 months
 (3) 12 months (4) 16 months
- 38.** A, B and C enter into a partnership and invest their capital in the ratio 4 : 8 : 9. Their period of investment are in the ratio 6 : 3 : 5. In what ratio would they distribute their profits?

PROFIT AND LOSS

- (1) 4 : 4 : 15 (2) 8 : 8 : 15
(3) 3 : 3 : 10 (4) 3 : 10 : 15
39. A, B and C enter into a partnership. Their capital contribution is in the ratio 21 : 18 : 14. At the end of the business term they share profits in the ratio 15 : 8 : 9. Find the ratio of time for which they invest their capitals.
(1) 37 : 38 : 72 (2) 39 : 38 : 72
(3) 90 : 56 : 81 (4) None of these
40. A, B and C enter into a partnership. Their contributions are Rs. 30 lakhs, Rs. 20 lakhs, and Rs. 10 lakhs respectively. A and B are working partners while C is a sleeping partner. A and B get 10% and 15% of gross profit respectively as salary for managing the business. If at the year end C receives ₹ 3.75 lakhs, as profit, find the share of A.
(1) ₹ 16 Lakhs (2) ₹ 12 Lakhs
(3) ₹ 18 Lakhs (4) ₹ 14.25 Lakhs

SHORT ANSWERS

1. (2)	2. (2)	3. (2)	4. (1)
5. (1)	6. (4)	7. (4)	8. (1)
9. (1)	10. (3)	11. (1)	12. (1)
13. (2)	14. (3)	15. (4)	16. (1)
17. (2)	18. (3)	19. (4)	20. (1)
21. (2)	22. (3)	23. (4)	24. (1)
25. (2)	26. (3)	27. (4)	28. (1)
29. (2)	30. (2)	31. (3)	32. (4)
33. (2)	34. (1)	35. (2)	36. (3)
37. (4)	38. (2)	39. (3)	40. (4)

EXPLANATIONS

1. (2) C.P. of 1 kg of mixture

$$= \frac{100}{100 + 25} \times 62.50 = \text{Rs. } 50$$
 By alligation rule,

Kind I Rs. 60	Kind II Rs. 45
Rs. 50	
Rs. (50 - 45) = Rs. 5	Rs. (60 - 50) = Rs. 10

 Required ratio = 5 : 10 = 1 : 2

2. (2) Total cost of the books
 $= \text{Rs. } (3000 \times 7) = \text{Rs. } 21000$
 500 books are given free of cost.
 Selling price for 25 books
 $= 24 \times 14.50 = \text{Rs. } 348$
 \therefore Total selling price = Rs. 34800
 \therefore Gain = Rs. (34800 - 21000)
 $= \text{Rs. } 13800$
 \therefore Gain%
 $= \frac{13800}{21000} \times 100 \approx 66\%$
3. (2) C.P. of car sold at 10% profit
 $= \frac{100}{100 + \text{gain}\%} \times \text{S.P.}$
 $= \frac{100}{110} \times 99000 = \text{Rs. } 90000$
 C.P. of car sold at 10% loss
 $= \frac{100}{90} \times 99000 = \text{Rs. } 110000$

Total C.P.
 $= \text{Rs. } (90000 + 110000)$
 $= \text{Rs. } 200000$

Total S.P. = Rs. 2 × 99000
 $= \text{Rs. } 198000$

\therefore Loss = Rs. 2000

$$\therefore \text{Loss}\% = \frac{2000}{200000} \times 100 = 1\%$$

Short - cut Method

If two things are sold at the same price and loss and gain per cent be same i.e. $x\%$ then there is always loss.

$$\text{and loss \%} = \frac{x^2}{100} \%$$

$$= \frac{10 \times 10}{100} = 1\%$$

4. (1) Let the total number of eggs be x dozens.
 \therefore Total C.P.

$$= \text{Rs. } \left(10x + \frac{3}{4}x \times 12 \right)$$

$$= \text{Rs. } \left(\frac{40x + 36x}{4} \right)$$

$$= \text{Rs. } \frac{76x}{4} = \text{Rs. } 19x$$

$$\text{Total S.P.} = \left(x + \frac{3}{4}x \right) \times 13$$

$$= \frac{7 \times 13x}{4} = \text{Rs. } \frac{91x}{4}$$

$$\therefore \frac{91x}{4} - 19x = 30$$

$$\Rightarrow 91x - 76x = 30 \times 4$$

$$\Rightarrow 15x = 30 \times 4$$

$$\Rightarrow x = \frac{30 \times 4}{15} = 8 \text{ dozens.}$$

5. (1) Manufacturing cost

$$= \frac{100}{115} \times \frac{100}{120} \times \frac{100}{125} \times 17.25$$

$$= \text{Rs. } 10$$

6. (4) Let the C.P. be Rs. x .

$$\text{S.P.} = \frac{88x}{100} = \text{Rs. } \frac{22x}{25}$$

$$\text{New S.P.} = \text{Rs. } \left(\frac{22x}{25} + 56 \right)$$

$$\therefore \frac{22x}{25} + 56 = \frac{104x}{100} = \frac{26x}{25}$$

$$\Rightarrow \frac{4x}{25} = 56 \Rightarrow x = \frac{56 \times 25}{4}$$

$$= \text{Rs. } 350$$

7. (4) A packet of goods marked 1 kg

Actual weight = 800 gm.

C.P. at Re. 1/gm = Rs. 800

S.P. of this packet

$$= \frac{105}{100} \times 1000 = \text{Rs. } 1050$$

$$\text{Gain \%} = \frac{250}{800} \times 100$$

$$= 31.25$$

8. (1) Let the C.P. of television set be Rs. x .

$$\text{First S.P.} = \text{Rs. } \frac{110}{100}x$$

$$= \text{Rs. } \frac{11}{10}x$$

$$\text{New C.P.} = \text{Rs. } \frac{9x}{10}$$

$$\text{New S.P.} = \text{Rs. } \frac{9x}{10} \times \frac{120}{100}$$

$$= \text{Rs. } \frac{27x}{25}$$

$$\therefore \frac{11x}{10} - \frac{27x}{25} = 360$$

$$\Rightarrow \frac{55x - 54x}{50} = 360$$

$$\Rightarrow x = 360 \times 50 = \text{Rs. } 18000$$

PROFIT AND LOSS

9. (1) Let the CP of shirt sold at 16% gain be Rs. x .

$$\therefore x \times \frac{116}{100} + (840 - x) \times \frac{88}{100}$$

$$= 840$$

$$\Rightarrow 116x + 88 \times 840 - 88x$$

$$= 84000$$

$$\Rightarrow 28x = 84000 - 88 \times 840$$

$$= 840 \times 12$$

$$\Rightarrow x = \frac{840 \times 12}{28} = \text{Rs. } 360$$

$$\text{CP of second shirt} = 840 - 360 = \text{Rs. } 480$$

Alternate Method

Let the CP of shirt sold at gain be Rs. x and that of shirt sold at loss be Rs. y .

$$\therefore x \times \frac{16}{100} = y \times \frac{12}{100}$$

$$\Rightarrow \frac{x}{y} = \frac{3}{4}$$

$$\Rightarrow x = \frac{3}{7} \times 840 = \text{Rs. } 360$$

$$y = \frac{4}{7} \times 840 = \text{Rs. } 480$$

10. (3) Required answer

$$= \frac{15 \times 100}{125} = 12$$

11. (1) CP of a compact disc player

$$= 13600 \times \frac{100}{85} = \text{Rs. } 16000$$

SP for a gain of 35%

$$= \frac{16000 \times 135}{100}$$

$$= \text{Rs. } 21600$$

12. (1) Let the, SP of 20 articles be x .

$$\text{then, SP of 1 articles} = \frac{x}{20}$$

Also the cost price of 23 articles = x

$$\text{Then, CP of 1 article} = \frac{x}{23}$$

$$\text{Profit} = \text{SP} - \text{CP}$$

$$= \frac{x}{20} - \frac{x}{23} = \frac{23x - 20x}{460} = \frac{3x}{460}$$

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

$$\frac{3x}{460} \times 100 = \frac{x}{23} \times 100$$

$$= \frac{3x}{460} \times \frac{23}{x} \times 100 = 15\%$$

13. (2) Total price of two boxes

$$= ₹ 1300$$

Let CP of one box = x

Then CP of other box = $(1300 - x)$

Profit on 1st box = 20%

\therefore SP of 1st box

$$= x + \frac{20}{100}x$$

$$= \frac{100x + 20x}{100} = \text{Rs. } \frac{120x}{100}$$

Loss on 2nd box = 12%

\therefore SP of 2nd box = CP - Loss

$$= (1300 - x) - \frac{12}{100}(1300 - x)$$

$$= (1300 - x) \left(1 - \frac{12}{100} \right)$$

$$= (1300 - x) \times \frac{88}{100}$$

$$= 1144 - \frac{88x}{100}$$

But SP of both boxes is same

$$\Rightarrow \frac{120x}{100} = 1144 - \frac{88x}{100}$$

$$\Rightarrow \frac{120x}{100} + \frac{88x}{100} = 1144$$

$$\Rightarrow \frac{208x}{100} = 1144$$

$$\Rightarrow x = \frac{1144 \times 100}{208} = 550$$

\therefore Cost price of 1st box

$$= ₹ 550$$

and cost price of another box

$$= ₹ 1300 - ₹ 550 = ₹ 750$$

14. (3) Let C.P. of the article = ₹ 100

\therefore The first selling price

$$= ₹ 100 + ₹ 15 = ₹ 115$$

Now, C.P. = $100 - 15 = ₹ 85$

$$\text{S.P.} = ₹ \left(\frac{85 \times 120}{100} \right) = ₹ 102$$

Difference in S.P.

$$= ₹ 115 - ₹ 102 = ₹ 13$$

\therefore If difference is ₹ 13, then C.P.

$$= ₹ 100$$

\therefore If difference is ₹ $\frac{78}{10}$, the

$$\text{C.P.} = \frac{100}{13} \times \frac{78}{10} = ₹ 60$$

15. (4) Let CP of motor cycle for Ram Kumar be x

SP for Ram Kumar

$$= x - \frac{28}{100}x = \frac{72}{100}x$$

$$\therefore \text{Cost for Mohan} = \frac{72}{100}x$$

Cost of repairing = ₹ 1680

\therefore Total CP for Mohan

$$= ₹ \frac{72}{100}x + 1680$$

Profit earned by Mohan = 12.5%

SP for Mohan = CP + Profit

$$= \frac{72}{100}x + 1680 + \frac{12.5}{100} \left(\frac{72}{100}x + 1680 \right)$$

$$\text{SP} = \left(\frac{72x}{100} + 1680 \right) \left(\frac{112.5}{100} \right)$$

But, SP for Mohan is given = Rs. 35910

$$\therefore \left(\frac{72x}{100} + 1680 \right) \left(\frac{112.5}{100} \right)$$

$$= ₹ 35910$$

$$\Rightarrow \left(\frac{72x}{100} + 1680 \right) = \frac{35910 \times 100}{112.5}$$

$$\Rightarrow \frac{72x}{100} + 1680 = 31920$$

$$\Rightarrow x = \frac{30240 \times 100}{72}$$

$$= ₹ 42000$$

So, the cost price of the motor cycle for Ram Kumar = ₹ 42,000

16. (1) Let initial S.P. = ₹ 100

profit = 25% of 100 = 25

\therefore C.P. = $100 - 25 = ₹ 75$

Now, when

Marked Price	Discount	S.P.
100	10	90
x	—	100

$$\therefore x = \frac{100 \times 100}{90} = ₹ \frac{1000}{9}$$

\therefore New S.P. = 50% of

PROFIT AND LOSS

$$\frac{1000}{9}, \text{ i.e., } \frac{1000}{9} \times \frac{50}{100}$$

$$= \frac{500}{9} = \frac{55\frac{5}{9}}{9}$$

$$\therefore \text{ Loss} = \text{₹ } 75 \text{ (Old Price)} - \text{₹}$$

$$55\frac{5}{9} \text{ (New S.P.)} = \text{₹ } 19\frac{4}{9}$$

\therefore When

S.P. Loss per cent

$$\begin{array}{ccc} 75 & \uparrow & 19\frac{4}{9} \\ 100 & & y \end{array}$$

where y = loss per cent

$$\therefore y = \frac{100}{75} \times \frac{175}{9}$$

$$\text{Loss per cent} = \frac{700}{27} = 25\frac{25}{27}\%$$

$$= 26\% \text{ (approx)}$$

- 17. (2)** Let the marked price of 1 pen = ₹ 100

$$\therefore \text{ MP of 20 pens}$$

$$= 20 \times 100 = \text{₹ } 2000$$

$$\text{MP of 16 pens}$$

$$= 16 \times 100 = \text{₹ } 1600$$

$$\text{CP of 20 pens for retailer}$$

$$= \text{₹ } 1600$$

$$\text{SP of 20 pens for retailer}$$

$$= \text{₹ } 2000$$

$$\therefore \text{ Profit} = \text{₹ } 400$$

$$\text{Profit}\% = \frac{400}{1600} \times 100 = 25\%$$

- 18. (3)** C.P. = ₹ 800

$$\text{Loss} = 8\%$$

$$\Rightarrow \text{SP} = \text{₹ } 800 - \frac{8}{100} \times 800$$

$$= \text{₹ } 800 - 64 = \text{₹ } 736$$

$$\text{Reduction } 5\% = \frac{5}{100} \times 736$$

$$\therefore \text{ Reduced SP}$$

$$= \text{₹ } 736 - 736 \times \frac{5}{100}$$

$$= \text{₹ } 736 - 36.80 = \text{₹ } 699.20$$

$$\therefore \text{ Selling price} = \text{₹ } 699.20 \approx \text{₹ } 700$$

- 19. (4)** Number of bicycles = 40

$$\text{Let C.P. of one bicycle be } x$$

$$\therefore \text{ Marked price of each bicycle}$$

$$= \frac{125}{100}x = 1.25x$$

$$\text{Discount for cash sale} = 10\%$$

$$\text{Discount for credit sale} = 5\%$$

$$\therefore \text{ S.P. for cash sale}$$

$$= 1.25x \times \frac{90}{100}$$

$$= (1.25x \times 0.9) = 1.125x$$

$$\text{S.P. for credit sale}$$

$$= 1.25x \times \frac{95}{100}$$

$$= (1.25x \times 0.95) = 1.1875x$$

$$\text{Number of bicycles sold for cash}$$

$$= 30$$

$$\text{Number of bicycles sold on credit}$$

$$= 10$$

$$\therefore \text{ Total S.P.} = [1.125x \times 30 + 1.1875x \times 10]$$

$$= 45.625x$$

$$\therefore \text{ Profit} = (45.625 - 40)x$$

$$= 5.625x$$

$$\text{But actual profit} = \text{₹ } 20250$$

$$\therefore 5.625x = 20250$$

$$\Rightarrow x = \frac{20250}{5.625} = \text{₹ } 3600$$

$$\text{Hence, C.P. of a bicycle}$$

$$= \text{₹ } 3600$$

- 20. (1)** S P of one cooler = ₹ 2,970

$$\text{Profit}\% = 10\%$$

$$\text{Let C P of the cooler be } x$$

$$\text{Then, SP} = \text{CP} + \text{Profit}$$

$$\Rightarrow 2970 = x + \frac{10}{100}x$$

$$\Rightarrow 2970 = \frac{110}{100}x$$

$$\Rightarrow \frac{2970}{110} \times 100 = x$$

$$\Rightarrow x = \text{₹ } 2700$$

$$\text{For 2nd cooler,}$$

$$\text{S P} = \text{₹ } 2970$$

$$\text{Loss} = 10\%$$

$$\text{Let CP} = y, \text{ then}$$

$$\text{SP} = \text{CP} - \text{Loss} = 2970$$

$$= y - \frac{10}{100}y$$

$$\Rightarrow \frac{90y}{100} = 2970 \Rightarrow y = \text{₹ } 3300$$

$$\therefore \text{ Total cost price for coolers}$$

$$= \text{₹ } 2700 + 3300 = \text{₹ } 6000$$

$$\text{Total selling price for two coolers}$$

$$= \text{₹ } 2970 + 2970 = \text{₹ } 5940$$

$$\text{Hence, Loss}$$

$$= \text{₹ } 6000 - 5940 = \text{₹ } 60$$

$$\& \text{ Loss}\% = \frac{60}{6000} \times 100 = 1\%$$

- 21. (2)** C.P. of $\frac{1}{3}$ rd of wheat

$$= \text{₹ } \frac{2400}{3} = \text{₹ } 800$$

$$\text{S.P. of } \frac{1}{3} \text{rd of wheat}$$

$$= \frac{105}{100} \times 800 = \text{₹ } 840$$

$$\text{C.P. of total wheat} = \text{₹ } 2400$$

$$\text{Required S.P. of total wheat}$$

$$= \text{₹ } \left(\frac{110}{100} \times 2400 \right) = \text{₹ } 2640$$

$$\text{C.P. of remaining } \frac{2}{3} \text{rd of wheat}$$

$$= \frac{2}{3} \times 2400 = \text{₹ } 1600$$

$$\text{Required S.P. of remaining } \frac{2}{3} \text{rd}$$

$$\text{wheat}$$

$$= \text{₹ } 2640 - 840 = \text{₹ } 1800$$

$$\text{Profit}\% = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$$

$$\text{Therefore, required profit}\%$$

$$= \frac{1800 - 1600}{1600} \times 100$$

$$= \frac{25}{2}\% = 12\frac{1}{2}\% = 12.5\%$$

- 22. (3)** Suppose the man purchases 1 mango in each case.

$$\therefore \text{ C.P. of 3 mangoes} = \text{₹ } 4$$

$$\therefore \text{ C.P. of 1 mango} = \text{₹ } \frac{4}{3}$$

$$\text{Again,}$$

$$\therefore \text{ C.P. of 5 mangoes} = \text{₹ } 6$$

$$\therefore \text{ C.P. of 1 mango} = \text{₹ } \frac{6}{5}$$

$$\therefore \text{ C.P. of 2 (mixed) mangoes}$$

$$= \frac{4}{3} + \frac{6}{5} = \frac{20+18}{15} = \text{₹ } \frac{38}{15}$$

$$\therefore \text{ C.P. of 1 mango}$$

$$= \frac{1}{2} \times \frac{38}{15} = \text{₹ } \frac{19}{15}$$

$$\text{Now, } \therefore \text{ S.P. of 3 mangoes} = \text{₹ } 5$$

$$\therefore \text{ S.P. of 1 mango} = \text{₹ } \frac{5}{3}$$

$$\therefore \text{ Profit} = \frac{5}{3} - \frac{19}{15} = \text{₹ } \frac{6}{15} = \text{₹ } \frac{2}{5}$$

$$\therefore \text{Profit on ₹ } \frac{19}{15} = ₹ \frac{2}{5}$$

$$\therefore \text{Profit on ₹ } 1 = \frac{2}{5} \times \frac{15}{19}$$

$$\therefore \text{Profit on ₹ } 100$$

$$= \frac{2}{5} \times \frac{15}{19} \times 100 = ₹ 31 \frac{11}{19}$$

$$\text{Hence, profit} = 31 \frac{11}{19} \% \text{ or } \approx 32\%$$

- 23.** (4) If the C.P. is ₹ 100, the cash selling price = ₹ 133.
Now, let invoice price (after allowing T.D.) be 100, cash discount = 5 %

$$\begin{array}{ccc} \therefore \text{When,} & & \\ \text{Cash S.P.} & \text{Invoice price} & \\ 100-5=95 & \uparrow 100 & \downarrow \\ & 133 & y \end{array}$$

$$\therefore y = \frac{133 \times 100}{95} = ₹ 140$$

$$\text{Now, Trade discount} = 12 \frac{1}{2} \%$$

$$\therefore \text{Marked price } 100 - 12 \frac{1}{2} \text{ T.D.}$$

$$= 87 \frac{1}{2} \text{ (Invoice price)}$$

$$\begin{array}{ccc} \text{When,} & & \\ \text{Invoice price} & \text{Marked price} & \\ 87 \frac{1}{2} & \uparrow 100 & \downarrow \\ 140 & & x \end{array}$$

$$\therefore x = \frac{140 \times 100 \times 2}{175} = \text{Rs. } 160$$

Thus, marked price should be 60% = (160-100) above cost.

- 24.** (1) This is a case of simple partnership

Ratio of investments,

$$\begin{array}{ccc} A & : & B & : & C \\ = 15000 & : & 20000 & : & 25000 \\ = 3 & : & 4 & : & 5 \end{array}$$

$$\text{Sum of the ratios} = 3 + 4 + 5 = 12$$

Share in the profit :

$$\text{For A} = \frac{3}{12} \times 1200 = ₹ 300$$

- 25.** (2) This is a case of simple partnership

$$\frac{1}{12} : \frac{1}{18} : \frac{1}{24} = \frac{6}{72} : \frac{4}{72} : \frac{3}{72}$$

(Here 72 is the LCM of 12, 18 and 24)

$$= 6 : 4 : 3$$

$$\text{Sum of the ratios} = 6 + 4 + 3 = 13$$

$$\text{and, } \frac{52000}{13} = 4000$$

$$\text{A's share} = 6 \times 4000 = \text{Rs. } 24000$$

- 26.** (3) Total initial investment
= Rs. 1000 + Rs. 4000 + Rs. 5000 = Rs. 10,000
Total loss = 20% of total initial investment

$$= \frac{20}{100} \times 10,000 = \text{Rs. } 2000$$

(This is an example of simple partnership.)

\therefore ₹ 2000 has to be divided among the partners in proportion to their investments. Ratio of investments are

$$A : B : C = ₹ 1000 : ₹ 4000 : ₹ 5000 = 1 : 4 : 5$$

$$\text{Sum of the ratios} = 1 + 4 + 5 = 10$$

$$1 \Rightarrow \frac{\text{Rs. } 2000}{10} = ₹ 200$$

Share of loss for B

$$= 4 \times ₹ 200 = ₹ 800$$

- 27.** (4) This is a case of compound partnership.

₹ 2400 investment for 4 years earns as much as ₹ 2400 × 4 = ₹ 9600 in 1 year

Similarly, ₹ 2800 for 8 years is equivalent to ₹ 2800 × 8 = ₹ 22400 in 1 year

₹ 2000 for 10 years is equivalent to ₹ 2000 × 10

$$= ₹ 20,000 \text{ in 1 year}$$

The profit is, therefore, divided in the ratio

$$₹ 9600 : ₹ 22400 : ₹ 20000$$

$$\text{or, } 12 : 28 : 25$$

$$\text{Sum of the ratios} = 12 + 28 + 25 = 65$$

$$₹ \frac{1170}{65} = \text{Rs. } 18$$

$$\text{So, A's share} = 12 \times ₹ 18 = ₹ 216$$

- 28.** (1) First we have to deduct the payment to be made to A from the total profit for his contribution in the management of the firm.

$$20\% \text{ of Rs. } 475 = ₹ 95$$

$$\text{Balance profit} = ₹ (475 - 95)$$

$$= ₹ 380.$$

This has to be divided between A and B in the ratio of their investments i.e.,

$$₹ 15000 : ₹ 25000 = 3 : 5$$

B's share

$$= ₹ 380 \times \frac{5}{8} = ₹ 237.5$$

- 29.** (2) A's investment is ₹ 20 lakhs for the whole year i.e., 12 months which is equivalent to 20 × 12

$$= ₹ 240 \text{ lakhs for 1 month}$$

B's investment is ₹ 40 lakhs for (12 - 4) = 8 months is equivalent to 40 × 8 = ₹ 320 lakhs for 1 month.

C's investment is ₹ 60 lakhs for 3 months is equivalent to 60 × 3 = ₹ 180 lakhs for 1 month

The share in the profit should be in the following ratio,

$$A : B : C = 240 : 320 : 180 \\ = 12 : 16 : 9$$

$$\frac{74000}{12+16+9} = ₹ 2000$$

$$= \text{profit for 1 month}$$

$$\text{A's share} = ₹ (12 \times 2000)$$

$$= ₹ 24000$$

- 30.** (2) Ravi : Shyam : Mohan

$$= (15000 \times 12) : (20000 \times 9) : (22500 \times 8)$$

$$= 180000 : 180000 : 180000$$

$$= 1 : 1 : 1$$

Therefore, the share of each in the profit is

$$\frac{9000}{3} = ₹ 3000$$

- 31.** (3) C's share of the capital

$$= 1 - \left(\frac{1}{2} + \frac{1}{3} \right) = \frac{1}{6}$$

$$A : B : C = \left(\frac{1}{2} \times \frac{3}{4} \right) :$$

$$\left(\frac{1}{3} \times \frac{1}{2} \right) : \left(\frac{1}{6} \times 1 \right)$$

$$= \frac{3}{8} : \frac{1}{6} : \frac{1}{6}$$

$$= \frac{9}{24} : \frac{4}{24} : \frac{4}{24}$$

$$= 9 : 4 : 4$$

$$\frac{510}{9+4+4} = ₹ 30$$

$$\text{Profit share of A} = ₹ 30 \times 9 \\ = ₹ 270$$

- 32.** (4) Suppose Mohan joins Ravi after x months.

Then, during the year Mohan's investment was for $(12 - x)$ months.

$$\therefore \frac{45000 \times 12}{30000 \times (12 - x)} = \frac{9}{4}$$

$$\Rightarrow \frac{12 - x}{12} = \frac{45000}{30000} \times \frac{4}{9}$$

$$\Rightarrow \frac{12 - x}{12} = \frac{2}{3} \Rightarrow 36 - 3x = 24$$

$$\therefore x = 4 \text{ months}$$

- 33.** (2) Let the total profit be ₹ 100
A's share for managing the business which is 30% of profit = ₹ 30
Balance profit = ₹ $(100 - 30) = ₹ 70$
Ratio of capital investment;

$$\begin{aligned} A : B : C &= ₹ 25000 \\ &: ₹ 30000 : ₹ 15000 \\ &= 5 : 6 : 3 \end{aligned}$$

$$\text{Now, } \frac{70}{5+6+3} = ₹ 5$$

Share of profit A's = ₹ $5 \times 5 = ₹ 25$

B's = ₹ $5 \times 6 = ₹ 30$

C's = ₹ $5 \times 3 = ₹ 15$

A's total share of profit

$$= ₹ 30 + ₹ 25 = ₹ 55$$

Profit share of B and C put together

$$= ₹ 30 + ₹ 15 = ₹ 45$$

A's - (B's + C's) share

$$= ₹ 55 - ₹ 45 = ₹ 10$$

When the difference is ₹ 10, the total profit is ₹ 100

When the difference is ₹ 200 (i.e., 10×20) total profit is ₹ $100 \times 20 = ₹ 2000$

- 34.** (1) Computing in terms of 1 month
A's investment = $(5000 \times 12) + (2000 \times 10) = ₹ 80000$
B's investment = $(4000 \times 4) + (3000 \times 8) = ₹ 40000$
C's investment = $5000 \times 8 = ₹ 40000$
 $A : B : C = 80000 : 40000 : 40000$
 $A : B : C = 2 : 1 : 1$

$$\text{Now, } \frac{2804}{2+1+1} = 701$$

A's share = $701 \times 2 = ₹ 1402$

- 35.** (2) Investment ratio in terms of 1 month or of their equivalent capitals,
 $A : B : C$

$$= \left\{ (50000 \times 4) + \left(\frac{50000}{2} \times 8 \right) \right\} :$$

$$\left\{ (45000 \times 8) + \left(\frac{45000}{2} \times 4 \right) \right\} :$$

$$(70000 \times 4)$$

$$= 400,000 : 450,000 : 280,000$$

$$= 40 : 45 : 28$$

The profits will be distributed in the above ratio i.e., 40 : 45 : 28.

- 36.** (3) Total rent to be paid for one year = $160 \times 12 = ₹ 1920$.

This is a case of compound partnership. So, the rent will be shared in proportion to the product of number of cows and time for each partner.

Computing in terms of 1 month,
For A :

$$(70 \times 4) + \left(70 - \frac{2}{7} \times 70 \right)$$

$$\times 3 + \left(70 - \frac{2}{7} \times 70 + \frac{2}{5} \times 40 \right) \times 5$$

$$= (70 \times 4) + (50 \times 3) + (66 \times 5)$$

$$= 280 + 150 + 330$$

$$\text{For A} = 760$$

For B :

$$\{ 50 \times 4 \} + \left\{ 50 + \frac{2}{7} \times 70 \right\} \times 8$$

$$= 200 + 560$$

$$\text{For B} = 760$$

For C

$$\{ 40 \times 7 \} + \left\{ 40 - \frac{2}{5} \times 40 \right\} \times 5$$

$$= 280 + 120$$

$$\text{For C} = 400$$

$$\text{So, } A : B : C = 760 : 760 : 400$$

$$= 19 : 19 : 10$$

$$\frac{1920}{19+19+10} = \frac{1920}{48} = 40$$

Rent to be paid,

$$\text{by A} = 19 \times 40 = ₹ 760$$

- 37.** (4) Let us assume that Shyam's capital was used for x months.

Then we can write the ratio of their equivalent capital investment as

$$\text{Ram} : \text{Shyam} = \frac{16 \times 5}{7 \times x} = \frac{5}{7}$$

$$\text{or, } x = 16$$

So, Shyam's capital was used for 16 months.

- 38.** (2) Ratio of profit = Ratio of product of investment and time period.

Ratio of share of profits

$$A : B : C = (4 \times 6) : (8 \times 3) : (9 \times 5) \\ = 24 : 24 : 45$$

$$\text{or } A : B : C = 8 : 8 : 15$$

- 39.** (3) Ratio of profits = (Ratio of capital by time).

\therefore Ratio of time = Ratio of profit divided by respective capitals.

$$= \frac{15}{21} : \frac{8}{18} : \frac{9}{14}$$

$$= \frac{5}{7} : \frac{4}{9} : \frac{9}{14}$$

$$= \frac{90}{126} : \frac{56}{126} : \frac{81}{126}$$

[126 is LCM of 7, 9 and 14]

$$A : B : C = 90 : 56 : 81.$$

- 40.** (4) Let the gross profit be x

$$\text{A's salary} = \frac{10}{100}x = 0.10x$$

$$\text{B's salary} = 0.15x$$

$$\text{Net profit} = x - (0.10x + 0.15x) \\ = 0.75x$$

The net profit will be shared among three partners in proportion to their capital contributions.

\therefore Ratio of capital contributions,

$$A : B : C = 30 : 20 : 10$$

$$A : B : C = 3 : 2 : 1$$

Sum of the ratios = $3 + 2 + 1 = 6$
C's share in the net profit

$$= \frac{1}{6} \times 0.75x$$

$$\text{But, } \frac{0.75}{6}x = 3.75$$

$$\text{or } x = 6 \times \frac{3.75}{0.75}$$

$$\text{or } x = 30$$

So, Gross profit = $x = ₹ 30$ lakhs

Total share for A or B will be sum of their salary and share in the net profit.

$$\text{A's share} = 0.10x + \frac{3}{6} \times 0.75x$$

$$= 0.10x + 0.375x = 0.475x$$

[\because Gross profit, $x = 30$ lakhs]

$$= 0.475 \times 30 = 14.25 \text{ lakhs}$$

& B's share

$$= 0.15x + \frac{2}{6} \times 0.75x$$

$$= 0.15x + 0.25x$$

$$= 0.40 \times 30 = 12 \text{ lakhs}$$

□□□