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PERCENTAGE PROFIT & LOSS

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Chapter 1: Percentage

1.1 Percentage

A decimal fraction is one in which the denominator of the fraction is a power of 10 i.e. 10, 100, and 1000 etc. That decimal fraction which has 100 as its denominator is known as Percentage. The numerator of such a fraction is known as Rate Per Cent.

15% and $\frac{15}{100}$ mean one and the same quantity. Any number written in the form of a fraction with 100 as the denominator is a percentage.

e.g. $13 = \frac{1300}{100} = 1300 \%$,

$\frac{3}{5} = \frac{60}{100} = 60 \%$,

$\frac{62.5}{100} = 62.5 \%$

Alternatively, X % of a number $Y = \frac{X \times Y}{100}$

e.g. $16\frac{2}{3}$ % of $300 = \frac{50}{3} \times \frac{300}{100} = 50$

1.2   Basic Percentage Terms

(i) Conversion from a Fraction to Percent and vice versa

1.   *Fraction to Percent:* Multiply the fraction by 100 to convert it into a percent.

e.g. 0.2 = 0.2 × 100 = 20 %

$\frac{3}{8}$ = $\frac{3}{8}$ × 100 = 37.5 %

2.   *Percent to Fraction:* Reversing the earlier operation will convert a percent to a fraction - i.e. divide   the percent by 100.

e.g. 40 % = $\frac{40}{100}$ = 0.4,

55 % = $\frac{55}{100}$ = 0.55 = 55: 100

(ii) Percentage Increase or Decrease of a Quantity:

Here, one point is to be noted, that the increase or the decrease is always on the original quantity. If the increase or decrease is given in absolute and the %age increase or decrease is to be calculated, then the following formula is applied to do so.

%increase /decrease= $\frac{\text{Quantity Increase or Decrease}}{\text{Original Quantity}} \times 100$

The point worth remembering is that the denominator is the **ORIGINAL QUANTITY.**

Illustration: The salary of a man goes up from Rs 100 to Rs 125. What is the percentage increase in his salary?

Sol.   Increase = 125 − 100 = Rs. 25.

∴ % increase = $\frac{25}{100} \times 100$ % = 25 %

Alternatively, if the salary of the same man had been reduced from Rs. 125 to Rs 100, what is the percentage decrease in his salary?

Decrease = 125 − 100 = Rs. 25

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

Note that for the same quantity of increase or decrease the % increase and % decrease have two different answers. The change in the denominator − which is the original value changes in the above two situations and hence the difference.

(iii) To Increase a Number by x %:

If a number is increased by 10 %, then it becomes 1.1 times of itself.

If a number is increased by 20 %, then it becomes 1.2 times of itself.

If a number is increased by 30 %, then it becomes 1.3 times of itself.

If a number is increased by 40 %, then it becomes 1.4 times of itself.

(iv) To Decrease a Number by x %:

If a number is decreased by 10 %, then it becomes 0.90 times of itself.

If a number is decreased by 20 %, then it becomes 0.80 times of itself.

If a number is decreased by 30 %, then it becomes 0.70 times of itself.

If a number is decreased by 40 %, then it becomes 0.60 times of itself.

(v) Equivalent Percentages of some commonly used Fractions:

$\frac{1}{2}$	**50 %**	$\frac{3}{4}$	**75 %**	$\frac{2}{9}$	**$22\frac{2}{9}$ %**
$\frac{1}{3}$	**$33\frac{1}{3}$ %**	$\frac{4}{5}$	**80 %**	$\frac{1}{15}$	**$6\frac{2}{3}$ %**

$\frac{1}{4}$	**25 %**	$\frac{1}{8}$	**$12\frac{1}{2}$ %**	$\frac{1}{20}$	**5 %**
$\frac{1}{5}$	**20 %**	$\frac{1}{12}$	**$8\frac{1}{3}$ %**	$\frac{1}{25}$	**4 %**
$\frac{1}{6}$	**$16\frac{2}{3}$ %**	$\frac{3}{8}$	**$37\frac{1}{2}$ %**	$\frac{1}{50}$	**2 %**
$\frac{2}{5}$	**40 %**	$\frac{5}{8}$	**$62\frac{1}{2}$ %**	$\frac{4}{3}$	**$133\frac{1}{3}$ %**
$\frac{3}{5}$	**60 %**	$\frac{7}{8}$	**$87\frac{1}{2}$ %**	$\frac{5}{4}$	**125 %**
$\frac{2}{3}$	**$66\frac{2}{3}$ %**	$\frac{1}{9}$	**11.11 %**	$\frac{6}{5}$	**120 %**

1.3 Percentage Basic Solved Examples

1. What is 25 % of Rs 50?

Sol. $\frac{25}{100} \times 50$ = Rs 12.5

2. What percentage is Rs 13 out of a total sum of Rs 65?

Sol. $\frac{13}{65} \times 100$ = 20 %

3. A student obtained 82.5 % marks in a certain examination. If the maximum marks is 600 find the total marks obtained by her.

Sol. $\dfrac{82.5}{100} \times 600 = 495$

4. The annual sales of company X were Rs 72,000 in fiscal year 94-95 and Rs 84,000 in fiscal 95-96. What was the % increase in turnover?

Sol. Here Increase = 84,000 − 72,000 = 12,000

∴ % Increase = $\dfrac{12,000 \times 100}{72,000}$ = $\dfrac{1}{6}$ ×100 = 16.67 %

5. The price of a Sajaj Scooter is Rs 25,000 which is 20 % lesser than a SMS Scooter. What is the price of a SMS Scooter?

Sol. Here note that the % given is defined in terms of the price of SMS Scooter and not Sajaj Scooter.

∴ Computing the price of SMS as 1.2 times Sajaj's price will give incorrect answer. The data given is

$\dfrac{100 - 20}{100} \times$ SMS = Sajaj = 25,000

∴ SMS = $\dfrac{25,000 \times 100}{80}$ = Rs 31,250.

Or you can simply do $\dfrac{25,000}{0.8}$ = 31250

(∵ 20% less means it is 0.80 times of the other one)

1.4 Important Percentage Formulae

(i) Salary/Weight/Income More.

If *A*'s income is *R* % more than *B*, then *B* is income is less than that of *A* by $100 \times \dfrac{R}{100+R}$ %. Given below are some of the important results in that context

(ii) Salary/Weight/Income Less.

If A's income is R% less than *B*, then *B*'s income is more than that of A by $100 \times \dfrac{R}{100-R}$ %.

Given below are some important results in that context.

If *A* is $16\dfrac{2}{3}$ % less than *B*, then *B* is 20 % more than *A*.

If *A* is 20 % less than *B*, then *B* is 25 % more than *A*.

If *A* is 25 % less than *B*, then *B* is $33\dfrac{1}{3}$ % more than *A.*

Note: If the question is - the price of a commodity is increased by R %, by what percent its consumption should be decreased, so that the total expenditure remains the same. Then the way to solve such question is the same. I.e. if the price is increased

then consumption should be decreased by $\dfrac{100 \times R}{(100 + R)}$.

If the price is decreased, then consumption should be increased by $\dfrac{100 \times R}{(100 - R)}$

(iii) *Increase and Decrease by the same % age*.

If a number is increased by *R* %, then this number is decreased by *R* %, then in total there would be a decrease of $\dfrac{R^2}{100}$ %.

(iv) **Increase and Decrease by different% age**.

If a number is decreased by *X* %, then this is again increased by *Y* %. Then the total increase in the number will be X+Y+$\dfrac{XY}{100}$.

The above-mentioned formula is very important. It has its application in so many other questions. In case instead of increase, there is a decrease, simply put a negative value in its place. You will get the right answer, even when both the decreases are given. What you will get after solving the formula, if it is positive, there is an increase, and if it is negative, there is a decrease.

(v) *Compound Growths.*

Typically compound growths are used in investment growth analysis (compound interest) or in population growth (things like cattle population, steel production output growth). In this section, we will be primarily concerned with compound growth related to population.

If P is the population of a country and if it grows at r % per annum, then the population after n years will be A = $P\left[\dfrac{100+r}{100}\right]^n$

1.5 More Solved Examples

6. The price of rice increases by 30 %. In order to keep the expenses on rice constant as before, by what percentage should a person cut down his consumption?

Sol. Here apply the formula $\dfrac{100 \times R}{(100+R)}$ ($\because$ the price has increased)

Consumption should be reduced by $\dfrac{100 \times 30}{(100+30)} = 23\dfrac{1}{13}\%$

7. Tom's income is 20 % less than Jerry's. How much is Jerry's income more than Tom's?

Sol. Apply the formula $\dfrac{100 \times R}{(100 + R)}$ ($\because$ income is R% less)

Jerry's income is more by $\dfrac{100 \times 20}{(80)}$ = 25 %

8. A traveling salesman carried 75 % of his money in traveler's cheque's and 25 % in cash. During one of his journeys, he lost his entire cash and spent from his traveler's cheques. On completion of the journey, he returned 30% of the traveler's cheques, which amounted to Rs 180. What was the total money that he carried?

Sol. 30 % of TC = Rs 180

$\therefore$ 100 % of TC s = $\dfrac{100}{30} \times 180$ = Rs 600

Since TC s accounted for 75% of the total money that he had carried, the total money that he carried is $\dfrac{100}{75} \times 600$ =Rs 800

9. A number is increased by 20%, then it is decreased by 30%, what is the net change in the number?

Sol. Using the formula $X + Y + \dfrac{XY}{100}$. $\Rightarrow 20 + (-30) + \dfrac{20 \times -30}{100}$ = -16. This means there is a decrease of 16%.

10. A square is converted into a rectangle by increasing one of its sides by 5 % and reducing the other by 5 %. What will be the % change in the area of the two figures?

Sol. Let the side of the square = a

$\therefore$ Its area = a^2 ; When the square is being converted to a rectangle, the length becomes 1.05a and the width becomes 0.95a. $\therefore$ New area = 1.05a × 0.95a = $0.9975a^2$

Change in area = a decrease of $0.0025a^2$

$\therefore$ % decrease in area = $\dfrac{0.0025a^2 \times 100}{a^2}$ = 0.25 %

11. If the population of a town is 231525 and it has been growing annually at 5 %, what was the population 3 years ago?

Sol. Let the population three years earlier be *X*

$\therefore X \times \left(\dfrac{100+5}{100}\right)^3 = 231525 \Rightarrow X \times \left[\dfrac{105}{100} \times \dfrac{105}{100} \times \dfrac{105}{100}\right] = 231525$

$\Rightarrow X \times \left[\dfrac{20}{21} \times \dfrac{20}{21} \times \dfrac{20}{21}\right] = 231525$

$\Rightarrow X = 231525 \times \left[\dfrac{20}{21} \times \dfrac{20}{21} \times \dfrac{20}{21}\right] = 200{,}000$

12. In an election there were two candidates A and B. The poll turnout was only 90 %. 500 of the registered votes were declared invalid. A won by a margin of 400 votes and got $48\frac{8}{9}$% of the registered votes. Find the total number of eligible voters and the number of votes received by each of the candidates.

Sol: Let the registered votes = X

A got $48\frac{8}{9}$% of *X* = $\frac{440}{9}$% of *X* = $\frac{4.4}{9}X$

Since *A* got 400 votes more than B, B got $\frac{4.4}{9}X - 400$

Total votes registered = X = A + B + Invalid votes

$X = \frac{4.4}{9}X + \frac{4.4}{9}X - 400 + 500 \Rightarrow X = \frac{8.8}{9}X + 100$

$\Rightarrow X$ = 4500. Since the poll turnout was only 90%, the total number of eligible voters = $\frac{100}{90} \times 4500$ = 5000

Number of votes A got = $\frac{4.4}{9} \times 4500$ = 2200

Number of votes B got = 2200 − 400 = 1800.

13. It was annual performance incentive time at Motak Kahindra. A's incentive was 10% less than B, B's was $33\frac{1}{3}$% more than C and C's was $16\frac{2}{3}$% less than D. What is D's incentive as a % of A's incentive?

Sol: A = 0.9 B = 9/10B,

B = 10/9 A.

B = 1.333 C = 4/3C,

$\therefore$ C = 3/4B = 3/4 × 10/9 A

C = 5/6 D,

$\therefore$ D = 6/5C = 6/5 × 3/4 × 10/9A = A.

Therefore, *D*'s incentive is 100 % of *A*'s or is equal to *A*'s.

Chapter 2: Profit & Loss

2.1 Profit & Loss

- ➢ **Cost Price (CP):** All overhead expenses such as transportation, taxes etc. are also included in the cost price.

- ➢ **Selling Price (SP)**: The sum of money, which is finally received for the product.

- ➢ **Marked Price (MP)**: The price, which is listed or marked on the product, this is also known as printed price/quotation price/invoice price/catalogue price.

- ➢ **Profit:** There is gain in a transaction if the selling price is more than the cost price. The excess of the selling price to the cost price is the profit in the transaction.

PROFIT = SELLING PRICE − COST PRICE

E.g. Let the cost price of a quintal of rice be Rs 1000 and the shopkeeper sells a kg of rice for Rs 12.5, then Cost price = Rs 1000 / quintal = Rs 10/kg as 1 quintal = 100 kg

Selling price = Rs 12.5 / kg.

∴ Profit = Rs 12.5 − Rs. 10 = Rs 2.5 / kg or Rs 250 per quintal

➢ **Loss:** When the selling price is less than the cost price there is loss in the transaction. The excess of cost price over the selling price is the loss in the transaction.

LOSS = COST PRICE − SELLING PRICE

E.g. The cost price of a score of mangoes is Rs. 220. The fruit vendor retails each mango for Rs. 10, then

Cost price = Rs. 220 / score = Rs. 11 / mango

(1 score = 20 nos.)

Selling price = Rs. 10 / mango

∴ Loss = Rs. 11 − Rs. 10 = Re. 1 per mango

Note: *Profit and loss percentage is always calculated on cost price, unless otherwise specified.*

2.2   Important Profit & Loss Formulae

➢ **% Profit:**

$$\% \operatorname{Pr}ofit = 100 \times \frac{Profit}{Costprice}$$

➢ **% Loss:**

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

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> **Equal % profit & loss on the same selling price of two articles:**

If two items are sold each at Rs *X*, one at a gain of P% and the other at a loss of P %, then the two transactions have resulted in an overall loss of $\dfrac{P^2}{100}\%$

The absolute value of the loss = Rs $\dfrac{2 \cdot P^2 \cdot X}{100^2 - P^2}$

> **Equal % profit & loss on the same cost price of two articles:**

If the cost price of two items are *X*, and one is sold at a profit of *p* % and the other at a loss of *p* %, then the two transactions have resulted in no gain or no loss.

> **Trade Discount:** To attract customers it is a common practice to announce discount on the marked price of an article.

Note: *The discount is always taken as a % of the marked price only unless otherwise specified.*

E.g. suppose the list price of an article be Rs. 450. A discount of 5 % on its list price is announced.

Therefore, the new selling price = $\dfrac{95}{100} \times 450$ = Rs 422.5

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➢ **Cash Discount:**

In addition to trade discount, the manufacturer may offer an additional discount called the Cash Discount if the buyer makes full payment within a certain specified time.

Cash Discount is usually offered on the net price (the price after subtracting discount from the marked price).

Therefore, Cash Price = Net Price - Cash Discount

Note: *Cash discount is always calculated on net price, unless otherwise specified.*

➢ **Wrong Weight**: When a tradesman professes to sell at cost price, but uses a false weight, then the percentage profit earned

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

➢ **Successive Discounts**: When a tradesman offers more than one discount to the customer, then sometimes you need to calculate the single discount, which is equal to the two discounts given. There you can apply the method of decimals learned in the concepts of percentages. e.g. a tradesman offers two successive discounts of 20% and 10 %, which single discount is equal to these two successive discounts.

You can apply the principle, that after the first discount of 20 % the remaining price is 0.8 and after the second discount of 10 %, the remaining part is 0.9.

Net the remaining part is $0.8 \times 0.9 = 0.72$

$\Rightarrow$ the discount is $1 - 0.72 = 0.28$ i.e. 28 %.

Or a straight method can be applied for two discounts.

Single discount, which is equal to two successive discounts of *m* % and *n* % $= \left(m + n - \dfrac{m}{100} \right)\%$

When the SP of x articles is equal to CP of y articles, what is the profit percent earned?

$\text{Profit percent} = \dfrac{100 \times \text{difference in x and y}}{X}.$

2.3   Solved Examples

1.   A cloth merchant bought 20 shirts, each at a price of Rs 180. He paid Rs 100 as octroi charges for bringing them into Pune. He sold each of them for Rs 203.50. Find his percentage profit.

Sol: Total cost = cost of 20 shirts + Rs 100 (Octroi)

= 20 × 180 + 100 = 3700

$\therefore$ Cost / Shirt = $\dfrac{3700}{20}$ = 185.

Selling price = 203.50. ∴ Profit = 203.5 − 185 = 18.50

∴ % Profit = $\frac{18.50}{185}$ × 100 = 10 %

2. Raj purchased two watches at the same price and sold one at a profit of 10 % and the other at a profit of 12.5%. If the difference between the two selling price is Rs 15, what is the cost price of each of the watches?

Sol: Let the cost price of the watches = 100

The selling price of the first watch = 110 and

The selling price of the second watch = 112.5.

The difference in the selling price = 2.5 if the cost price = 100

∴ If the difference in selling price = 15, the cost price = $\frac{100}{2.5}$ × 15 = 600

3. A retail fruit vendor buys pineapples at a score for Rs 175, and retails them at a dozen for Rs 114. Did he gain or lose in the transaction and what % was his gain or loss?

Sol: C.P = Rs.175/score

∴ C.P/Pineapple = $\frac{175}{20}$ = 8.75 (Note: 1 score = 20 nos.)

S.P = Rs.114/dozen

∴ S.P/Pineapple = $\frac{114}{12}$ = 9.5

Profit = 0.75.

∴ % Profit = $\frac{0.75}{8.75}$ × 100 = $8\frac{4}{7}$ %

4. A man sells two tables at the same price. On one he makes a profit of 10 % and on the other he makes a loss of 10 %. Find his total loss / gain in these two transactions. If the selling price of the tables was Rs 1000 each, what was the profit / loss in Rs and what was the cost price of each of the tables?

Sol: Net loss = $\frac{10^2}{100\%}$ = 1 % loss

If the selling price = S.P, the amount of loss = $\dfrac{2 \cdot p^2 \cdot S.P}{100^2 - p^2}$ ∴ As the selling price = 1000,

loss = $\dfrac{2 \cdot 10^2 \cdot 1000}{100^2 - 10^2}$ = $\frac{2000}{99}$ = $20\,\frac{20}{99}$.

Cost price of the item sold on profit

C.P $(1 + 0.1) = 1000.$

C.P $= {1000}/{1.1} = 909\,{1}/{11}$

Cost price of the item sold on loss

C.P $(1 - 0.1) = 1000.$

$\therefore$ C.P $= {1000}/{0.9} = 1111.11$

5. A floppy disc drive is sold for Rs 935 at a profit of 10 %. What would have been the actual profit or loss if it had been sold at Rs 807.50?

Sol: C.P $(1.1) = 935.$ $\therefore$ C.P $= {935}/{1.1} = 850$

If selling price = Rs.807.50, then loss = 850 − 807.50 = 42.50

% Loss = ${42.5}/{850} \times 100 = 5\%$

6. Profit obtained by selling a wristwatch at Rs 160 is equal to 7/5th of the profit obtained by selling the same wristwatch at Rs 150. What is the cost price of the watch?

Sol: Let the cost of a watch be x $\therefore$ $(160 - x) = \frac{7}{5} \times (150 - x)$ $800 - 5x = 1050 - 7x.$ $\Rightarrow 2x = 250 \Rightarrow x = Rs.125$

7. A merchant buys 20 kgs of rice at Rs 1.50 / kg, and another 40 kgs of rice at Rs 0.90 / kg. He mixes them and sells one third of the mixture at Re 1/ kg. At what price should he sell the remaining mixture to get an overall profit of 25 %?

Sol: Total cost for the entire quantity of rice = 20 × 1.5 + 40 × 0.9 = 66

If his profit is 25 % then the sales realization = 1.25 × 66 = 82.50

He sells 20 kgs at Re 1/kg = Rs.20.

Therefore to make the said amount of profit, he should sell the remaining 40 kgs of rice at (82.50 - 20) = Rs.62.50

∴ The selling price of a kg of rice for the remaining 40 kgs = $^{62.5}/_{40}$ = 1.5625

8. 2000 copies of a book are printed at Rs 8000. What should be the list price if the publisher wishes to make a 50 % profit after giving a 20 % discount on the list price to the retailer?

Sol: C.P per book = 4

Profit to be made = 50 % ⇒ S.P = 1.5 × 4 = 6

Rs. 6 should be the net price to the publisher after a 20 % discount on the list price.

I.e. List price $\times 0.8 = 6 \Rightarrow$ List price $= 6/0.8 =$ Rs. 7.5

9. What should each of the sixty T - Shirts be sold at, the cost of each of which is Rs.25, so as to get a profit equal to the selling price of 10 of them?

Sol: S.P. of 10 T – Shirts = S.P of 60 T – Shirts – C.P. of 60 T – Shirts

10 S.P. = 60 S.P – 60 $\times$ 25

50 S.P = 1500 $\Rightarrow$ S.P = Rs. 30

10. 5/8th of 160 chairs were sold at a profit of Rs. 25 each and the rest for Rs. 8,200. If the seller makes a profit of 25 % on the whole transaction, what is the cost price of each of the chairs?

Sol: 100 chairs were sold at a profit of Rs.25 each.

$\therefore$ Profit on these 100 chairs = 2500

S. P. of all 160 chairs = C. P. of 100 chairs + Profit on 100 chairs + S. P. of 60 chairs = 100 $\times$ C.P + 2500 + 8700 = 100 $\times$ C. P. +10700

But these 160 chairs were sold at a profit of 25 %.

$\therefore$ S. P. = 1.25 $\times$ C.P

$\Rightarrow 160 \times 1.25 \times C.P = 100 \times C.\ P. + 10700$

$\Rightarrow 200\ C.P = 100\ C.P + 10700 \Rightarrow C.\ P. = 107.$

11. If an article is sold at a loss of 66 2/3%, what is the loss in terms of the selling price?

Sol: Let the C. P. = 100. ∴ Amount loss = 66 2/3

$\Rightarrow$ S. P. = 100 − 66 2/3 = 33 1/3

∴ Loss expressed in terms of S. P.

$= \dfrac{66\,^2\!/_3}{33\,^1\!/_3} \times 100 = 200\ \%$

12. Arun buys a camera for Rs 6000 and sells it to Kumar at a profit of 20 %. After some time Kumar sells it back to Arun at a loss of 10 %. How much did Arun gain in the whole transaction and what was the % gain in terms of his original cost?

Sol: **Transaction I**: S. P. of Arun = C. P. of Kumar = 1.2 × 6000 = 7200

Transaction II: S. P. of Kumar = C. P. of Arun = 0.9 × 7200 = 6480

Therefore net profit to Arun = S. P. $_{A1}$ − S. P. $_{K2}$ = 7200 − 480 = 720

∴ % Profit = $^{720}\!/_{6000}$ × 100 = 12 %

13. A package tour operator allows a 25 % discount on his advertised price and then makes a profit of 20 %. What is the advertised price on which he gains Rs.60?

Sol: Profit = Net price − Cost Price = 60

Net price = 1.2 (C. P.) $\Rightarrow$ 1.2 C.P − C. P. = 60

$\Rightarrow$ 0.2 C. P. = 60 $\Rightarrow$ C. P. = 300 and Net price = 360.

List price or advertised price× (0.75) = Net price

$\therefore$ List price = $\dfrac{\text{Net.price}}{0.75}$ = $\dfrac{360}{0.75}$ = 480.

14. The cost price of each of 1000 articles works out to be Rs. 0.85. The manufacturer finds that only 700 articles be sold. If he fixes the selling price of these 700 articles such that he makes a profit of 40 % on his total cost, find the mark up on the cost?

Sol: C. P. of 1000 articles = Rs.850

The vendor makes 40 % profit.

$\therefore$ S. P. = 1.4 C.P = 1.4 ×850 = 1190.

But as he can sell only 700 out of the 1000, he has to price the 700 articles in such a way that he gets Rs.1190

∴ S.P of an item = $\frac{1190}{700}$ = Rs 1.70.

Therefore, mark up = S. P. − C. P. = Rs 0.85 and % mark up = $\frac{0.85}{0.85}$ × 100 = 100 %

(Mark up is always expressed as a % of a cost)

15. One tradesman calculates % profit on the buying price and the other on the selling price. Find the difference between their profits if both of them claim to make 20 % on their goods sold at Rs.1500

Sol: **Case I:** C. P. (1.2) = 1500.

∴ C. P. = 1250 ⇒ Profit = 1500 − 1250 = Rs. 250

Case II: Profit = 0.2 (S.P) = 0.2 × 1500 = Rs. 300

⇒ The difference in profit made by each of the tradesmen = Rs. 50.

16. A manufacturer estimates that on inspection 20 % of the articles he produces are rejected. He accepts an order to supply 20,000 articles at Rs. 7.50 per item. He estimates the profit on his outlay to be 20 % after providing for the rejects. Find his cost of manufacture per article.

Sol: S.P = Rs. 7.5 per item

∴ For 20,000 items = 150,000

Minimum no. of items that need to be produced so that after providing for 20 % rejection he still has 20,000 items = $\frac{20,000}{0.8}$ = 25,000

If he makes a 20 % profit, then his cost price = $\frac{150,000}{1.2}$

= 125,000 $\Rightarrow$ Cost per item = $\frac{125,000}{25,000}$ = Rs. 5

17. A man sold Pentium computers at a profit of 6 %. Had he made a loss of 5 % instead due to a price crash, he would have sold it for Rs 3,850 less. What was his cost price and selling price in each of the instances?

Sol: C. P. (1.06) = S. P.$_1$

C. P. (0.95) = S. P.$_2$

S. P.$_1$ - S. P.$_2$ = 3850

$\Rightarrow$ C. P. (1.06 − 0.95) = 3850

$\Rightarrow$ 0.11 C. P. = 3850

$\Rightarrow$ C. P. = 35,000

And S. P.$_1$ = 1.06 × 35,000 = 37,100 and S. P.$_2$

= 0.95 × 35,000 = 33,250

18. Trader A offers a discount of 25 % on the marked price for cash purchase. Trader B offers a trade discount of 20 % and a cash discount of 5 % on the same article marked at the same price as that of Trader A. As a buyer whom should I buy from if I am to pay cash?

Sol: **Trader A:** If the marked price = 100 then the net price to the buyer = $0.75 \times 100 = 75$.

Trader B: If the marked price = 100, then the net price

= $0.8 \times 100 = 80$ and the cash price = $0.95 \times 80 = 0.76$.

Since the discount is higher or the price to me as a buyer is lower with Trader A, I should choose to buy from Trader A.