6

Profit & Loss

INTRODUCTION

Traditionally, Profit & Loss has always been an important chapter for CAT. Besides, all other Management entrance exams like SNAP, CMAT, MAT, ATMA as well as Bank P.O. exams extensively use questions from this chapter. From the point of view of CAT, the relevance of this chapter has been gradually reducing. However, CAT being a highly unpredictable exam, my advice to students and readers would be to go through this chapter and solve it at least up to LOD II, so that they are ready for any changes in patterns.

Further, the Level of Difficulties at which questions are set in the various exams can be set as under:

LOD I: CAT, XLRI, IRMA, IIFT, CMAT, Bank PO aspirants, MAT, NIFT, NMAT, and SNAP and all other management exams.

LOD II: CAT, XLRI, IRMA (partially), etc.

LOD III: CAT, XLRI (students aiming for 60% plus in Maths in CAT).

THEORY

Profit & Loss are part and parcel of every commercial transaction. In fact, the entire economy and the concept of capitalism is based on the so called "Profit Motive".

Profit & Loss in Case of Individual Transactions

We will first investigate the concept of Profit & Loss in the case of individual transactions. Certain concepts are important in such transactions. They are:

The price at which a person buys a product is the cost price of the product for that person. In other words, the amount paid or expended in either purchasing or producing an object is known as its Cost Price (also written as CP).

The price at which a person sells a product is the sales price of the product for that person. In other words, the amount got when an object is sold is called as the *Selling Price* (*SP*) of the object from the seller's point of view.

When a person is able to sell a product at a price higher than its cost price, we say that he has earned a profit. That is,

If SP > CP, the difference, SP – CP is known as the profit or gain.

Similarly, if a person sells an item for a price lower than its cost price, we say that a loss has been incurred.

The basic concept of profit and loss is as simple as this.

If, however, SP < CP, then the difference, CP – SP is called the loss.

It must be noted here that the Selling Price of the seller is the Cost Price of the buyer.

Thus we can say that in the case of profit the following formulae hold true:

1. Profit = SP – CP
2. SP = Profit + CP
3. CP = SP – Profit
4. Percentage Profit = $\frac{\text{Profit} \times 100}{\text{CP}}$

Percentage Profit is always calculated on CP unless otherwise stated.

Notice that SP = CP + Gain
= CP + (Gain on ₹1) × CP
= CP + (Gain%/100) × CP

Example: A man purchases an item for ₹ 120. If he sells it at a 20 per cent profit find his selling price.

Solution: The selling price is given by $120 + 120 \times 0.2 = 144$

$$= \text{CP} + (\text{Gain}\%/100) \times \text{CP} = \text{CP}\left[1 + \frac{\%\text{Gain}}{100}\right]$$

For the above problem, the selling price is given by this method as: Selling Price $= 1.2 \times 120 = 144$.

Hence, we also have the following:

1. $\text{SP} = \left[1 + \frac{\%\text{Gain}}{100}\right] \times \text{C.P} = \frac{(100 + \text{Gain}\%) \times \text{CP}}{100}$
2. $\text{CP} = \frac{100 \times \text{SP}}{(100 \times \text{Gain}\%)}$

In case of loss

1. Loss = CP – SP
2. SP = CP – Loss
3. CP = SP + Loss
4. Loss% = Loss on ₹ 100 $= \frac{\text{Loss} \times 100}{\text{CP}}$

Precentage Loss is always calculated on CP unless otherwise stated.

The above situation (although it is the basic building block of Profit and Loss) is not the normal situation where we face Profit and Loss problems. In fact, there is a wide application of profit and loss in day-to-day business and economic transactions. It is in these situations that we normally have to work out profit and loss problems.

Having investigated the basic concept of profit and loss for an individual transaction of selling and buying one unit of a product, let us now look at the concept of profit and loss applied to day-to-day business and commercial transactions.

Profit & Loss as Applied to Business and Commercial Transactions

Profit & Loss when Multiple Units of a Product are Being Bought and Sold The basic concept of profit and loss remains unchanged for this situation. However, a common mistake in this type of problem can be avoided if the following basic principle is adopted:

Profit or Loss in terms of money can only be calculated when the number of items bought and sold are equal.

That is, Profit or Loss in money terms cannot be calculated unless we equate the number of products bought and sold.

This is normally achieved by equating the number of items bought and sold at 1 or 100 or some other convenient figure as per the problem asked.

Overlooking of this basic fact is one of the most common mistakes that students are prone to making in the solving of profit and loss problems.

Types of Costs In any business dealing, there is a situation of selling and buying of products and services. From the sellers point of view, his principle interest, apart from maximising the sales price of a product/service, is to minimise the costs associated with the selling of that product/service. The costs that a businessman/trader faces in the process of day-to-day business transaction can be subdivided into three basic categories:

1. **Direct Costs or Variable Costs** This is the cost associated with direct selling of product/service. In other words, this is the cost that varies with every unit of the product sold. Hence, if the variable cost in selling a pen for ₹ 20 is ₹ 5, then the variable cost for selling 10 units of the same pen is $10 \times 5 =$ ₹ 50.

   As is clear from the above example, that part of the cost that varies directly for every additional unit of the product sold is called as direct or variable cost.

   Typical examples of direct costs are: Raw material used in producing one unit of the product, wages to labour in producing one unit of the product when the wages are given on a piece rate basis, and so on. In the case of traders, the cost price per unit bought is also a direct cost (i.e. every such expense that can be tied down to every additional unit of the product sold is a direct cost).
2. **Indirect Costs (Overhead Costs) or Fixed Costs** There are some types of costs that have to be incurred irrespective of the number of items sold and are called as fixed or indirect costs. For example, irrespective of the number of units of a product sold, the rent of the corporate office is fixed. Now, whether the company sells 10 units or 100 units, this rent is fixed and is hence a fixed cost.

   Other examples of indirect or fixed costs: Salary to executives and managers, rent for office, office telephone charges, office electricity charges.

   Apportionment of indirect (or fixed) costs: Fixed Costs are apportioned equally among each unit of the product sold. Thus, if n units of a product is sold, then the fixed cost to be apportioned to each unit sold is given by

   $$\frac{\text{Fixed costs}}{n}$$
3. **Semi-Variable Costs** Some costs are such that they behave as fixed costs under normal circumstances but have to be increased when a certain level of sales figure is reached. For instance, if the sales increase to such an extent that the company needs to take up additional office space to accommodate the increase in work

due to the increase in sales then the rent for the office space becomes a part of the semi-variable cost.

The Concept of Margin or Contribution Per Unit The difference between the value of the selling price and the variable cost for a product is known as the margin or the contribution of the product. This margin goes towards the recovery of the fixed costs incurred in selling the product/service.

The Concept of the Break-even Point The break-even point is defined as the volume of sale at which there is no profit or no loss. In other words, the sales value in terms of the number of units sold at which the company breaks even is called the break-even point. This point is also called the break-even sales.

Since for every unit of the product the contribution goes towards recovering the fixed costs, as soon as a company sells more than the break-even sales, the company starts earning a profit. Conversely, when the sales value in terms of the number of units is below the break-even sales, the company makes losses.

The entire scenario is best described through the following example.

Let us suppose that a *paan* shop has to pay a rent of ₹ 1000 per month and salaries of ₹ 4000 to the assistants.

Also suppose that this *paan* shop sells only one variety of *paan* for ₹ 5 each. Further, the direct cost (variable cost) in making one *paan* is ₹ 2.50 per *paan*, then the margin is ₹ (5 – 2.50) = ₹ 2.50 per *paan*.

Now, break-even sales will be given by:

Break-even-sales = Fixed costs/Margin per unit = 5000/2.5 = 2000 *paans*.

Hence, the *paan* shop breaks-even on a monthly basis by selling 2000 *paans*.

Selling every additional *paan* after the 2000th *paan* goes towards increasing the profit of the shop. Also, in the case of the shop incurring a loss, the number of *paans* that are left to be sold to break-even will determine the quantum of the loss.

Note the following formulae:

Profit = (Actual sales – Break-even sales) × Contribution per unit

Also in the case of a loss:

Loss = (Break-even sales – Actual sales) × Contribution per unit

Also, if the break-even sales equals the actual sales, then we reach the point of no profit no loss, which is also the technical definition of the break-even point.

Note that the break-even point can be calculated on the basis of any time period (but is normally done annually or monthly).

Profit Calculation on the Basis of Equating the Amount Spent and the Amount Earned

We have already seen that profit can only be calculated in the case of the number of items being bought and sold being equal. In such a case, we take the difference of the money got and the money given to get the calculation of the profit or the loss in the transaction.

There is another possibility, however, of calculating the profit. This is done by equating the money got and the money spent. In such a case, the profit can be represented by the amount of goods left. This is so because in terms of money the person going through the transaction has got back all the money that he has spent, but has ended up with some amount of goods left over after the transaction. These left over items can then be viewed as the profit or gain for the individual in consideration.

Hence, profit when money is equated is given by Goods left. Also, cost in this case is represented by Goods sold and hence percentage profit $= \dfrac{\text{Goods left}}{\text{Goods sold}} \times 100.$

Example: A fruit vendor recovers the cost of 25 mangoes by selling 20 mangoes. Find his percentage profit.

Solution: Since the money spent is equal to the money earned the percentage profit is given by:

$$\%\ \text{Profit} = \frac{\text{Goods left}}{\text{Goods sold}} \times 100 = 5 \times 100/20 = 25\%$$

Concept of Mark Up

Traders/businessmen, while selling goods, add a certain percentage on the cost price. This addition is called percentage mark up (if it is in money terms), and the price thus obtained is called as the marked price (this is also the price printed on the product in the shop).
The operative relationship is

CP + Mark up = Marked price
or CP + % Mark up on CP = Marked Price

The product is normally sold at the marked price in which case the marked price = the selling price

If the trader/shopkeeper gives a discount, he does so on the marked price and after the discount the product is sold at its discounted price.

Hence, the following relationship operates:

CP + % Mark up (Calculated on CP) = Marked Price
Marked price – % Discount = Selling price

Use of PCG in Profit and Loss

1. The relationship between CP and SP is typically defined through a percentage relationship. As we have seen earlier, this percentage value is called as

the percentage mark up. (And is also equal to the percentage profit if there is no discount).

Consider the following situation —

Suppose the SP is 25% greater than the CP. This relationship can be seen in the following diagram.

$$CP \xrightarrow{25\%\uparrow} SP$$

In such a case the reverse relationship will be got by the A→B→A application of PCG and will be seen as follows:

If the profit is 25% :

Example: $CP \xrightarrow{25\%\uparrow} SP \xrightarrow{20\%\downarrow} CP$

Suppose you know that by selling an item at 25%, profit the Sales price of a bottle of wine is ₹ 1600. With this information, you can easily calculate the cost price by reducing the sales price by 20%. Thus, the CP is

$$1600 \xrightarrow[-320]{20\%\downarrow} 1280$$

Space for Notes

WORKED-OUT PROBLEMS

Before we go into problems based on profit and loss, the reader should realize that there are essentially four phases of a profit and loss problem. These are connected together to get higher degrees of difficulty.

These are clues for (a) Cost calculations (b) Marked price calculations (c) Selling price calculations (d) Overheads/fixed costs calculations.

It is left to the reader to understand the interrelationships between *a*, *b*, *c* and *d* above. (These have already been stated in the earlier part of this chapter.)

Problem 6.1 A shopkeeper sold goods for ₹ 2000 at a profit of 50%. Find the cost price for the shopkeeper.

Solution The shopkeeper sells his items at a profit of 50%. This means that the selling price is 150% of cost price (Since CP + % Profit = SP)

For short you should view this as SP = 1.5 CP.

The problem with this calculation is that we know what 150% of the cost price is but we do not know what the cost price itself is. Hence, we have difficulty in directly working out this problem. The calculation will become easier if we know the percentage calculation to be done on the basis of the selling price of the goods.

Hence look at the equation from the angle → CP = SP/1.5.

Considering the SP as SP/1, we have to find CP as SP/1.5. This means that the denominator is increasing by 50%. But from the table of denominator change to ratio change of the chapter of percentages, we can see that when the denominator increases by 50% the ratio decreases by 33.33%.

Interpret this as the CP can be got from the SP by reducing the SP by 33.33%. Hence, the answer is 2000 – (1/3) × 2000 = ₹ 1333.33

Also, this question can also be solved through options by going from CP (assumed from the value of the option) to the SP by increasing the assumed CP by 50% to check whether the SP comes out to 2000. If a 50% increase in the assumed CP does not make the SP equal 2000 it means that the assumed CP is incorrect. Hence, you should move to the next option. Use logic to understand whether you go for the higher options or the lower options based on your rejection of the assumed option.

Note: The above question will never appear as a full question in the examination but might appear as a part of a more complex question. If you are able to interpret this statement through the denominator change to ratio change table, the time requirement will reduce significantly and you will gain a significant time advantage over this statement.

Problem 6.2 A man buys a shirt and a trousers for ₹ 371. If the trouser costs 12% more than the shirt, find the cost of the shirt.

Solution Here, we can write the equation:
$s + 1.12s = 371 \rightarrow s = 371/2.12$ (however, this calculation is not very easily done)

An alternate approach will be to go through options. Suppose the options are

(a) ₹ 125 (b) ₹ 150
(c) ₹ 175 (d) ₹ 200

Checking for, say, ₹ 150, the thought process should go like:

Let s = cost of a shirt

If s = 150, $1.12s$ will be got by increasing s by 12% i.e. 12% of 150 = 18. Hence the value of $1.12s$ = 150 + 18 =168 and $s + 1.12s$ = 318 is not equal to 371. Hence check the next higher option.

If s = 175, $1.12s = s$ + 12% of s = 175 + 21 = 196. i.e. 2.12 s = 371.

Hence, Option (c) is correct.

Problem 6.3 A shopkeeper sells two items at the same price. If he sells one of them at a profit of 10% and the other at a loss of 10%, find the percentage profit/loss.

Generic question: A shopkeeper sells two items at the same price. If he sells one of them at a profit of x% and the other at a loss of x%, find the percentage profit/loss.

Solution The result will always be a loss of $[x/10]^2$%. Hence, the answer here is $[10/10]^2$% = 1% loss.

Problem 6.4 For Problem 6.3, find the value of the loss incurred by the shopkeeper if the price of selling each item is ₹ 160.

Solution When there is a loss of 10% → 160 = 90% of CP_1. ∴ CP_1 = 177.77

When there is a profit of 10% → 160 = 110% of CP_2 ∴ CP_2 = 145.45

Hence total cost price = 177.77 + 145.45 = 323.23 while the net realisation is ₹ 320.

Hence loss is ₹ 3.23.

Short cut for calculation: Since by selling the two items for ₹ 320 the shopkeeper gets a loss of 1% (from the previous problem), we can say that ₹ 320 is 99% of the value of the cost price of the two items. Hence, the total cost is given by 320/0.99 (solution of this calculation can be approximately done on the percentage change graphic).

Problem 6.5 If by selling 2 items for ₹ 180 each the shopkeeper gains 20% on one and loses 20% on the other, find the value of the loss.

Solution The percentage loss in this case will always be $(20/10)^2 = 4\%$ loss.

We can see this directly as 360 → 96% of the CP → CP = 360/0.96. Hence, by percentage change graphic 360 has to be increased by 4.166 per cent = 360 + 4.166% of 360 = 360 + 14.4 + 0.6 = ₹ 375.

Hence, the loss is ₹ 15.

Problem 6.6 By selling 15 mangoes, a fruit vendor recovers the cost price of 20 mangoes. Find the profit percentage.

Solution Here since the expenditure and the revenue are equated, we can use percentage profit = (goods left × 100)/ goods sold = 5 × 100/15 = 33.33%.

Problem 6.7 A dishonest shopkeeper uses a 900 gram weight instead of 1 kilogram weight. Find his profit percent if he sells per kilogram at the same price as he buys a kilogram.

Solution Here again the money spent and the money got are equal. Hence, the percentage profit is got by goods left × 100/goods sold.

This gives us 11.11%.

Problem 6.8 A manufacturer makes a profit of 15% by selling a colour TV for ₹ 6900. If the cost of manufacturing increases by 30% and the price paid by the retailer is increased by 20%, find the profit percent made by the manufacturer.

Solution For this problem, the first line gives us that the cost price of the TV for the manufacturer is ₹ 6000.

(By question stem analysis you should be able to solve this part of the problem in the first reading and reach at the figure of 6000 as cost, before you read further. This can be achieved advantageously if your percentage rule calculations are strong. Hence, work on it. The better you can get at it the more it will benefit you. In fact, one of the principal reasons I get through the CAT every year is the strength in percentage calculation. Besides, percentage calculation will also go a long way in improving your scores in data Interpretation.)

Further, if you have got to the 6000 figure by the end of the first line, reading further you can increase this advantage by calculating while reading as follows:

Manufacturing cost increase by 30% → New manufacturing cost = 7800 and new selling price is 6900 + 20% of 6900 = 6900 + 1380 = 8280.

Hence, profit = 8280 – 7800 = 480 and profit percent = 480 × 100/7800 = 6.15%.

Problem 6.9 Find a single discount to equal three consecutive discounts of 10%, 12% and 5%.

Solution Using percentage change graphic starting from 100: we get 100 → 88 → 83.6 → 75.24 (Note we can change percentages in any order).

Hence, the single discount is 24.76%.

Problem 6.10 A reduction in the price of petrol by 10% enables a motorist to buy 5 gallons more for $180. Find the original price of petrol.

Solution 10% reduction in price → 11.11% increase in consumption.

But 11.11% increase in consumption is equal to 5 gallons. Hence, original consumption is equal to 45 gallons for $180. Hence, original price = 4$ per gallon.

Problem 6.11 Ashok bought an article and spent ₹ 110 on its repairs. He then sold it to Bhushan at a profit of 20%. Bhushan sold it to Charan at a loss of 10%. Charan finally sold it for ₹ 1188 at a profit of 10%. How much did Ashok pay for the article.

(a) ₹ 890 (b) ₹ 1000
(c) ₹ 780 (d) ₹ 840

Solution Solve through options using percentage rule and keep checking options as you read. Try to finish the first option-check before you finish reading the question for the first time. Also, as a thumb rule always start with the middle most convenient option. This way you are likely to be required lesser number of options, on an average.

Also note that LOD II and LOD III questions will always essentially use the same sentences as used in LOD I questions. The only requirement that you need to have to handle LOD II and III questions is the ability to string together a set of statements and interconnect them.

Problem 6.12 A dishonest businessman professes to sell his articles at cost price but he uses false weights with which he cheats by 10% while buying and by 10% while selling. Find his percentage profit.

Solution Assume that the businessman buys and sells 1 kg of items. While buying he cheats by 10%, which means that when he buys 1 kg he actually takes 1100 grams. Similarly, he cheats by 10% while selling, that is, he gives only 900 grams when he sells a kilogram. Also, it must be understood that since he purportedly buys and sells the same amount of goods and he is trading at the same price while buying and selling, money is already equated in this case. Hence, we can directly use: % Profit = (Goods left × 100/Goods sold) = 200 × 100/900 = 22.22% (Note that you should not need to do this calculation since this value comes from the fraction to percentage conversion table).

If you are looking at 70% plus net score in quantitative ability you should be able to come to the solution in about 25 seconds inclusive of problem reading time. And the calculation should go like this:

Money is equated → % profit = 2/9 = 22.22%

The longer process of calculation in this case would be involving the use of equating the amount of goods bought and sold and the money value of the profit. However, if you try to do this you will easily see that it requires a much higher degree of calculations and the process will tend to get messy.

The options for doing this problem by equating goods would point to comparing the price per gram bought or sold. Alternatively, we could use the price per kilogram bought and sold (which would be preferable to equating on a per gram basis for this problem).

Here the thought process would be:

Assume price per kilogram = ₹ 1000. Therefore, he buys 1100 grams while purchasing and sells 900 grams while selling.

To equate the two, use the following process:

	Money paid		*Amount of goods*
Buying	₹ 1000	1100	grams (Reduce this by 10%)
After reduction	₹ 900	990	grams
Selling	₹ 1000	900	grams (Increase this by 10%)
After increase	₹ 1100	990	

Problem 6.13 RFO Tripathi bought some oranges in Nagpur for ₹ 32. He has to sell it off in Yeotmal. He is able to sell off all the oranges in Yeotmal and on reflection finds that he has made a profit equal to the cost price of 40 oranges. How many oranges did RFO Tripathi buy?

Solution Suppose we take the number of oranges bought as x. Then, the cost price per orange would be ₹ $32/x$, and his profit would by $40 \times 32/x = 1280/x$.

To solve for x, we need to equate this value with some value on the other side of the equation. But, we have no information provided here to find out the value of the variable x. Hence, we cannot solve this equation.

Problem 6.14 By selling 5 articles for ₹ 15, a man makes a profit of 20%. Find his gain or loss percentage if he sells 8 articles for ₹ 18.4?

Questions of this type normally appear as part of a more complex problem in an exam like the CAT.

Remember, such a question should be solved by you as soon as you finish reading the question by solving-while-reading process, as follows.

By selling 5 articles for ₹ 15, a man makes a profit of 20% → SP = 3. Hence, CP = 2.5, if he sells 8 articles for ₹ 18.4 → SP = 2.3. Hence percentage loss = 8%. For solving this question through this method with speed you need to develop the skill and ability to calculate percentage changes through the percentage change graphic. For this purpose, you should not be required to use a pencil and a paper.

Problem 6.15 Oranges are bought at 12 for a rupee and are sold at 10 for a rupee. Find the percentage profit or loss.

Solution Since money spent and got are equated, use the formula for profit calculation in terms of goods left/goods sold.

This will give you percentage profit = 2/10 = 20%.

Alternatively, you can also equate the goods and calculate the percentage profit on the basis of money as

CP of 1 orange = 8.33 paise

SP of 1 orange = 10 paise

8.33 paise → 10 paise (corresponds to a percentage increase of 20% on CP)

Problem 6.16 In order to maximise its profits, AMS Corporate defines a function. Its unit sales price is ₹ 700 and the function representing the cost of production = 300 + $2p^2$, where p is the total units produced or sold. Find the most profitable production level. Assume that everything produced is necessarily sold.

Solution The function for profit is a combination of revenue and costs. It is given by Profit = Revenue – Costs = $700p - (300 + 2p^2) = -2p^2 + 700p - 300$.

In order to find the maxima or minima of any quadratic function, we differentiate it and equate the differentiated equation to zero.

Thus, the differentiated profit function is $-4p + 700 = 0 \rightarrow p = 175$. This value of production will yield the maximum profits in this case.

Note: Whether a quadratic function is maximum or minimum is decided by redifferentiating the differentiated equation. We then look at the sign of the constant term to determine whether the value got by equating the differentiated equation to zero corresponds to the maximum or the minimum. In the case of the constant term, left being negative, we say that the function is a maxima function and hence the solution point got would be a maximum point. In the event that the final constant term is positive, it is a minimum function.

Short cut Just look at the coefficient of x^2 in the function. If it is positive, equating the first differentiation to zero would yield the minimum point, and if the coefficient of x^2 is negative, the function is a maximum function.

Problem 6.17 For Problem 6.16, what is the value of the maximum profits for AMS Corporate?

Solution For this, continuing from the previous question's solution, we just put the value of $p = 175$ in the equation for profit. Thus, substitute $p = 175$ in the equation. Profit = $-2p^2 + 700p - 300$ and get the answer.

Problem 6.18 A shopkeeper allows a rebate of 25% to the buyer. He sells only smuggled goods and as a bribe, he pays 10% of the cost of the article. If his cost price is ₹ 2500, then find what should be the marked price if he desires to make a profit of 9.09%.

Solution Use solving-while-reading as follows: Cost price (= 2500) + Bribe (= 10% of cost of article = 250) = Total cost to the shopkeeper (2500 + 250 = 2750).

He wants a profit of 9.09 percent on this value → Using fraction to percentage change table we get 2750 + 9.09% of 2750 = 2750 + 250 = ₹ 3000.

But this ₹ 3000 is got after a rebate of 25%. Since we do not have the value of the marked price on which 25% rebate is to be calculated, it would be a good idea to work reverse through the percentage change graphic:

Going from the marked price to ₹ 3000 requires a 25% rebate. Hence the reverse process will be got by increasing ₹ 3000 by 33.33% and getting ₹ 4000.

[Notice the use of percentage change graphic in general and the product constancy table in particular in the solving of this question]

Problem 6.19 A man sells three articles, one at a loss of 10%, another at a profit of 20% and the third one at a loss of 25%. If the selling price of all the three is the same, find by how much percent is their average CP lower than or higher than their SP.

Solution

Note: It is always convenient to solve questions involving percentages by using the number 100. The reason for this is that it reduces the amount of effort required in calculating the solution. Hence, it goes without saying that the variable to be fixed at 100 should be the one with the highest number of calculations associated with it. Another thumb rule for this is that the variable to be fixed at 100 should be the one with which the most difficult calculation set is associated.

We have to calculate: (average CP – average SP)/average SP.

Here, the selling price is equal in all three cases. Since the maximum number of calculations are associated with the SP, we assume it to be 100. This gives us an average SP of 100 for the three articles. Then, the first article will be sold at 111.11, the second at 83.33 and the third at 133.33. (The student is advised to be fluent at these calculations) Further, the CP of the three articles is 111.11 + 83.33 + 133.33 = 327.77.

The average CP of the three articles is 327.77/3 = 109.2566.

Hence, (average CP – average SP)/average SP = 9.2566%. higher

Any other process adopted for this problem is likely to require much more effort and time.

Note: This process will be feasible if you have worked well with the percentage calculation techniques of the previous chapter.

Space for Rough Work

LEVEL OF DIFFICULTY (I)

1. By selling a watch for ₹ 560, a shopkeeper incurs a loss of 20%. Find the cost price of the watch for the shopkeeper.
   (a) ₹ 600 (b) ₹ 700
   (c) ₹ 610 (d) ₹ 640
2. By selling a cap for ₹ 29.75, a man gains 6.25%. What will be the CP of the cap?
   (a) ₹ 26 (b) ₹ 27.5
   (c) ₹ 28 (d) ₹ 27.80
3. A cellular phone when sold for ₹ 3808 fetches a profit of 12%. Find the cost price of the cellular phone.
   (a) ₹ 3190 (b) ₹ 3400
   (c) ₹3260 (d) ₹ 3560
4. A machine costs ₹ 1025. If it is sold at a loss of 25%, what will be its cost price as a percentage of its selling price?
   (a) 125% (b) 116.67%
   (c) 120% (d) 133.33%
5. A shopkeeper sold goods for ₹1800 and made a profit of 20% in the process. Find his profit per cent if he had sold his goods for ₹ 1687.5.
   (a) 11.5% (b) 10.5%
   (c) 12.5% (d) 6.25%
6. A tablet is sold for ₹6612.5 at a profit of 15%. What would have been the actual profit or loss on it, if it had been sold for ₹ 5380?
   (a) ₹ 370 (b) ₹ 410
   (c) ₹ 480 (d) ₹ 340
7. A marble table when sold for ₹ 6400 gives a loss of 11.11% to the merchant who sells it. Calculate his loss or gain per cent, if he sells it for ₹ 7812.
   (a) Loss of 8.625% (b) Profit of 8.5%
   (c) Loss of 8% (d) Profit of 7.5%
8. By selling bouquets for ₹ 69, a florist gains 15%. At what price should he sell the bouquets to gain 20% on the cost price?
   (a) ₹ 72 (b) ₹ 75
   (c) ₹ 66 (d) ₹ 78
9. A shopkeeper bought 480 chocolates at ₹ 6 per dozen. If he sold all of them at ₹ 0.75 each, what was his profit per cent?
   (a) 50% (b) 33(1/3)%
   (c) 75% (d) 20%
10. A feeding bottle is sold for ₹ 150. Sales tax accounts for one-fifth of this and profit one-third of the remainder. Find the cost price of the feeding bottle.
    (a) ₹ 72 (b) ₹ 80
    (c) ₹ 90 (d) ₹ 76
11. An iron merchant makes a profit of 30% by selling iron at ₹ 26 per quintal. If he sells the iron at ₹ 22.50 per quintal, what is his profit per cent on the whole investment?
    (a) 12.5% (b) 6.66%
    (c) 7.5% (d) 8%
12. The cost price of a shirt and a pair of trousers is ₹ 473. If the shirt costs 15% more than the trousers, find the cost price of the trouser.
    (a) ₹ 243 (b) ₹ 253
    (c) ₹ 210 (d) ₹ 220
13. A pet shop owner sells two puppies at the same price. On one he makes a profit of 25% and on the other he suffers a loss of 25%. Find his loss or gain per cent on the whole transaction.
    (a) Gain of 6.25% (b) No profit no loss
    (c) Loss of 12.5% (d) Loss of 6.25%
14. The marked price of a table is ₹1200, which is 20% above the cost price. It is sold at a discount of 10% on the marked price. Find the profit per cent.
    (a) 10% (b) 8%
    (c) 7.5% (d) 6%
15. 125 toffees cost ₹ 75. Find the cost of one million toffees if there is a discount of 40% on the selling price for this quantity.
    (a) ₹ 3,00,000 (b) ₹ 3,20,000
    (c) ₹ 3,60,000 (d) ₹ 4,00,000
16. A shopkeeper marks the price of an article at ₹ 250. Find the cost price if after allowing a discount of 20% he still gains 25% on the cost price.
    (a) 210 (b) 160
    (c) 200 (d) 180
17. In Question 16, what will be the selling price of the article if he allows two successive discounts of 10% each?
    (a) 202.5 (b) 225
    (c) 200 (d) 197.5
18. A dozen pairs of gloves quoted at ₹120 are available at a discount of 20%. Find how many pairs of gloves can be bought for ₹ 16.
    (a) 2 (b) 3
    (c) 4 (d) 6
19. Find a single discount equivalent to the discount series of 25%, 20%, 10%.
    (a) 66% (b) 46%
    (c) 54% (d) 34%
20. The printed price of a calculator is ₹ 225. A retailer pays ₹ 148.5 for it by getting successive discounts of 20% and another rate which is illegible. What is the second discount rate?

(a) 17% (b) 18.5%
(c) 16% (d) 17.5%

21. How much percent more than the cost price should a shopkeeper mark his goods, so that after allowing a discount of 6.25% he should have a gain of 25% on his outlay?
(a) 33.33% (b) 16.66%
(c) 25% (d) 20%

22. In order to maintain the price line, a trader allows a discount of 20% on the marked price of goods in his shop. However, he still makes a gross profit of 12% on the cost price. Find the profit per cent he would have made on the selling price had he sold at the marked price.
(a) 35.67% (b) 40.67%
(c) 40% (d) 35%

23. A whole-seller allows a discount of 25% on the list price to a retailer. The retailer sells at 10% discount on the list price. If the customer paid ₹ 54 for an article, what is the profit by the retailer?
(a) 12 (b) 9
(c) 5 (d) 8

24. In Question 23, also find the retailer's percentage profit on his cost giving your answer correct to two decimal places.
(a) 33.33% (b) 16.66%
(c) 20% (d) 25%

25. The cost of production of a cordless phone set in 2016 is ₹ 1100, divided between material, labour and overheads in the ratio 4 : 5 : 2. If the cordless phone set is marked at a price that gives a 10% profit on the component of price accounted for by labour, what is the marked price of the set?
(a) ₹ 1140 (b) ₹ 1210
(c) ₹ 1120 (d) ₹ 1150

26. For Question 25, if subsequently in 2017, the cost of material, labour and overheads increased by 20%, 30% and 10% respectively, calculate the cost of manufacturing in 2017.
(a) ₹ 1350 (b) ₹ 1150
(c) ₹ 1250 (d) ₹ 1450

27. What should be the new marked price if the criteria for profit is to remain the same as for Question 25 above?
(a) ₹ 1420 (b) ₹ 1405
(c) ₹ 1415 (d) None of these

28. By selling a casserole for ₹ 820, a man incurs a loss of 18%. At what price should he sell the casserole to gain 28%?
(a) ₹ 1180 (b) ₹ 1280
(c) ₹ 1220 (d) None of these

29. A man sells 5 articles for ₹ 15 and makes a profit of 20%. Find his gain or loss percent if he sells 8 such articles for ₹ 18.40.
(a) 2.22% profit (b) 2.22% loss
(c) 8% loss (d) 8% profit

30. The cost price of 40 Oranges is equal to the selling price of 30 Oranges. Find the percentage profit.
(a) 20% (b) 25%
(c) 33.33% (d) None of these

31. *P* owns a house worth ₹ 20,000. He sells it to *Q* at a profit of 25%. After some time, *Q* sells it back to *P* at 25% loss. Find *P*'s loss or gain percent.
(a) 25% gain (b) 6.25% gain
(c) 31.56% gain (d) 31.25% gain

32. A shopkeeper bought locks at the rate of 8 locks for ₹ 34 and sold them at the rate of 12 locks for ₹ 57. Calculate his gain percent.
(a) 9.33% (b) 12.5%
(c) 11.11% (d) 11.76%

33. Vikas bought an article at ₹ 150 and sold it at a profit of 20%. What would have been the increase in the profit percent if it was sold for ₹ 195?
(a) 10% (b) 5%
(c) 15% (d) None of these

34. *A* makes an article for ₹ 250 and sells it to *B* at a profit of 20%. *B* sells it to *C* who sells it for ₹ 386.4, making a profit of 15%. What profit percent did *B* make?
(a) 20% (b) 12%
(c) 16.66% (d) 33.33%

35. A reduction of 20% in the price of sugar enables a housewife to buy 5.4 kg. more for ₹ 432. Find the reduced price per kilogram
(a) ₹ 20 (b) ₹16
(c) ₹ 18 (d) None of these

36. A man buys 50 kg of oil at ₹10 per kilogram and another 40 kg of oil at ₹12 kilogram and mixes them. He sells the mixture at the rate of ₹11 per kilogram. What will be his gain percent if he is able to sell the whole lot?
(a) 100/98% (b) 100(10/49)%
(c) 10(1/49)% (d) None of these

37. If the cost price of 25 articles is equal to the selling price of 15 articles, find the profit percent.
(a) 33.33% (b) 20%
(c) 66.67% (d) 50%

38. A shopkeeper sells sugar in such a way that the selling price of 850 gm is the same as the cost price of one kilogram. Find his gain percent.
(a) 150/17% (b) 100/17%
(c) 17(11/17)% (d) 1/17%

39. A dealer buys eggs at ₹ 72 per gross. He sells the eggs at a profit of 6.25% on the cost price. What is the selling price per egg (approximately)?
(a) 53 paise (b) 50 paise
(c) 49 paise (d) 52 paise

40. *P* sold a table to *Q* at a profit of 25%. *Q* sold the same table to *R* for ₹ 90 thereby making a profit of 20%. Find the price at which *P* bought the table from *Z* if it is known that *Z* gained 25% in the transaction.
(a) ₹ 80 (b) ₹ 75
(c) ₹ 90 (d) ₹ 60

41. *A* sold a table to *B* at a profit of 15%. Later on, *B* sold it back to *A* at a profit of 20%, thereby gaining ₹ 69. How much did *A* pay for the table originally?
(a) ₹ 300 (b) ₹ 320
(c) ₹ 345 (d) ₹ 350

42. A dealer sold two TV sets for ₹ 9600 each, gaining 20% on one and losing 20% on the other set. Find his net gain or net loss.
(a) ₹ 400 loss (b) ₹ 800 loss
(c) ₹ 400 gain (d) ₹ 800 gain

43. On selling tea at ₹ 20 per kg a loss of 10% is incurred. Calculate the amount of tea (in kg) sold if the total loss incurred is ₹60.
(a) 27 kg (b) 21 kg
(c) 15 kg (d) 30 kg

44. A colour TV and a VCP were sold for ₹ 19,800 each. The TV was sold at a loss of 10% whereas the VCP was sold at a gain of 10%. Find gain or loss in the whole transaction.
(a) ₹ 400 loss (b) ₹ 1000 loss
(c) ₹ 960 loss (d) ₹ 1040 loss
(*Note:* In this case there will always be a loss)

45. A man sells a TV set for ₹ 33000 and makes a profit of 10%. He sells another TV at a loss of 20%. If on the whole, he neither gains nor loses, find the selling price of the second TV set.
(a) ₹ 15,000 (b) ₹ 12,000
(c) ₹ 30,000 (d) ₹ 27,000

46. A man sells an article at 10% above its cost price. If he had bought it at 15% less than what he paid for it and sold it for ₹ 33 less, he would have gained 10%. Find the cost price of the article.
(a) ₹ 400 (b) ₹ 260
(c) ₹ 325 (d) ₹ 200

47. A briefcase was sold at a profit of 5%. If its cost price was 5% less and it was sold for ₹ 63 more, the gain would have been 20%. Find the cost price of the briefcase.
(a) ₹ 800 (b) ₹ 900
(c) ₹700 (d) ₹ 960

48. A man sells a plot of land at 8% profit. If he had sold it at 15% profit, he would have received ₹ 630 more. What is the selling price of the land?
(a) ₹ 9320 (b) ₹ 9600
(c) ₹ 9820 (d) ₹ 9720

49. Ashok bought an article and spent ₹ 110 on its repairs. He then sold it to Bhushan at a profit of 20%. Bhushan sold it to Charan at a loss of 10%. Charan finally sold it for ₹ 1188 at a profit of 10%. How much did Ashok pay for the article?
(a) ₹ 890 (b) ₹ 1000
(c) ₹ 780 (d) ₹ 840

50. A man buys two cycles for a total cost of ₹ 900. By selling one for 4/5 of its cost and other for 5/4 of its cost, he makes a profit of ₹ 90 on the whole transaction. Find the cost price of lower priced cycle.
(a) ₹ 360 (b) ₹ 250
(c) ₹ 300 (d) ₹ 420

51. A merchant bought two transistors, which together cost him ₹ 480. He sold one of them at a loss of 15% and other at a gain of 19%. If the selling price of both the transistors are equal, find the cost of the lower priced transistor.
(a) ₹ 300 (b) ₹ 180
(c) ₹ 200 (d) ₹ 280

52. A manufacturer makes a profit of 15% by selling a colour TV for ₹ 5750. If the cost of manufacturing increases by 30% and the price paid by the retailer is increased by 20%, find the profit percent made by the manufacturer.
(a) 6(2/13)% (b) 4 (8/13)%
(c) 6(1/13)% (d) 7(4/13)%

53. The cost of manufacturing an article is made up of materials, labour and overheads in the ratio 6 : 7 : 2. If the cost of labour is ₹ 350, find the profit percent if the article is sold for ₹ 900.
(a) 30% (b) 33.33%
(c) 20% (d) 25%

54. Two dealers *P* and *Q* selling the same model of TV set mark them under the same selling prices. *P* gives successive discounts of 20% and 15% and *Q* gives successive discounts of 18% and 17%. From whom is it more profitable to purchase the TV set?
(a) From *P*
(b) From *Q*
(c) Indifferent between the two
(d) Cannot be determined

55. A sells a car priced at ₹ 1,80,000. He gives a discount of 5% on the first ₹ 1,00,000 and 12.5% on the remaining ₹ 80,000. His competitor *B* sells a car on the same marked priced at ₹ 1,80,000. If he wants to be competitive what percent discount should *B* offer on the marked price.
(a) 3.33% (b) 15.67%
(c) 8.33% (d) 6.67%

56. An article costs ₹ 1400 to a manufacturer who lists its price at ₹ 1600. He sells it to a trader at a discount of 5%. The trader gets a further discount of 5% on his net payment for paying in cash. Calculate the amount that the trader pays to the manufacturer.
(a) ₹ 1444 (b) ₹ 1420
(c) ₹ 1434 (d) None of these

57. In Question 56, find the profit percent that the manufacturer makes on the sale.
(a) 20/7% (b) 22/7%
(c) 15/7% (d) None of these

58. A firm dealing in furniture allows 5% discount on the marked price of each item. What price must be marked on a dining table that cost ₹2000 to assemble, so as to make a profit of 14%?
(a) ₹ 3800 (b) ₹ 2700
(c) ₹ 2500 (d) ₹ 2400

59. A shopkeeper allows a discount of 10% on the marked price of a certain article and makes a profit of 12.5%. If the article cost the shopkeeper ₹ 360, what price must be marked on the article?
(a) ₹ 410 (b) ₹ 450
(c) ₹ 480 (d) None of these

60. A Camera shop allows a discount of 15% on the advertised price of a camera. What price must be marked on the camera, that costs him ₹ 600, so that he makes a profit of 19%?
(a) ₹ 840 (b) ₹ 820
(c) ₹ 750 (d) ₹ 880

61. A watch dealer pays 20% custom duty on a watch that costs ₹ 450 abroad. For how much should he mark it, if he desires to make a profit of 25% after giving a discount of 20% to the buyer?
(a) ₹ 800 (b) ₹ 843.75
(c) ₹ 810 (d) ₹ 840.75

62. A shopkeeper buys an article for ₹ 1200 and marks it for sale at a price that gives him 60% profit on his cost. He, however, gives a 35% discount on the marked price to his customer. Calculate the actual percentage profit made by the shopkeeper.
(a) 2% (b) 4%
(c) 3% (d) 56%

63. In the land of the famous milkman Merghese Durian, a milkman sells his buffalo for ₹15400 at some profit. Had he sold his buffalo at ₹ 8200, the quantum of the loss incurred would have been double that of the profit earned. What is the cost price?
(a) ₹ 13200 (b) ₹ 12900
(c) ₹ 13500 (d) None of these

64. A trader purchases apples at ₹ 70 per hundred. He spends 10% on the transportation. What should be the selling price per 100 to earn a profit of 30%?
(a) ₹ 101.1 (b) ₹ 100.1
(c) ₹ 90.1 (d) ₹ 99.1

65. A dishonest dealer professes to sell at cost price but uses a 800 gram weight instead of a 1 kilogram weight. Find the percent profit to the dealer.
(a) 25% (b) 20%
(c) 12.5% (d) None of these

Space for Rough Work

LEVEL OF DIFFICULTY (II)

1. Mithilesh makes 750 articles at a cost of 60 paise per article. He fixes the selling price such that if only 600 articles are sold, he would have made a profit of 40% on the outlay. However, 120 articles got spoilt and he was able to sell 630 articles at this price. Find his actual profit percent as the percentage of total outlay assuming that the unsold articles are useless.
   (a) 42% (b) 53%
   (c) 47% (d) 46%
2. A manufacturer estimates that on inspection 12% of the articles he produces will be rejected. He accepts an order to supply 22,000 articles at ₹ 7.50 each. He estimates the profit on his outlay including the manufacturing of rejected articles, to be 20%. Find the cost of manufacturing each article.
   (a) ₹ 6 (b) ₹ 5.50
   (c) ₹ 5 (d) ₹ 4.50
3. The cost of setting up the type of a magazine is ₹ 1000. The cost of running the printing machine is ₹ 120 per 100 copies. The cost of paper, ink and so on is 60 paise per copy. The magazines are sold at ₹ 2.75 each. 900 copies are printed, but only 784 copies are sold. What is the sum to be obtained from advertisements to give a profit of 10% on the cost?
   (a) ₹ 730 (b) ₹ 720
   (c) ₹ 726 (d) ₹ 736
4. A tradesman fixed his selling price of goods at 30% above the cost price. He sells half the stock at this price, one-quarter of his stock at a discount of 15% on the original selling price and rest at a discount of 30% on the original selling price. Find the gain percent altogether.
   (a) 14.875% (b) 15.375%
   (c) 15.575% (d) 16.375%
5. A tradesman marks an article at ₹ 205 more than the cost price. He allows a discount of 10% on the marked price. Find the profit percent if the cost price is ₹ x.
   (a) $\frac{\left[\frac{x}{(18450)}-10\right]}{x}$ (b) $\frac{[(18450)]-10x}{x}$
   (c) $\frac{\left[\frac{x}{(18450)}-100\right]}{x}$ (d) $\frac{\left[\frac{18450}{x}-100\right]}{x}$
6. Dolly goes to a shop to purchase a doll priced at ₹ 400. She is offered 4 discount options by the shopkeeper. Which of these options should she opt for to gain maximum advantage of the discount offered?
   (a) Single discount of 30%
   (b) 2 successive discounts of 15% each
   (c) 2 successive discounts of 20% and 10%
   (d) 2 successive discounts of 20% and 12%
7. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a 900 gram weight instead of a 1 kilogram weight. Find his percentage profit due to these maneuvers.
   (a) 8% (b) 12%
   (c) 20% (d) 16%
8. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. Besides, he also cheats both his supplier and his buyer by 100 grams while buying or selling 1 kilogram. Find the percentage profit earned by the shopkeeper.
   (a) 20% (b) 25%
   (c) 32% (d) 27.5%
9. For Question 8, if it is known that the shopkeeper takes a discount of 10% from his supplier and he disregards this discount while marking up (i.e. he marks up at the undiscounted price), find the percentage profit for the shopkeeper if there is no other change from the previous problem.
   (a) 32% (b) 36.66%
   (c) 40.33% (d) 46.66%
10. Cheap and Best, a *kirana* shop bought some apples at 4 per rupee and an equal number at 5 per rupee. He then sold the entire quantity at 9 for 2 rupees. What is his percentage profit or loss?
    (a) 1.23% loss (b) 6.66%
    (c) 8.888% (d) No profit no loss
11. A watch dealer sells watches at ₹ 600 per watch. However, he is forced to give two successive discounts of 10% and 5% respectively. However, he recovers the sales tax on the net sale price from the customer at 5% of the net price. What price does a customer have to pay him to buy the watch?
    (a) ₹ 539.75 (b) ₹ 539.65
    (c) ₹ 538.75 (d) ₹ 538.65
12. Deb bought 100 kg of rice for ₹ 1100 and sold it at a loss of as much money as he received for 20 kg rice. At what price did he sell the rice?
    (a) ₹ 9 per kg (b) ₹ 9.1666 per kg
    (c) ₹ 9.5 per kg (d) ₹ 10.33 per kg

13. A carpenter wants to sell 40 chairs. If he sells them at ₹ 156 per chair, he would be able to sell all the chairs. But for every ₹ 6 increase in price, he will be left with one additional unsold chair. At what selling price would he be able to maximise his profits (assuming unsold chairs remain with him)?
    (a) 198 (b) 192
    (c) 204 (d) 210

Directions for Questions 14 and 15: Read the following and answer the questions that follow.

Doctors have advised Renu, a chocolate freak, not to take more than 20 chocolates in one day. When she went to the market to buy her daily quota, she found that if she buys chocolates from the market complex she would have to pay ₹ 3 more for the same number of chocolates than she would have spent had she bought them from her uncle Scrooge's shop, getting two sweets less per rupee. She finally decided to get them from Uncle Scrooge's shop paying only in one rupee coins.

14. How many chocolates did she buy?
    (a) 12 (b) 9
    (c) 18 (d) 15
15. How much would she have spent at the market complex?
    (a) ₹ 6 (b) ₹ 12
    (c) ₹ 9 (d) ₹ 5
16. A shopkeeper makes a profit of Q% by selling an object for ₹ 24. Had the cost price and selling price been interchanged, it would have led to a loss of 62.5Q%. With the latter cost price, what should be the new selling price to get a profit of Q%?
    (a) ₹ 34.40 (b) ₹ 32.50
    (c) ₹ 25.60 (d) ₹ 38.4
17. Find the change in the percentage profit for a fruit vendor who, after finding 20% of the fruits rotten, increased his selling price by 10% over and above 15% that he was already charging?
    (a) –15 (b) +11.5
    (c) –13.8 (d) –11.5

Directions for Questions 18 and 19: Read the following and answer the questions that follow.

Ramu and Shyamu decided to sell their cars each at ₹ 36,000. While Ramu decided to give a discount of 8% on the first ₹ 8000, 5% on next ₹ 12,000 and 3% on the rest to buyer Sashi, Shyamu decided to give a discount of 7% on the first 12,000, 6% on the next 8,000 and 5% on the rest to buyer Rajesh. These discounts were, however, subject to the buyers making the payment on time failing which the discount gets reduced by 1% for every delay of a week. In each case, the selling price of 36,000 was arrived at by increasing the cost price by 25%.

18. If each of them got the payments on time, what is the approximate percentage profit of the person getting the higher profit?
    (a) 19% (b) 21%
    (c) 25% (d) 17%
19. If Sashi defaults by 1 and 2 weeks in the second and third payments respectively, what would be the profit of Ramu in the sale of the car?
    (a) ₹ 5920 (b) ₹ 6240
    (c) ₹ 5860 (d) ₹ 5980
20. What would be the difference in the profits if both the buyers default in each payment by a week?
    (a) ₹ 200 (b) ₹ 300
    (c) ₹ 400 (d) ₹ 500
21. Find the selling price of goods if two salesmen claim to make 25% profit each, one calculating it on cost price while another on the selling price, the difference in the profits earned being ₹ 100 and selling price being the same in both the cases.
    (a) ₹ 2000 (b) ₹ 1600
    (c) ₹ 2400 (d) ₹ 2500
22. A shopkeeper calculates percentage profit on the buying price and another on the selling price. What will be their difference in profits if both claim a profit of 20% on goods sold for ₹ 3000?
    (a) ₹ 200 (b) ₹ 100
    (c) ₹ 400 (d) ₹ 150
23. A pharmaceutical company made 3000 strips of tablets at a cost of ₹ 4800. The company gave away 1000 strips of tablets to doctors as free samples. A discount of 25% was allowed on the printed price. Find the ratio of profit if the price is raised from ₹ 3.25 to ₹ 4.25 per strip and if at the latter price, samples to doctors were done away with. (New profit/old profit)
    (a) 55.5 (b) 63.5
    (c) 75 (d) 99.25
24. A merchant makes a profit of 20% by selling an article. What would be the percentage change in the profit percent had he paid 10% less for it and the customer paid 10% more for it?
    (a) 120% (b) 125%
    (c) 133.33% (d) 150%
25. An article costing ₹ 20 was marked 25% above the cost price. After two successive discounts of the same percentage, the customer now pays ₹ 20.25. What would be the percentage change in profit had the price been increased by the same percentage twice successively instead of reducing it?
    (a) 3600% (b) 3200%
    (c) 2800% (d) 4000%
26. Divya goes to buy fruits and after a lot of bargaining is able to get the price of a dozen apples reduced

by ₹ 1 from the initial price, thereby enabling her to get 1 apple extra for every rupee saved. (Getting no discount on the extra apple). What is the initial price of a dozen apples?

(a) ₹ 10 (b) ₹ 13
(c) ₹ 12 (d) ₹ 15

27. The accounts of a company show sales of ₹ 12,600. The primary cost is 35% of sales and trading cost accounts for 25% of the gross profit. Gross profit is arrived at by excluding the primary cost plus the cost of advertising expenses of ₹ 1400, director's salary of ₹ 650 per annum plus 2% of annual sales as miscellaneous costs. Find the percentage profit (approx) on a capital investment of ₹ 14,000?

(a) 35% (b) 31%
(c) 28% (d) Cannot be determined

28. Jonny has two cycles and one rickshaw. The rickshaw is worth ₹ 96. If he sells the rickshaw along with the first cycle, he has an amount double that of the value of the second cycle. But if he decides to sell the rickshaw along with the second cycle, the amount received would be less than the value of first cycle by ₹ 306. What is the value of first cycle?

(a) ₹ 900 (b) ₹ 600
(c) ₹ 498 (d) None of these

29. David sells his Laptop to Goliath at a loss of 20% who subsequently sells it to Hercules at a profit of 25%. Hercules, after finding some defect in the laptop, returns it to Goliath but could recover only ₹ 4.50 for every ₹ 5 he had paid. Find the amount of Hercules' loss if David had paid ₹ 1.75 lakh for the laptop.

(a) ₹ 3500 (b) ₹ 2500
(c) ₹ 17,500 (d) None of these

30. A dishonest shopkeeper, at the time of selling and purchasing, weighs 10% less and 20% more per kilogram respectively. Find the percentage profit earned by treachery. (Assuming he sells at Cost Price)

(a) 30% (b) 20%
(c) 25% (d) 33.33%

31. A dealer marks articles at a price that gives him a profit of 30%. 6% of the consignment of goods was lost in a fire in his premises, 24% was soiled and had to be sold at half the cost price. If the remainder was sold at the marked price, what percentage profit or loss did the dealer make on that consignment?

(a) 2% (b) 2.5%
(c) 3% (d) 6.2%

32. A book was sold for a certain sum and there was a loss of 20%. Had it been sold for ₹ 12 more, there would have been a gain of 30%. What would be the profit if the book were sold for ₹ 4.8 more than what it was sold for?

(a) No profit, no loss (b) 20%
(c) 10% (d) 25%

For Questions 33 to 36 use the following data:

33. Two thousand people lived in Business Village of which 55% were male and the rest were female. The male population earned a profit of 5% and the female population earned 8% on an investment of ₹ 50 each. Find the change in the percentage profit of the village if the ratio of male to female gets reversed the next year, population remaining the same.

(a) Drop of 0.3 (b) Increase of 0.3
(c) Increase of 0.45 (d) Drop of 0.45

34. In Question 33, find the change in the percentage profit of the village, if the population increases by 10%. (Assume the ratio remains the same)

(a) Increase of 10% (b) Increase of 11.11%
(c) No change (d) Cannot be determined

35. For Question 34, find the percentage change in the profit.

(a) Increase of 10% (b) Increase of 11.11%
(c) No change (d) Cannot be determined

36. For Question 33, what would be the change in the percentage profit, if alongwith the reversal of the ratio of males to females, the profit also increases by 1% for both males and females?

(a) Drop of 1.3 (b) Increase of 1.3
(c) Increase of 0.8 (d) None of these

37. A rickshaw dealer buys 30 rickshaws for ₹ 4725. Of these, 8 are four-seaters and the rest are two-seaters. At what price must he sell the four-seaters so that if he sells the two-seaters at 3/4th of this price, he makes a profit of 40% on his outlay?

(a) ₹ 180 (b) ₹ 270
(c) ₹ 360 (d) ₹ 450

38. A flat and a piece of land were bought by two friends Raghav and Sita respectively at prices of ₹ 2 lakh and ₹ 2.2 lakh. The price of the flat rises by 20 percent every year and that of land by 10% every year. After two years, they decide to exchange their possessions. What is percentage gain of the gainer?

(a) 7.56% (b) 6.36%
(c) 4.39% (d) None of these

39. *A*, *B* and *C* form a company. *A* invests half of *C* expecting a return of 10%. *B* invests three-fourths of *C*, expecting a return of 15% on it. *C* invests ₹ 3000 and the profit of the firm is 25%. How much would *B*'s share of profit be more than that of *A*'s share if *B* gets an additional 8% for managing the business? (Assume that their expectations with respect to returns on capital invested are met before profit is divided in the ratio of capitals invested).

(a) 20% (b) 18%
(c) 15% (d) Cannot be determined

40. A driver of a autorickshaw makes a profit of 20% on every trip when he carries 3 passengers and the price of petrol is ₹ 30 a litre. Find the percentage profit for the same journey if he goes for four passengers per trip and the price of petrol reduces to ₹ 24 litre. (Assume that revenue per passenger is the same in both the cases.)
    (a) 33.33% (b) 65.66
    (c) 100% (d) Data inadequate
41. Raghav bought 25 washing machines and microwave ovens for ₹ 2,05,000. He sold 80% of the washing machines and 12 microwave ovens for a profit of ₹ 40,000. Each washing machine was marked up by 20% over cost and each microwave oven was sold at a profit of ₹ 2,000. The remaining washing machines and 3 microwave ovens could not be sold. What is Raghav's overall profit/loss?
    (a) ₹ 1000 profit (b) ₹ 2500 loss
    (c) ₹ 1000 loss (d) Cannot be determined
42. After selling a watch, Shyam found that he had made a loss of 10%. He also found that had he sold it for ₹ 27 more, he would have made a profit of 5%. The actual initial loss was what percentage of the profit earned, had he sold the watch for a 5% profit?
    (a) 23% (b) 150%
    (c) 200% (b) 180%
43. Sambhu buys rice at ₹ 10/kg and puts a price tag on it so as to earn a profit of 20%. However, his faulty balance shows 1000 gm when it is actually 800 gm. What is his actual gain percentage?
    (a) 50% (b) 40%
    (c) 18% (d) 10%
44. The profit earned when an article is sold for ₹ 800 is 20 times the loss incurred when it is sold for ₹ 275. At what price should the article be sold if it is desired to make a profit of 25%.
    (a) ₹ 300 (b) ₹ 350
    (c) ₹ 375 (d) ₹ 400
45. *A* sells to *B* goods at five-thirds the rate of profit at which *B* has decided to sell it to *C*. *C*, on other hand, sells it to *D* at one-third the rate of profit at which *B* sold it to *C*. If *D* gives ₹ 2145 to *C* at 10% profit, how much did *A* buy it for?
    (a) ₹ 1000 (b) ₹ 2000
    (c) ₹ 1500 (d) ₹ 1800
46. In the town of Andher Nagari Chaupat Raja, shopkeepers have to buy and sell goods in the range of ₹ 500 to ₹ 999. A shopkeeper in such a town decides not to buy or sell goods for amounts that contain the digit 9 or for amounts that add up to 13 or are a multiple of 13. What is the maximum possible profit he can earn?
    (a) ₹ 388 (b) ₹ 389
    (c) ₹ 488 (d) None of these
47. Manish bought a combined total of 25 monitors and printers. He marked up the monitors by 20% on the cost price, while each printer was marked up by ₹ 2000. He was able to sell 75% of the monitors and 2 printers and make a profit of ₹ 49,000. The remaining monitors and 3 printers could not be sold by him. Find his overall profit or loss if he gets no return on unsold items and it is known that a printer costs 50% of a monitor.
    (a) Loss of ₹ 48,500 (b) Loss of 21,000
    (c) Loss of ₹ 41,000 (d) Inadequate data
48. For Question 47, Manish's approximate percentage profit or loss is
    (a) 14.37% loss (b) 16.5% loss
    (c) 12.14% loss (d) Insufficient information
49. An orange vendor makes a profit of 20% by selling oranges at a certain price. If he charges ₹ 1.2 higher per orange he would gain 40%. Find the original price at which he sold an orange.
    (a) ₹ 5 (b) ₹ 4.8
    (c) ₹ 6 (d) None of these
50. The Mindworkzz prints 5000 copies of a magazine for ₹ 5,00,000 every month. In the July issue of the magazine, Mindworkzz distributed 500 copies free. Besides, it was able to sell 2/3 of the remaining magazines at 20% discount. Besides, the remaining magazines were sold at the printed price of the magazine (which was ₹ 200). Find the percentage profit of Mindworkzz in the magazine venture in the month of July (assume a uniform 20% of the sale price as the vendor's discount and also assume that Mindworkzz earns no income from advertising for the issue).
    (a) 56% (b) 24.8%
    (c) 28.5% (d) 22.6%

Space for Rough Work

LEVEL OF DIFFICULTY (III)

The charges of a taxi journey are decided on the basis of the distance covered and the amount of the waiting time during a journey. Distance wise, for the first 2 kilometres (or any part thereof) of a journey, the metre reading is fixed at ₹ 10 (if there is no waiting). Also, if a taxi is boarded and it does not move, then the metre reading is again fixed at ₹ 10 for the first ten minutes of waiting. For every additional kilometre the metre reading changes by ₹ 5 (with changes in the metre reading being in multiples of ₹ 1 for every 200 metres travelled). For every additional minute of waiting, the metre reading changes by ₹ 1. (no account is taken of a fraction of a minute waited for or of a distance less than 200 metres travelled). The net metre reading is a function of the amount of time waited for and the distance travelled.

The cost of running a taxi depends on the fuel efficiency (in terms of mileage/litre), depreciation (straight line over 10 years) and the driver's salary (not taken into account if the taxi is self owned).

Depreciation is ₹ 100 per day everyday of the first 10 years. This depreciation has to be added equally to the cost for every customer while calculating the profit for a particular trip. Similarly, the driver's daily salary is also apportioned equally across the customers of the particular day. Assume, for simplicity, that there are 50 customers every day (unless otherwise mentioned). The cost of fuel is ₹ 15 per litre (unless otherwise stated).

The customer has to pay 20% over the metre reading while settling his bill. Also assume that there is no fuel cost for waiting time (unless otherwise stated).

Based on the above facts, answer the following:

1. If Sardar Preetpal Singh's taxi is 14 years old and has a fuel efficiency of 12 km/litre of fuel, find his profit in a run from Howrah Station to Park Street (a distance of 7 km) if the stoppage time is 8 minutes. (Assume he owns the taxi)
   (a) ₹ 32.25 (b) ₹ 40.85
   (c) ₹ 34.25 (d) ₹ 42.85
2. For question 2, Sardar Preetpal Singh's percentage profit is
   (a) 391.42% (b) 380%
   (c) 489.71% (d) 438.23%
3. For the same journey as in question 1 if on another day, with heavier traffic, the waiting time increases to 13 minutes, find the percentage change in the profit.
   (a) 12% (b) 14%
   (c) 13% (d) 16%
4. For Question 3, if Sardar Preetpal Singh idled his taxi for 7 minutes and if the fuel consumption during idling is 50 ml per minute, find the percentage decrease in the profits.
   (a) 10.74% (b) 11.21%
   (c) 10.87% (d) 9.94%

Directions for Questions 5 to 10: Answer questions based on this additional information:

Mr. Vikas Verma owns a fleet of 3 taxis, where he pays his driver ₹ 3000 per month. He also insists on keeping an attendant for ₹ 1500 per month in each of his taxis. Idling requires 50 ml of fuel for every minute of idling. For a moving taxi, the fuel consumption is given by 12 km/per litre. On a particular day, he received the following reports about the three taxis.

Taxi code	*Total kilometres*	*Waiting time*	*Waiting time with idling*	*Waiting time without idling*
A	260	190 min	30 min	
B	264	170 min	80 min	
C	275	180 min	60 min	

5. The maximum revenue has been generated by which taxi?
   (a) *A* (b) *B*
   (c) *C* (d) Cannot be determined

   If it is to be assumed that every customer travelled at least 2 kilometres:
6. Which of the three taxis generated the maximum revenue?
   (a) *A* (b) *B*
   (c) *C* (d) Both *A* & *B*
   (e) Cannot be determined
7. What percentage of the total revenue was generated by taxi *B*?
   (a) 32.30 (b) 33.36
   (c) 34.32 (d) 34.36
8. The highest profit was yielded by which taxi?
   (a) *A* (b) *B*
   (c) *C* (d) Both *A* & *B*
9. The taxi which had the highest percentage profit for the day was
   (a) *A* (b) *B*
   (c) *C* (d) *B* & *C*
10. The profit as a percentage of costs for the day was:
   (a) 179.46% (b) 150.76%
   (c) 163.28% (d) 173.48%

Directions for Questions 11 to 15: Read the following and answer the questions that follow.

The Coca-Cola Company is setting up a plant for manufacture and sale of the soft drink.

The investment for the plant is ₹ 10 crore (to be invested in plant, machinery, advertising, infrastructure, etc.).

The following information is available about the different bottle sizes planned:

Bottle size	*Bottling cost*	*Cost of liquid*	*Transportation cost*	*Sale price*	*Dealer margin*
300 ml	₹ 2	₹ 0.6	10 paise per bottle	₹10	₹3
500 ml	₹ 5	₹ 1	15 paise per bottle	₹18	₹6
1.5 litre	₹ 10	₹ 3	20 paise per bottle	₹40	₹12

Based on this information answer the questions given below:

11. For which bottle should Coca-Cola try to maximise sales to maximise its profits? (Assume that the total number of litres of Coca-Cola sold is constant irrespective of the break up of the sales in terms of the bottle sizes)
    (a) 300 ml
    (b) 500 ml
    (c) 1.5 litres
    (d) Indifferent between the three sizes
12. If the company sells only 300 ml bottles in the first year, how many bottles should it sell to recover the investment made in the first year only?
    (a) 23,255,814 (b) 232,558,140
    (c) 32,255,814 (d) 322,558,140
13. If sales of 300 ml bottles to 500 ml bottles is 4 : 1, and there is no sale of 1500 ml bottles how many 300 ml bottles will be required to recover the investment?
    (a) 1,73,53,580 (b) 2,93,25,512
    (c) 16,25,848 (d) 16,25,774
14. For Question 13, the total number of both the types to be sold in India in order to recover the whole investment is
    (a) 3665890 (b) 2032310
    (c) 21691975 (d) 21723165
15. If we add administrative costs @ ₹ 1 per litre, which bottle size will have the maximum profitability?
    (a) 300 ml (b) 500 ml
    (c) 1.5 litres
    (d) Indifferent between the three sizes
16. Hotel Chanakya in Chankyapuri has a fixed monthly cost of ₹ 1,000,00. The advertising cost is ₹ 10,000 per month. It has 5 A/C rooms, which cost ₹ 600 per day and 10 non-A/C rooms, which cost ₹ 350 per day. Direct costs are ₹ 100 per day for an A/C room, and ₹ 50 for a non-A/C room. In the month of April 2020, the occupancy rate of A/C rooms is 50% while that of non-A/C rooms is 45%. Find the profit of the hotel in rupee terms for the month of April 2020.
    (a) 33,600 (b) 28,800
    (c) (32,000) Loss (d) (17,750) Loss
17. For the above question, keeping the A/C occupancy constant at 50%, what should be the minimum occupancy rate for non-A/C rooms for incurring no loss for the month?
    (a) 75.66% (b) 80.66%
    (c) 83.33% (d) 86.66%
18. For Questions 15 and 16: ₹ 25,000 worth of advertising a sales promotion of 20% off on the bill doubles the occupancy rate. If this is done, what is the change in the profit or loss?
    (a) Reduction of loss by ₹ 5,900
    (b) Reduction of loss to ₹ 5,900
    (c) Reduction of loss by ₹ 26,100
    (d) Both b and c
19. Advertising worth ₹ 50,000 is done for the sales promotion of A/C rooms (advertising a 20% reduction in the bill for A/C rooms). This leads to a doubling of the occupancy rate of A/C rooms. Besides, it also has an effect of increasing non-A/C room occupancy by 20%. Is this advised?
    (a) Yes (b) No
    (c) Indifferent (d) Cannot be determined

A restaurant has a pricing policy that allows for the following mark-ups:

Soups	Mark-up of	40%
Starters	Mark-up of	50%
Meals	Mark-up of	25%
Breads	Mark-up of	75%
Sweets	Mark-up of	75%

20. Mr. Amarnath and his family of 4 went to the restaurant and got a bill for: Soups (₹ 126), Starters (₹ 180), Meals (₹ 300), Breads (₹ 245) and Sweets (₹ 210). Find the profit for the restaurant.
    (a) ₹ 341 (b) ₹ 351
    (c) ₹ 361 (d) ₹ 371
21. The approximate percentage profit for the restaurant on the bill is
    (a) 40% (b) 45%
    (c) 50% (d) 55%

22. Which of these are true:
    (i) Profit increases if a part of the money spent on starters was spent on breads and another part of the starters was spent on snacks.
    (ii) Profit increases if a part of the money spent on meal items was spent on starters and another part spent on soups was spent on breads.
    (iii) Profit decreases if a certain amount (say x) of the spending on soups was spent on starters and the same amount (₹ x) of the spending on soups is spent on meal items.
    (a) (ii) only (b) (iii) only
    (c) (ii) and (iii) (d) All the three

Directions for Questions 23 to 28: Read the following and answer the questions that follow.

Prabhat Ranjan inaugurates his internet cafe on the 1st of January 2003. He invests in 10 computers @ ₹ 30,000 per computer. Besides, he also invests in the other infrastructure of the centre, a sum of ₹ 1 lakh only. He charges his customers on the time spent on the internet a flat rate of ₹ 50 per hour. His initial investment on computers has to be written off equally in 3 years (1 lakh per year) and the infrastructure has to be written off in 5 years (@ ₹ 20,000 per year).

He has to pay a fixed rental of ₹ 8000 per month for the space and also hires an assistant at ₹ 2000 per month.

For every hour that he is connected to the internet, he has to bear a telephone charge of ₹ 20 irrespective of the number of machines operational on the internet at that time. On top of this, he also has to pay an electricity charge of ₹ 5 per computer per hour. Assume that there are no other costs involved unless otherwise mentioned. The internet cafe is open 12 hours a day and is open on all 7 days of the week. (Assume that if a machine is not occupied, it is put off and hence consumes no electricity).

23. Assuming a uniform 80% occupancy rate for the month of April 2003, find his profit or loss for the month.
    (a) ₹ 1,02,400 (b) ₹ 1,22,400
    (c) ₹ 1,23,600 (d) ₹ 1,20,733.33
24. If the occupancy rate drops to 60% in the month of June, what is the value of the profit for the month?
    (a) ₹ 90,000 (b) ₹ 70,000
    (c) ₹ 1,23,600 (d) ₹ 90,633.33
25. If Prabhat estimates a fixed occupancy rate of 80% during the peak hours of 2 to 8 pm and 40% in the off peak hours of 8 am to 2 pm find the expected profit for him in the month of July 2006.
    (a) ₹ 73,000 (b) ₹ 93,000
    (c) ₹ 96,000 (d) ₹ 1,27,500
26. The percentage margin is defined as the margin as a percentage of the variable cost for an hour of operation. Find the percentage margin of the cyber cafe Prabhat runs.
    (a) 600 % (b) 533.33%
    (c) 525% (d) Cannot be determined
27. For Question 25 above, how many 30-day months will be required for Prabhat to recover back the investment?
    (a) 3.58 months (b) 3.72 months
    (c) 5.71 months (d) Cannot be determined
28. If the internet rates per hour have to be dropped drastically to ₹ 20 per hour in the fourth year of operation, what is Prabhat's expected profit for the calendar year 2010 assuming an average of 60% occupancy rate for the year?
    (a) ₹ 2,66,600 (b) ₹ 1,66,600
    (c) ₹ 88,500 (d) ₹ 91,500

Directions for Questions 29 to 33: Read the following and answer the questions that follow.

A train journey from Patna to Delhi by the Magadh Express has 4 classes:

The fares of the 4 classes are as follows:

3 tier: ₹ 330	No. of berths per bogey: 72	No. of bogeys: 8
AC 3 tier: ₹ 898	No. of berths per bogey: 64	No. of bogeys: 2
AC 2 tier: ₹ 1388	No. of berths per bogey: 45	No. of bogeys: 2
AC first: ₹ 2691	No. of berths per bogey: 26	No. of bogeys: 1

Patna to Delhi distance: 1100 kilometres. Assume the train does not stop at any station unless otherwise indicated. Running cost per kilometre: AC bogey → ₹ 25, non AC bogey → ₹ 10.

29. Assuming full occupancy, a bogey of which class exhibits the highest profit margin?
    (a) AC 3 tier (b) AC 2 tier
    (c) AC first class (d) 3 tier
30. Assuming full occupancy in all the classes, for a journey between Patna to Delhi, the profit margin (as a percentage of the running costs) of the class showing the lowest profit is approximately.
    (a) 116% (b) 127%
    (c) 109% (d) None of these
31. What is the approximate profit for the railways in rupees if the Magadh Express runs at full occupancy on a particular day?
    (a) ₹ 250,000 (b) ₹ 275,000
    (c) ₹ 300,000 (d) Cannot be determined
32. For Question 31, the percentage of the total profit that comes out of AC bogeys is (approximately)

(a) 50% (b) 60%
(c) 70% (d) 80%

33. The highest revenue for a journey from Patna to Delhi will always be generated by
(a) 3 tier (b) AC 3 tier
(c) AC 2 tier (d) Cannot be determined

34. A newspaper vendor sells three kinds of periodicals-dailies, weeklies and monthlies.
The weeklies sell for ₹ 12 at a profit of 20%, the monthlies sell for ₹ 50 at a profit of 25%, while the dailies sell at ₹ 3 at a profit of 50%. If there is a government restriction on the total number of periodicals that one particular news vendor, can sell, and Kalu a newspaper vendor, has sufficient demand for all the three types of periodicals, what should he do to maximise profits?
(a) Sell maximum weeklies
(b) Sell maximum monthlies
(c) Sell maximum dailies
(d) Cannot be determined

35. Without the restriction mentioned in the problem above, what should the newspaper vendor do to maximise his profits if his capital is limited?
(a) Sell maximum weeklies
(b) Sell maximum monthlies
(c) Sell maximum dailies
(d) Cannot be determined

36. A fruit vendor buys fruits from the fruit market at wholesale prices and sells them at his shop at retail prices. He operates his shop 30 days a month, as a rule. He buys in multiples of 100 fruits and sells them in multiples of a dozen fruits. He purchases mangoes for ₹ 425 per hundred and sells at ₹ 65 per dozen, he buys apples at ₹ 150 per hundred and sells at ₹ 30 per dozen, he buys watermelons (always of equal size) at ₹ 1800 per hundred and sells at ₹ 360 per dozen. Which of the three fruits yields him the maximum percentage profit?
(a) Mangoes (b) Apples
(c) Watermelons (d) Both (b) and (c)

37. For Question 36, if he adds oranges, which he buys at ₹ 180 per hundred and sells at ₹ 33 per dozen, what can be his maximum profit on a particular day if he invests ₹ 1800 in purchasing fruits everyday and he sells everything that he buys?
(a) ₹ 1200 (b) ₹ 1180
(c) ₹ 1260 (d) ₹ 1320

38. For Questions 36 and 37, if the fruit vendor hires you as a consultant and pays you 20% of his profit in the month of July 2006 as a service charge, what can be the maximum fees that you will get for your consultancy charges?
(a) ₹ 7200 (b) ₹ 14,400
(c) ₹ 7440 (d) Cannot be determined

39. A newspaper costs ₹ 11 to print on a daily basis. Its sale price (printed) is ₹ 3. The newspaper gives a sales incentive of 40% on the printed price, to the newspaper vendors. The newspaper makes up for the loss through advertisements, which are charged on the basis of per column centimetre rates. The advertisement rates of the newspaper are ₹ 300 per cc (column centimetre). It has to give an incentive of 15% on the advertising bill to the advertising agency. If the newspaper has a circulation of 12,000 copies, what is the approximate minimum advertising booking required if the newspaper has to break-even on a particular day. (Assume there is no wastage)
(a) 300 cc (b) 350 cc
(c) 435 cc (d) 450 cc

40. For Question 39, if it is known that the newspaper house is unable to recover 20% of its dues, what would be the approximate advertising booking target on a particular day in order to ensure the break-even point?
(a) 375 cc (b) 438 cc
(c) 544 cc (d) 562.5 cc

Space for Rough Work

ANSWER KEY

Level of Difficulty (I)

1. (b)	2. (c)	3. (b)	4. (d)
5. (c)	6. (a)	7. (b)	8. (a)
9. (a)	10. (b)	11. (a)	12. (d)
13. (d)	14. (b)	15. (c)	16. (b)
17. (a)	18. (a)	19. (b)	20. (d)
21. (a)	22. (c)	23. (b)	24. (c)
25. (d)	26. (a)	27. (c)	28. (b)
29. (c)	30. (c)	31. (d)	32. (d)
33. (a)	34. (b)	35. (b)	36. (a)
37. (c)	38. (c)	39. (a)	40. (d)
41. (a)	42. (b)	43. (a)	44. (a)
45. (b)	46. (d)	47. (c)	48. (d)
49. (a)	50. (c)	51. (c)	52. (a)
53. (c)	54. (a)	55. (c)	56. (a)
57. (b)	58. (d)	59. (b)	60. (a)
61. (b)	62. (b)	63. (d)	64. (b)
65. (a)			

Level of Difficulty (II)

1. (c)	2. (b)	3. (c)	4. (b)
5. (b)	6. (a)	7. (c)	8. (c)
9. (d)	10. (a)	11. (d)	12. (b)
13. (a)	14. (a)	15. (a)	16. (d)
17. (c)	18. (a)	19. (a)	20. (c)
21. (a)	22. (b)	23. (b)	24. (c)
25. (d)	26. (c)	27. (b)	28. (a)
29. (c)	30. (d)	31. (c)	32. (a)
33. (b)	34. (c)	35. (a)	36. (b)
37. (b)	38. (d)	39. (d)	40. (c)
41. (c)	42. (c)	43. (a)	44. (c)
45. (a)	46. (a)	47. (a)	48. (a)
49. (d)	50. (b)		

Level of Difficulty (III)

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

Hints

Level of Difficulty (III)

1-10. Concentrate on creation of the revenue equation and the cost equations separately. Revenue from a journey will depend on
(a) length of journey (over 2 kilometres)
(b) time of waiting.
Besides, the fixed metre reading of ₹ 10 at the start is used up at the rate of 1 ₹ per 200 metres and/or 1 ₹/minute of waiting.

11. Coca-Cola earns (10 – 3) – (2 + 0.6 + 0.1) = ₹ 4.3 per 300 ml bottle.
Similarly, for 500 ml bottle, the profit is
$$12 - 6.15 = ₹\ 5.85.$$
and for 1500 ml bottle, 28 – 13.2 = 14.8 for 1500 ml bottle.
The profit per ml sold has to be maximised.

12. $\frac{₹\ 10\ \text{crore}}{4.3}$ = 2,32,55,814.

13-14. The earning for one set of 5 bottles = 4.3 × 4 + 5.85 = ₹ 23.05.

15. Maximum profitability = $\frac{\text{Margin per bottle}}{\text{Cost per bottle}}$.

16-19. Profit = Revenue – Expenses.

20-22. Observe the profitability rates for each type of item.

23. Revenues = 8 computers × ₹ 50/hr × 12 hours × 30 days
Costs = monthly cost + $\frac{\text{Depreciation}}{12}$ + Hourly cost × 12 hours × 30 days.

24-28. Will be solved on the same principle as question 23.

29-33. Revenues = occupancy × cost/ticket.
$$\frac{\text{Cost}}{\text{Kilometer}} \times \text{no. of kilometres.}$$

Solutions and Shortcuts

Level of Difficulty (I)

1. 0.8 × Price = 560 → Price 700.
2. The SP = 106.25% of the CP. Thus, CP = 29.75/1.0625 = ₹ 28.
3. 1.12 × Price = 3808 → Price = 3400.
4. A loss of 25% means a cost price of 100 corresponding to a selling price of 75. CP as a percentage of the SP would then be 133.33%
5. 1800 = 1.2 × cost price → Cost price = 1500
Profit at 1687.5 = ₹ 187.5
Percentage profit = (187.5/1500) × 100 = 12.5%
6. CP = 6612.5/1.15 = 5750. Selling this at 5380 would mean a loss of ₹370 on a CP of ₹ 5750.
7. The CP will be ₹ 7200 (got by 6400 × 1.125). Hence at an S.P. of 7812 the percentage profit will be 8.5%
8. CP = 69/1.15 = 60. Thus, the required SP for 20% profit = 1.2 × 60 = 72.
9. The buying price is ₹ 6 per dozen, while the sales price is ₹ 0.75 × 12 = 9 per dozen – a profit of 50%
10. Sales tax = 150/5 = 30. Thus, the SP contains ₹ 30 component of sales tax. Of the remainder (150 – 30 = 120) 1/3rd is the profit. Thus, the profit = 120/3 = 40. Cost price = 120 – 40 = 80.

11. C.P × 1.3 = 26 → CP = 20
    At a selling price of ₹ 22.5, the profit percent 2.5/20 = 12.5%
12. Solve using options. Option (d) gives you ₹220 as the cost of the trouser. Hence, the shirt will cost 15% more i.e. 220 + 22 + 11 = 253.
    This satisfies the total cost requirement of ₹ 473.
13. The formula that satisfies this condition is:
    Loss of $a^2/100\%$ (Where a is the common profit and loss percentage). Hence, in this case 625/100 = 6.25% loss.
14. Cost price = ₹ 1000, selling price = 0.9 of 1200 = 1080.
    Hence, 8% is the correct answer.
15. The cost per toffee = 75/125 = ₹ 0.6 = 60 paise. Cost of 1 million toffees = 600000. But there is a discount of 40% offered on this quantity. Thus, the total cost for 1 million toffees is 60% of 600000 = 360000.
16. On a marked price of ₹ 250, a discount of 20% would mean a selling price of ₹ 200. Since this represents a 25% profit we get:
    1.25 × CP = 200 → CP = 160.
17. The thought process in this question would go as follows:
    250 – 10% of 250 = 225 (after the first discount). 225 – 10% of 225 = 225 – 22.5 = 202.5 (after the second discount). You could do this on the PCG.
18. For ₹ 96, we can buy a dozen pair of gloves. Hence, for ₹ 16 we can buy 2 pairs of gloves.
19. 100 → 75 (after 25% discount) → 60 (after 20% discount) → 54 (after 10% discount).
    Thus, the single discount which would be equivalent would be 46%.
20. 225 × 0.8 × x = 148.5 → x = 0.825
    Which means a 17.5% discount.
21. If you assume the cost price to be 100 and we check from the options, we will see that for Option (a) the marked price will be 133.33 and giving a discount of 6.25% would leave the shopkeeper with a 25% profit.
22. Solve by trial and error using the options. If he marks his goods 40% above the cost price he would be able to generate a 12% profit inspite of giving a 20% discount.
23. The customer pays ₹54 after a discount of 10%. Hence, the list price must be ₹ 60.
    This also means that at a 25% discount, the retailer buys the item at ₹45.
    Hence, the profit for the retailer will be ₹9 (54 – 45).
24. The profit would be given by the percentage value of the ratio 9/45 = 20%.
25. The labour price accounts for ₹ 500. Since the profit percentage gives a 10% profit on this component i.e. 50.
    Hence, the marked price is 1150.
26. The costs in 2016 were 400, 500 and 200 respectively. An increase of 20% in material → increase of 80. An increase of 30% in labor → increase of 150. Increase of 10% in overheads → increase of 20.
    Total increase = 80 + 150 + 20 = 250. New cost = 1100 + 250 = 1350
27. For a 10% profit on labour cost, he should mark his goods at 1350 + 10% of 650 = 1415. Note, 650 is the new cost of labour after a 30% increase as described in Question 26.
28. SP = 820 = 0.82 × CP → CP = 1000. To gain a profit of 28%, the marked price should be 128% of 1000 = 1280.
29. The SP per article = ₹ 3. This represents a profit of 20%. Thus, CP = 3/1.2 = 2.5. 8 articles would cost ₹ 20 and hence selling at 18.40 would represent a loss of ₹1.6, which would mean an 8% loss on ₹20.
30. The percentage profit = $\frac{\text{Goods left}}{\text{Goods Sold}} \times 100$.
    = 10/30 × 100 = 33.33%
    (Note: This formula can be used if the money got and money spent is equated.)
31. In the question, *P*'s investment has to be considered as ₹ 20,000 (the house he puts up for sale).
    He sells at ₹25000 and buys back at ₹ 18750. Hence his profit is ₹ 6250.
    Required answer = (6250 × 100/20000) = 31.25%
32. For 12 locks, he would have paid ₹51, and sold them at ₹ 57. This would mean a profit percentage of 11.76%
33. 195/150 = 1.3 → the profit percentage would be 30% if sold at 195. Thus, the increase in profit percent = 30% – 20% = 10%.
34. A's selling price = 1.2 × 250 = 300. C's Cost price = B's selling price = 386.4/1.15 = 336. Thus, B's profit = ₹36 and his profit percent = 36 × 100/300 = 12%.
35. A 20% reduction in price increases the consumption by 25% (Refer Table 4.1). But the increase in consumption is 5.4 kg.
    Hence, the consumption (original) will be 5.4 × 4 = 21.6 kg.
    Hence, original price = 432/21.6 = ₹ 20.
    Hence, reduced price = ₹ 16
36. Total cost = 50 × 10 + 40 × 12 = 980. Total revenue = 90 × 11 = 990. Gain percent = (10 × 100)/980 = 100/98 %.
37. Percentage profit = $\frac{\text{Goods left}}{\text{Goods Sold}} \times 100$
    = 10/15 × 100 = 66.67%
38. The profit percent would be equal to 150 × 100 /850 = 15000/850 = 300/17% = 17 (11/17)%

39. A gross means 144 eggs. Thus, the cost price per egg = 50 paise and the selling price after a 6.25% profit = 53 paise (approximately).
40. Q sold the table at 20% profit at ₹ 90. Thus cost price would be given by: $CP_Q \times 1.2 = 90$
    Q's Cost price = ₹ 75.
    We also know that P sold it to Q at 25% profit.
    Thus,
    P's Cost price × 1.25 = 75
    → P's cost price = 60.
41. From the options, checking option (a): 300 (*A* buys at this value) → 345 (sells it to *B* at a profit of 15%) → 414 (*B* sells it back to *A* at a profit of 20% gaining ₹69 in the process). Thus, *A*'s original cost = ₹ 300.
42. Net loss = $(20/10)^2$ = 4% of cost price. Thus, 19200 (total money realized) represents 96% of the value. Thus, the cost price would be ₹ 20,000 and the loss would be ₹800.
43. CP × 0.9 = 20 → CP = ₹22.222, Loss per kg = ₹2.222. To incur a loss of ₹ 60, we need to sell 60/2.22 = 27 kgs of tea.
44. The CP of the TV → $CP_{TV} \times 0.9 = 19{,}800 \rightarrow CP_{TV}$ = 22,000
    The CP of the VCP → $CP_{VCP} \times 1.1 = 19{,}800 \rightarrow CP_{VCP}$ = 18,000.
    Total sales value = 19,800 × 2 = 39,600.
    Total cost price = 22000 + 18000 = 40,000. Loss = 40,000 – 39,600 = 400.
45. The profit of 10% amounts to ₹3000. This should also be the actual loss on the second TV.
    Thus, the actual loss = ₹3000 (20% of C.P.)
    Hence, the CP of the second set = ₹15000. SP of the second TV set = 15000 – 3000 = 12000.
46. Solve using options. The correct option (d) would work as follows: If CP = 200, the man sells at 220 (after 10% profit). If he bought for 15% less, he would have bought it at 0.85 × 200 = 170. Also, selling for ₹33 less than 220, means he would have sold at 220 – 33 = 187. This represents the required profit of 10% on his new cost price of 170. Hence, this option is correct. (Note: For the wrong options, the last percentage profit would not match the required 10% profit).
47. Let the cost price be *P*. Then, $P \times 0.95 \times 1.2 = P \times 1.05 + 63 \rightarrow P = 700$. Alternately, you could have solved this using options, as shown in the previous question.
48. 7% of the cost price = ₹ 630.
    Thus, cost price = ₹ 9000
    and selling price @ 8% profit = ₹ 9720.
49. From the last statement we have: Charan's cost price = 1188/1.1 = 1080 = Bhushan's selling price. Then, Bhushan's CP would be given by the equation: CP × 0.9 = 1080 → CP for Bhushan = 1200 = SP for Ashok.
    Also, Ashok gains 20%. Hence, CP for Ashok → CP × 1.2 = 1200 → CP for Ashok = 1000.
    This includes ₹ 110 component of repairs. Thus, the purchase price for Ashok would be 1000 – 110 = 890.
50. Solve through the values given in the options. Option (c) is correct because at 4/5 × 300 + 5/4 × 600 we see that the profit earned = ₹90.
51. Solve this question using the options. The first thing you should realize is that the cost of the lower priced item should be less than 240. Thus, we can reject options (a) and (d). Checking option (c) we can see that if the lower priced item is priced at 200, the higher priced item would be priced at ₹ 280. Then: 1.19 × 200 = 238 and 0.85 × 280 = 238. It can be seen that in this condition the values of the selling price of both the items would be equal (as required by the conditions given in the problem). Thus, option (c) is the correct answer.
52. Original Cost Price = ₹ 5000
    New Cost Price = 1.3 × 5000 = ₹ 6500
    Price paid by retailer = 1.2 × 5750 = ₹ 6900
    Profit percentage = (400/6500) × 100 = 6 (2/13)%
53. The total manufacturing cost of the article = 300 + 350 + 100 = 750. SP = 900. Thus, profit = ₹ 150.
    Profit Percent = 150 × 100/750 = 20%
54. Assume marked price for both to be 100.
    P's selling price = 100 × 0.8 × 0.85 = 68
    Q's selling price = 100 × 0.82 × 0.83 = 68.06.
    Buying from '*P*' is more profitable.
55. The total discount offered by *A* = 5% on 1,00,000 + 12.5% on 80,000 = 5,000 + 10,000 = 15,000.
    If *B* wants to be as competitive, he should also offer a discount of ₹ 15,000 on 1,80,000. Discount percentage = 1500 0 × 100/1,80,000 = 8.33% discount.
56. The trader pays 1600 × 0.95 × 0.95 = ₹ 1444
57. Manufacturer's profit percentage = (44/1400) × 100 = (22/7)%
58. For a cost price of ₹2000, he needs a selling price of 2280 for a 14% profit. This selling price is arrived at after a discount of 5% on the marked price. Hence, the marked price MP = 2280/0.95 = 2400.
59. Solve using options. Option (b) fits the situation as a 10% discount on 450 would mean a discount of 45. This would leave us with a selling price of 405, which represents a profit percent of 12.5% on ₹ 360.
60. If he marks the camera at 840, a 15% discount would still allow him to sell at 714 – a profit of 19%. Alternately: Marked Price × 0.85 = 600 × 1.19 → Marked Price = 840

61. Cost price to the watch dealer
= 450 + 20% of 450 = ₹ 540
Desired selling price for 25% profit
= 1.25 × 540 = 675
But 675 is the price after 20% discount on the marked price.
Thus,
Marked price × 0.8 = 675 → MP = 843.75
Hence, he should mark the item at ₹843.75.
62. If the cost price is 100, a mark up of 60% means a marked price of 160. Further a 35% discount on the marked price would be given by:
160 – 35% of 160 = 160 – 56 = 104. Thus, the percentage profit is 4%.
63. A cost price of ₹13000 would meet the conditions in the problem as it would give us a loss of 4800 (if sold at 8200) and a profit of 2400 (when sold at 15400). You can think of this as: If you take the loss as 2x, the profit is x. Then, 3x = 15400 – 8200 = 7200 x = 2400. Thus, the profit is 2400 when he sells at 15400. Hence, the cost price must be 15400 – 2400 = 13000.
64. Cost per 100 apples = 70 + 10% of 70 = ₹77.
Selling price @ 30% profit = 1.3 × 77 = ₹100.1
65. Profit percent = (200/800) × 100 = 25%

Level of Difficulty (II)

1. Total outlay (initial investment) = 750 × 0.6 = ₹ 450.
By selling 600, he should make a 40% profit on the outlay. This means that the selling price for 600 should be 1.4 × 450 → ₹ 630
Thus, selling price per article = 630/600 = 1.05. Since, he sells only 630 articles at this price, his total recovery = 1.05 × 630 = 661.5
Profit percent (actual) = (211.5/450) × 100 = 47%
2. In order to solve this problem, first assume that the cost of manufacturing 1 article is ₹1. Then 100 articles would get manufactured for ₹100. For a 20% profit on this cost, he should be able to sell the entire stock for ₹120. However since he would be able to sell only 88 articles (given that 12% of his manufactured articles would be rejected) he needs to recover ₹120 from selling 88 articles only. Thus, the profit he would need would be given by the ratio 32/88.
Now it is given to us that his selling price is ₹7.5. The same ratio of profitability i.e.32/88 is achieved if his cost per article is ₹ 5.5.
3. The total cost to print 900 copies would be given by:
Cost for setting up the type + cost of running the printing machine + cost of paper/ink etc
= 1000 + 120 × 9 + 900 × 0.6 = 1000 +1080 + 540 = 2620.
A 10% profit on this cost amounts to ₹ 262. Hence, the total amount to be recovered is ₹ 2882.
Out of this, 784 copies are sold for ₹ 2.75 each to recover ₹ 2156.
The remaining money has to be recovered through advertising.
Hence, The money to be recovered through advertising = 2882 – 2156 = ₹ 726. Option (c) is correct.
4. Total cost (assume) = 100.
Recovered amount = 65 + 0.85 × 32.5 + 0.7 × 32.5
= 65 + 27.625 + 22.75 = 115.375
Hence, profit percent = 15.375%
5. Cost price = x
Marked Price = x + 205
Selling Price = $0.9x$ + 184.5
Percentage Profit = $[(-0.1x + 184.5)/x] \times 100$.
$$= \frac{18450 - 10x}{x}$$
6. She should opt for a straight discount of 30% as that gives her the maximum benefit.
7. If you assume that his cost price is ₹ 1 per gram, his cost for 1000 grams would be ₹ 1000. For supposed 1 kg sale he would charge a price of 1080 (after an increase of 20% followed by a decrease of 10%).
But, since he gives away only 900 grams the cost for him would be ₹ 900.
Thus he is buying at 900 and selling at 1080 – a profit percentage of 20%
8. While buying
He buys 1100 gram instead of 1000 grams (due to his cheating).
Suppose he bought 1100 grams for ₹ 1000
While selling:
He sells only 900 grams when he takes the money for 1 kg.
Now according to the problems he sells at a 8% profit (20% mark up and 10% discount).
Hence his selling price is ₹ 1080 for 900 grams.
To calculate profit percentage, we either equate the goods or the money.
In this case, let us equate the money as follows:
Buying;
1100 grams for ₹ 1000
Hence 1188 grams for ₹ 1080
Selling: 900 grams for ₹ 1080
Hence, profit% = 288/900 = 32%
(using goods left by goods sold formula)
9. The new situation is
Buying:
1100 grams for ₹ 900

Hence, 1320 grams for ₹ 1080

Selling: 900 grams for ₹ 1080

Profit % = $\frac{420}{900} \times 100$ = 46.66%

10. Assume he bought 20 apples each. Net investment ⇒ ₹ 5 + ₹ 4 = ₹ 9 for 40 apples. He would sell 40 apples @ (40 × 2)/9 = ₹ 8.888 → Loss of ₹ 0.111 on ₹ 9 investment

    Loss percentage = 1.23%

11. 600 – 10% of 600 = 540. 540 – 5% of 540 = 513. 513 + 5% of 513 = 538.65

12. The problem is structured in such a way that you should be able to interpret that if he had sold 120 kg of rice he would recover the investment on 100 kg of rice.

$$\% \text{ Loss/Profit} = \frac{\text{Goods left}}{\text{Goods sold}} \times 100$$

    (–20/120) × 100 = 16.66% loss.

    Since, cost price for Deb is ₹ 11; selling price per kg would be ₹ 9.166.

13. Comparisons have to be made between:

    192 × 34, 198 × 33, 204 × 32 and 210 × 31 for the highest product amongst them.

    The highest value of revenue is seen at a price of ₹ 198.

14 & 15: Using options from question 15. Suppose she had spent ₹ 6 at the market complex, she would spend ₹ 3 at her uncle's shop. The other condition (that she gets 2 sweets less per rupee at the market complex) gets satisfied in this scenario if she had bought 12 chocolates overall. In such a case, her buying would have been 2 per Rupee at the market and 4 per rupee at Uncle Scrooge's shop.

Trial and error will show that this condition is not satisfied for any other option combination.

16. The given situation fits if we take *Q* as 60% profit and then the loss would be 37.5% (which is 62.5%) of *Q*). Thus, if ₹ 24 is the cost price, the selling price should be 24 × 1.6 = ₹ 38.4

17. Assume the price of 1 kg as 100. He initially sells the kg at 115. His original profit is 15%. When he is able to sell only 80% of his items: his new revenue would be given by 80 × 1.265 = 101.2 on a cost of 100. Profit percentage = 1.2%

    Change in profit percent = –13.8 (It drops from 15 to 1.2)

18. Ramu's total discount:

    8% on 8000 = ₹ 640

    5% on 12000 = ₹ 600

    3% on 16000 = ₹ 480

    Total = ₹ 1720 on ₹ 36000.

    Hence, Realised value = 34280.

    Shyamu's Discounts:

    7% on 12000 = 840

    6% on 8000 = 480

    5% on 16000 = 800

    ₹ 2120 on ₹ 36000

    Hence, Realised value = 33880.

    The higher profit is for Ramu.

    Also, the CP has a mark up of 25% for the Marked price. Thus the CP must have been 28800 (This is got by 36000 – 20% of 36000 – PCG thinking)

    Thus, the profit % for Ramu would be: (5480*100)/28800 → 19% approx.

19. In the case of the given defaults, the discount for Ramu would have gone down to:

    4% on 12000 (the second payment) and the second discount would thus have been ₹480 meaning that the sale price would have risen by ₹120 (since there is a ₹120 drop in the discount)

    1% on 16000 → A reduction of 2% of 16000 in the discount → a reduction of ₹ 320.

    Hence, Ramu's profit would have gone up by ₹440 in all & would yield his new profit as:

    5480 + 440 = ₹ 5920

20. The following working would show the answer:

    Ramu's Discounts

    7% on 8000 = ₹ 560

    4% on 12000 = ₹ 480

    2% on 16000 = ₹ 320

    Total = ₹ 1360 on ₹ 36,000.

    Shyamu's discounts:

    6% on 12000 = 720

    5% on 8000 = 400

    4% on 16000 = 640

    ₹ 1760 on ₹ 36000

    Thus, their profits would vary by ₹ 400 (since their cost price is the same)

21. Solve using options. Option (a) fits as if we take SP as 2000, we get CP_1 as 1500 and CP_2 as 1600 which gives us the required difference of ₹ 100.

22. The first one would get a profit of ₹ 500 (because his cost would be 2500 for him to get a 20% profit on cost price by selling at 3000).

    The second one would earn a profit of 600 (20% of 3000).

    Difference in profits = ₹100

23. Find out the total revenue realization for both the cases:

    Case 1: (Old) Total sales revenue = 2000 × 3.25 × 0.75.

    $Profit_{old}$ = Total sales revenue – 4800

    Case 2: (New) Total sales revenue = 3000 × 4.25 × 0.75

$Profit_{new}$ = Total sales revenue – 4800

The ratio of profit will be given by $Profit_{new}$ /$Profit_{old}$

24. Profit in original situation = 20%.

    In new situation, the purchase price of 90 (buys at 10% less) would give a selling price of 132 (sells at 10% above 120).

    The new profit percent = [(132 – 90) × 100]/90 = 46.66

    Change in profit percent = [(46.66 – 20) × 100]/20 = 133.33%

25. The successive discounts must have been of 10% each. The required price will be got by reducing 25 by 10% twice consecutively. (use PCG application for successive change)

26. From the options you can work out that if the original price was ₹ 12 per dozen, the cost per apple would be ₹1.

    If she is able to get a dozen apples at a reduced price (reduction of ₹ 1 per dozen), she would be able to purchase 1 extra apple for the 1 Rupee she saved. Thus, option (c) is correct.

27. The following calculations will show the respective costs:

    Primary Cost: 35% of 12600 = 4410

    Miscellaneous costs = 2% of 12600 = 252

    Gross Profit = 12600 – 4410 – 1400 – 650 – 252 = 5888

    Trading cost = 0.25 × 5888 = 1472

    Hence, Net profit = 4416.

    Percentage profit = 4416/14000 = 31.54%

28. If we assume the value of the first cycle as ₹ 900. Then 900 + 96 = 996 should be equal to twice the value of the second cycle. Hence, the value of the second cycle works out to be: 498.

    Also 498 + 96 = 594 which is ₹306 less than 900.

    Hence, Option (a) fits the situation perfectly and will be the correct answer.

    Note here that if you had tried to solve this through equations, you would have got stuck for a very long time.

29. David (100) → Goliath (80) → Hercules (100) → Goliath (90)

    Hercules loss corresponds to 10 when David buys the laptop for 100.

    Hence, Hercules's loss would be ₹17500 when David buys the laptop for 1,75,000.

30. While purchasing he would take 1200 grams for the price of 1000 grams.

    While selling he would sell 900 grams for the price of 1000 grams. Since CP = SP, the profit earned is through the weight manipulations. It will be given by:

    Goods left/goods sold = 300 × 100/900 = 33.33%

31. Assume that for 100 items the cost price is ₹ 100, then the selling price is ₹ 130. Since 24 is sold at half the price, he would recover 24 × 1/2 = ₹12 (since it is sold at half the cost price)

    The remaining 70 would be sold at 70 × 1.3 = ₹91.

    Total revenue = 91 + 12 = 103 → a profit of 3% (on a cost of 100).

32. An increase in the price by ₹12 will correspond to 50% of the CP.

    Hence, The CP is ₹24 and initially the book was being sold at ₹19.2. Hence, if there is an increment of ₹ 4.8 in the selling price, there would be no profit or loss.

33. In the first year, the profit percentage would be:

    $$\text{Old Profit Percentage} = \frac{0.55 \times 5 + 0.45 \times 8}{1} = 6.35\%$$

    $$\text{New Profit Percentage} = \frac{0.55 \times 8 + 0.45 \times 5}{1} = 6.65$$

34. Since the ratio remains unchanged the percentage profit of the village will remain unchanged too.

35. The profit would increase by 10% as there is no change in the percentage profit.

36. Since the answer to question 33 is 0.3, if we increase the percentage profit for both men and women by 1 % the overall percentage profit would also go up by 1% - thus 0.3 + 1 = 1.3%

37. $x \times 8 + 0.75x \times 22 = 1.4 \times 4725 \rightarrow x = 270$.

    On an investment of ₹ 4725, a profit of 40% means a profit of 1890.

    Hence, the targeted sales realization is ₹ 6615.

    The required equation would be:

    $8p + 22\ (3p)/4 = 6615$

    $\rightarrow 8p + 33p/2 = 6615$

    In this expression for LHS to be equal to RHS, we need $33p/2$ to be an odd number. This can only happen when p is not a multiple of 4 (why?? Apply your mind). Hence, options a & c get eliminated automatically.

38. After 2 years, the flat would be worth ₹ 288000, while the land would be worth ₹ 266200. The profit percentage of the gainer would be given by:

    $$(21800/266200) \times 100 = 8.189\%$$

    Hence (d).

39. The total investment will be $A + B + C$.

    C being 3000, B will be 2250 and A will be 1500.

    The total investment is: 6750.

    Returns to be given on their expectations:

    A = 150, B = 337.5 and C = 0.

    From this point calculate the total profit, subtract A's and B's expected returns and B's share of the profits

for managing the business before dividing the profits in the ratio of capital invested. However, most of this information is unknown. Hence option (d) is correct.

40. The cost of the trip would be proportional to the price of petrol. So, if initially the cost is 100, the new cost would be 80. Also, initially since his profit is 20%, his revenue would be 120. When he takes 4 passengers instead of 3 his revenue would go up to 160 – and his profit would become 100% (cost 80 and revenue 160).
41. Total number of microwave ovens = 15
    Hence, washing machines = 10
    Thus, He sells 80% of both at a profit of ₹ 40,000.
    Cost of 80% of the goods = 0.8 × 2,05,000 = 1,64,000.
    Total amount recovered = 1,64,000 + 40,000 = 2,04,000
    Hence, loss = ₹ 1000
42. Since the actual initial loss was 10% and it is to be compared to a profit of 5%, it is 200% of the profit. Option (c) is correct.
43. He would be selling 800 grams for ₹12. Since a kg costs ₹10 800 grams would cost ₹ 8.
    Hence, his profit percentage is 50%.
44. The interpretation of the first statement is that if the loss at 275 is L, the profit at 800 is 20L.
    Thus, 21L = 800 – 275 = 525 → L = 25.
    Thus, the cost price of the item is ₹300.
    To get a profit of 25%, the selling price should be 1.25 × 300 = 375.
45. C's purchase price = 2145 × 10/11 =1950
    B's rate of profit is 3 times C's rate of profit. Hence, B sells to C at 30% profit.
    B's price + 30% profit = 1950 (C's price).
    Hence, B's Price = 1500.
    Further, since A's profit rate is 5/3rd the rate of profit of B, A's profit percent would be 30 × 5/3 = 50%.
    Thus, A's Price + 50% profit = 1500 (B's price)
    Thus, A's price = 1000
46. He would buy at 500 and sell at 888 to get a profit of 388
47. There were 5 printers (2 + 3) and 20 monitors. He sells 2 printers for a profit of ₹ 2000 each. Hence, profit from printer sales = ₹ 4000.
    Then, profit from monitor sales = ₹ 45000
    Thus, profit per monitor $= \frac{45000}{15} = ₹\ 3000$
    (Since, 15 monitors were sold in all.)
    Hence, C.P. of monitor = ₹ 15000
    And C.P. of Printer = ₹ 7500
    Total cost = 15000 × 20 + 7500 × 5 = 3,37,500
    Total Revenues = 18000 × 15 + 9500 × 2 = 28,900
    Hence, loss of ₹ 48,500
48. Loss% $= \frac{48,500}{3,37,500} \times 100 = 14.37\%$
49. By charging ₹ 1.2 more his profit should double to 40%. This means that his profit of 40% should be equal to ₹ 2.4. Thus, his cost price must be ₹6 and his original selling price should be 7.2. Hence, option (d) is correct.
50. Total cost = 5 lacs
    Total revenue = 3000 × 160 + 1500 × 200 – vendors discount of 20% of revenues
    = 7.8 lacs – 1.56 lacs = 6.24 lacs.
    Profit percent = (1.24 × 100)/5 = 24.8%

Space for Notes