PROFIT, LOSS AND DISCOUNT
6

INTRODUCTION

Traditionally, Profit, Loss and Discount has always been an important chapter for CAT. Besides, all other Management entrance exams like XAT, SNAP, NMAT, CMAT, MAT, ATMA as well as Bank P.O. exams extensively use questions from this chapter.

During the early years of the 2000s, the importance of this chapter had gradually reduced. However, in the online version of the exam, this chapter has regained its importance as questions have started to appear regularly in the exam.

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". Let us start to look at the basic theory of this chapter by first understanding the typical terminology of this chapter.

Key Terms and Standard Language in Profit and Loss:

Cost Price (CP): It is the price at which a seller has bought an item. It can also be seen to be the cost at which a unit of the product has been produced (in case, it is being produced).

Marked Price (MP): It is the price at which the item is marked for sale.

Percentage Mark Up: The relation between the cost price and the marked price is defined by the 'Percentage Mark Up'. A typical statement involving per-

centage mark-up would read as follows: 'A shopkeeper marks up his items by 30%.' The interpretation of this statement would be that if the Cost Price is taken as 100, then the Marked Price would be 130. Alternately, you could think of this algebraically also as, if the Cost Price is 'x', then the Marked Price is $1.3x$. Sometimes, you might also be provided with the value of the Cost Price along with the percentage mark up. In such cases, the Marked Price would be obtained by raising the given cost price by the percentage mark up. For instance, given: 'A shopkeeper buys a shirt for ₹400 and marks up the price by 30%' would lead to a reaction of CP = 400, MP = 400 × 1.3 = 520.

Mark Up: Sometimes, the mark-up may be given in terms of a number of Rupees (or currency). So, if the seller marks up the price of his items by ₹10 for items he purchases for ₹40, the marked price would be ₹40 + 10 = ₹50.
The operative relationships are:

CP + Mark up = Marked Price

or CP + % Mark up on CP = Marked Price

Selling Price (SP): The Selling Price is the price at which an item is actually sold for. The Selling Price might be equal to or smaller than the Marked Price. Whether it is equal or lower, depends on whether the seller is giving a discount on the Marked Price. In the case of no discount, the SP = MP. However, if there is a discount offered then the SP < MP.

Discount: Discounts are offered by sellers to attract the buyer to purchase the item/s. Discounts are reductions in the Marked Price that is made by the seller to sell the item below the marked price. Discounts can be offered in two forms viz:

1. **Absolute Discount:** An absolute discount is a direct value reduction in the Marked Price of an item. Thus, when a seller gives an absolute discount of ₹100 on an item marked at 1200, the SP would be 1200 – 100 = 1100.
2. **Percentage Discount:** When the discount is offered as a percentage of the Marked Price, it is referred to as a percentage discount. Consider the following statement to understand this: 'A shopkeeper offers a discount of 20% on an item marked at ₹1200.' In this case, the MP is given to us as 1200. The SP would be obtained after a 20% reduction on the MP. Thus, the SP = 1200 – 20% of 1200 = 1200 – 240 = 960.

Profit: It is the difference between the Selling Price and the Cost Price, when the SP > CP. Profit = SP – CP.

The operative relationship between CP and SP through mark ups and discounts is:

CP + Mark-up = Marked Price

Marked Price – Discount = Selling Price

Loss: If the CP > SP, then the seller is making a loss on the item. Loss = CP – SP.

Successive Mark Ups: This is best explained by looking at this statement: 'A shopkeeper successively marks up the price of his items by 20% and 10%. What would be the single equivalent mark up?' In this case, if the CP is 100, after a mark-up by 20%, the MP would become 120. However, this is not the final MP, since we will need to increase 120 by 10% again to get the effect of successive

markups. We can see that 120 increase by 10%, becomes 132. Hence, the single equivalent mark-up would be 32%. Thus, in effect successive mark ups have to be thought about using the successive change use of the Percentage Change Graphic (PCG) that we have seen extensively in the chapter on percentages.

Successive Discounts: Very much like successive mark-ups, successive discounts are also, solved using the successive percentage change use of the PCG. So, the reaction to a shopkeeper giving two successive discounts of 20% and 10% would be that if the MP be 100, then after a discount of 20%, the MP would become 80. Further, a 10% discount on 80 would make it 72. Thus, successive discounts of 20% and 10% are equivalent to a single discount of 28%.

Percentage Profit: It is defined as $\text{Percentage Profit} = \frac{\text{Profit}}{\text{Cost Price}} \times 100$ (**Note:** For percentage loss, the same formula would apply, i.e. $\text{Percentage Loss} = \frac{\text{Loss}}{\text{Cost Price}} \times 100.$

The above situation (although it is the basic building block of Profit, Loss and Discount) 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 and Loss as Applied to Business and Commercial Transactions

Profit and 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 are 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 an additional office space to accommodate the increase in work due to the increase in sales than the rent for the office space becomes a part of the semi-variable cost.

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.

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 *pen* shop has to pay a rent of ₹1000 per month and salaries of ₹4000 to the assistants.

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

Now, break-even sales will be given by:

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

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

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

Note the following formulae:

$$\text{Profit} = (\text{Actual sales} - \text{Break-even sales}) \times \text{Contribution per unit}$$

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 received 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 received 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 leftover after the transaction. These leftover 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 $= \frac{\text{Goods left}}{\text{Goods sold}} \times 100$.

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:

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

WORKED-OUT PROBLEMS

Before we go into problems based on profit and loss, the reader should realise 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) Over-heads/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 obtanied 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 denominatorchange 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 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 obtained by increasing it 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. $\therefore$ $CP_1 = 177.77$

When there is a profit of 10% → 160 = 110% of CP_2. $\therefore$ $CP_2 = 145.45$

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 two 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 % = 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 received are equal. Hence, the percentage profit is received 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 reached 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 five 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 five 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. Option (a) would be correct.

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 g. Similarly, he cheats by 10% while selling, that is, he gives only 900 g 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 g while purchasing and sells 900 g while selling.

To equate the two, use the following process:

	Money paid		*Amount of goods*
Buying	₹1000	1100	gram (Reduce this by 10%)
After reduction	₹900	990	gram
Selling	₹1000	900	gram (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 five articles for ₹15, a man makes a profit of 20%. Find his gain or loss percentage if he sells eight articles for ₹18.4.

Solution: 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 five articles for ₹15, a man makes a profit of 20% → SP = 3. Hence, CP = 2.5, if he sells eight 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 received 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, Mindworkzz 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 Mindworkzz 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% 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 obtained 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 obtained by increasing ₹3000 by 33.33% and getting ₹4000.

Note: The use of percentage change graphic in general and the product constancy table in particular in solving 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%.

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.

LEVEL OF DIFFICULTY (I)

1. By selling a book for ₹1080, a shopkeeper incurs a loss of 10%. Find the cost price of the book for the shopkeeper.

   (a) ₹1200

   (b) ₹1300

   (c) ₹1280

   (d) ₹1240

2. By selling a pen for ₹36, a man gains 20%. What will be the CP of the pen?

   (a) ₹30

   (b) ₹36

   (c) ₹38

   (d) ₹32

3. A phone when sold for ₹4480 fetches a profit of 12%. Find the cost price of the phone.

   (a) ₹4000

   (b) ₹4400

   (c) ₹4260

   (d) ₹4560

4. A chair costs ₹1000. If it is sold at a loss of 15%, what will be its cost price as a percentage of its selling price?

   (a) 115.33%

   (b) 116.67%

   (c) 120%

   (d) 117.65%

5. Anil sold goods for ₹1440 and made a profit of 20% in the process. Find his profit per cent if he had sold his goods for ₹1500.

   (a) 23%

   (b) 21%

   (c) 25%

   (d) 22%

6. A phone is sold for ₹3220 at a profit of 15%. What would have been the actual profit or loss on it, if it had been sold for ₹3360?

   (a) ₹570

   (b) ₹560

   (c) ₹580

   (d) ₹540

7. A table when sold for ₹3680 gives a loss of 8% to the merchant who sells it. Calculate his loss or gain per cent, if he sells it for ₹3600.

   (a) Loss of 10%

(b) Loss of 8.5%

(c) Loss of 9%

(d) Loss of 7.5%

8. By selling a bouquet for ₹690, a florist gains 15%. At what price should he sell the bouquets to gain 25% on the cost price?

(a) ₹720

(b) ₹750

(c) ₹660

(d) ₹780

9. A shopkeeper bought 960 bananas at ₹12 per dozen. If he sold all of them at ₹1.5 each, what was his profit per cent?

(a) 50%

(b) 33(1/3)%

(c) 75%

(d) 20%

10. An article 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 article.

(a) ₹72

(b) ₹80

(c) ₹90

(d) ₹76

11. Anil makes profit of 30% by selling an article at ₹52 per quintal. If he sells the article at ₹60 per quintal, what is his profit per cent on the whole investment?

    (a) 25%

    (b) 30%

    (c) 50%

    (d) 15%

12. The cost price of a chair and a table is ₹450. If the table costs 25% more than the chair, find the cost price of the chair.

    (a) ₹240

    (b) ₹250

    (c) ₹210

    (d) ₹200

13. A shop owner sells two chairs at the same price. On one, he makes a profit of 20% and on the other, he suffers a loss of 20%. Find his loss or gain per cent on the whole transaction.

    (a) Gain of 5%

    (b) No profit no loss

    (c) Loss of 2%

    (d) Loss of 4%

14. The marked price of a book is ₹240, which is 50% above the cost price. It is sold at a discount of 20% on the marked price. Find the profit per cent.

    (a) 20%

    (b) 12%

    (c) 15%

    (d) 8%

15. The cost of 250 bananas is ₹150. Find the cost of two million bananas, if there is a discount of 10% on the selling price for this quantity.

    (a) ₹20,00,000

    (b) ₹12,00,000

    (c) ₹10,80,000

    (d) ₹30,00,000

16. A shopkeeper marks the price of an article at ₹125. Find the cost price if after allowing a discount of 20%, he still gains 25% on the cost price. (in ₹)

    (a) 100

    (b) 80

    (c) 120

    (d) 90

17. In the previous question, what will be the selling price of the article, if he allows two successive discounts of 10% each?

    (a) 101.5

    (b) 101.25

    (c) 100

    (d) 107.5

18. Ten shirts quoted at ₹14000 are available at a discount of 10%. Find how many shirts can be bought for ₹16000.

    (a) 13

    (b) 12

    (c) 14

    (d) 16

19. Find a single discount equivalent to the discount series of 20%, 25%, 20%.

    (a) 66%

    (b) 46%

    (c) 52%

    (d) 34%

20. The printed price of a table is ₹2250. A retailer pays ₹1485 for it by getting successive discounts of 20% and another rate which is illegible. What is the second discount rate?

    (a) 20%

    (b) 16.5%

(c) 15%

(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 20%, he should have a gain of 25% on his outlay?

(a) 16.67%

(b) 56.25%

(c) 66.66%

(d) 50%

22. A shopkeeper gives a discount of 10% on the marked price of goods in his shop. However, he still makes a gross profit of 50% on the cost price. Find the profit percent he would have made on the selling price had he sold at the marked price.

(a) 45.67%

(b) 66.67%

(c) 50%

(d) 45%

23. A whole seller allows a discount of 20% on the list price to a retailer. The retailer sells at 10% discount on the list price. If the customer paid ₹108 for an article, what is the profit by the retailer?

(a) 12

(b) 10

(c) 11

(d) 15

24. In Question 23, also find the retailer's percentage profit on his cost giving your answer correct to two decimal places.

(a) 13.33%

(b) 12.50%

(c) 10%

(d) 15%

25. The cost of production of a shirt in 2019 was ₹2200, divided between material, labour and overheads in the ratio 4 : 5 : 2. If the shirt is marked at a price that gives a 10% profit on the component of price accounted for by labor, what is the marked price of the set?

(a) ₹2280

(b) ₹2300

(c) ₹2120

(d) ₹2150

26. For Question 25, if subsequently in 2020, the cost of material, labour and overheads increased by 10%, 10% and 20% respectively, calculate the cost of manufacturing in 2020.

(a) ₹2420

(b) ₹2460

(c) ₹2250

(d) ₹2450

27. What should be the new marked price if the criteria for profit is to remain the same as for Question 25 above?

(a) ₹2420

(b) ₹2570

(c) ₹2530

(d) None of these

28. By selling a book for ₹1640, a man incurs a loss of 18%. At what price should he sell the book to gain 15%?

(a) ₹2300
(b) ₹2250

(c) ₹2220

(d) None of these

29. Aman sells 100 articles for ₹300 and makes a profit of 10%. Find his gain or loss percent if he sells 88 such articles for ₹200.

(a) 22.22% profit

(b) 16.67% loss

(c) 28% loss
(d) 16% profit

30. The cost price of 30 toffees is equal to the selling price of 20 toffees. Find the percentage profit.

(a) 20%

(b) 25%

(c) 50%

(d) None of these

31. *A* owns a bike worth ₹40,000. He sells it to *B* at a profit of 10%. After some time, *B* sells it back to *A* at 20% loss. Find *A*'s loss or gain percent.

(a) 25% gain

(b) 6.25% gain

(c) 31% gain

(d) 22% gain

32. A shopkeeper bought pens at the rate of 16 for ₹96 and sold them at the rate of 24 for ₹192. Calculate his gain percent.

(a) 18.67%

(b) 25%

(c) 22.22%

(d) 33.33%

33. Sudhir bought an article at ₹1500 and sold it at a profit of 10%. What would have been the increase in the profit percent if it was sold for ₹1950?

(a) 10%

(b) 25%

(c) 33.33%

(d) 20%

34. Aman makes an article for ₹500 and sells it to Baman at a profit of 10%. Baman sells it to , Charan who sells it for ₹660, making a profit of 10%. What profit percent did Baman make?

(a) 9.09%

(b) 12%

(c) 16.66%

(d) 33.33%

35. A reduction of 20% in the price of sugar enables a housewife to buy 7.5 kg more for ₹132. Find the reduced price per kilogram.

(a) ₹3.52

(b) ₹3.16

(c) ₹3.80

(d) None of these

36. Aman buys 20 kg of wheat at ₹10 per kilogram and another 30 kg of wheat at ₹15 per kilogram and mixes them. He sells the mixture at the rate of ₹13 per kilogram. What will be his gain percent if he is able to sell the whole lot?

(a) 12.25%

(b) 34.50%

(c) 14.5%

(d) None of these

37. If the cost price of 12 articles is equal to the selling price of 10 articles, find the profit percent.

(a) 12.33%

(b) 12%

(c) 20%

(d) 16.67%

38. Ajay sells wheat in such a way that the selling price of 250 g is the same as the cost price of 300 g. Find his gain percent.

(a) 15%

(b) 10%

(c) 17%

(d) 20%

39. A shopkeeper buys bananas at ₹72 per dozen. He sells the bananas at a profit of 12.5% on the cost price. What is the selling price per banana?

(a) ₹6.75

(b) ₹6.50

(c) ₹6.80

(d) ₹5.60

40. *A* sold a table to *B* at a profit of 25%. *B* sold the same table to *C* for ₹90 thereby making a profit of 20%. Find the price at which *A* bought the table from *D* if it is known that *D* gained 25% in the transaction.

    (a) ₹70

    (b) ₹75

    (c) ₹90

    (d) ₹60

41. *P* sold a table to *Q* at a profit of 10%. Later on, *Q* sold it back to *P* at a profit of 20%, thereby gaining ₹66. How much did *P* pay for the table originally?

    (a) ₹300

    (b) ₹320

    (c) ₹345

    (d) ₹350

42. A dealer sold two chairs for ₹4800 each, gaining 10% on one and losing 10% on the other set. Find his net gain or net loss.

    (a) ₹96.96 loss

    (b) ₹48 loss

    (c) ₹96 gain

    (d) None of these

43. On selling sugar at ₹198 per kg a loss of 10% is incurred. Calculate the amount of sugar (in kg) sold if the total loss incurred is ₹8800.

(a) 450 kg

(b) 410 kg

(c) 400 kg

(d) 440 kg

44. A table and a chair were sold for ₹39600 each. The table was sold at a loss of 10% whereas the chair was sold at a gain of 10%. Find gain or loss in the whole transaction.

(a) ₹800 loss

(b) ₹2000 loss

(c) ₹1920 loss

(d) ₹2080 loss

(*Note:* In this case, there will always be a loss)

45. A man sells a table set for ₹66,000 and makes a profit of 10%. He sells another table at a loss of 20%. If on the whole, he neither gains nor loses, find the selling price of the second table.

(a) ₹45,000

(b) ₹42,000

(c) ₹30,000

(d) ₹24,000

46. Aman sells an article at 20% above its cost price. If he had bought it at 25% less than what he paid for it and sold it for ₹200 less, he would have gained 33.33%. Find the cost price of the article.

(a) ₹1000

(b) ₹760

(c) ₹825

(d) ₹900

47. A book was sold at a profit of 15%. If its cost price was 15% less and it was sold for ₹33 more, the gain would have been 100%. Find the cost price of the book.

(a) ₹80

(b) ₹90

(c) ₹70

(d) ₹60

48. A man sells an article at 12% profit. If he had sold it at 20% profit, he would have received ₹600 more. What is the selling price of the article?

(a) ₹8400

(b) ₹7600

(c) ₹7800

(d) ₹7500

49. Anil bought a TV and spent ₹1000 on its repairs. He then sold it to Baman at a profit of 50%. Baman sold it to Chaman at a loss of 16.67%. Chaman finally sold it for ₹27,500 at a profit of 10%. How much did Anil pay for the article?

(a) ₹18,900

(b) ₹19,000

(c) ₹17,800

(d) ₹18,400

50. A man buys two pens for a total cost of ₹900. By selling one for 2/5 of its cost and other for 5/2 of its cost, he makes a profit of ₹720 on the whole transaction. Find the cost price of lower priced cycle.

(a) ₹360

(b) ₹2500

(c) ₹300

(d) ₹420

51. Sunil bought two books, which together cost him ₹600. He sold one of them at a loss of 40% and other at a gain of 20%. If the selling price of both the books are equal, find the cost of the lower priced book.

(a) ₹300

(b) ₹200

(c) ₹220

(d) ₹250

52. Two mobile phones were purchased at the same price. One was sold at a profit of 30% and the second was sold at a price which was ₹2500 less than the price at which the first was sold. If the overall profit earned by selling both the mobile phones was 5%, what was the cost price of one mobile phone?

(a) ₹8000

(b) ₹5000

(c) ₹6000

(d) ₹4500

53. A sold an article for ₹8000 and incurred a loss. Had he sold the article for ₹9800, his gain would have been twice the amount of loss. At what price should the article be sold to earn 20% profit?

(a) ₹10,840

(b) ₹9820

(c) ₹10,320

(d) ₹9840

54. *A* bought a certain quantity of oranges at total cost of ₹1200. He sold 1/3rd of those oranges at 20% loss. If *A* earns overall profit of 10%, at what percent profit did *A* sell the rest of the oranges?

(a) 16%

(b) 15%

(c) 22%

(d) 25%

55. A dealer allowed a discount of 25% on the marked price of ₹12000 on an article and incurred a loss of 10%. What discount should he allow on the marked price so that he gains ₹440 on the article?

(a) 11%

(b) 13%

(c) 19%

(d) 15%

56. A shopkeeper bought 84 identical shirts priced at ₹240 each. He spent a total of ₹3200 on transportation and packaging. He put the label of marked price of ₹420 on each shirt. He offered a discount of 15% on each shirt at the marked price. What is the total profit of the shopkeeper in the whole transaction?

(a) ₹6258

(b) ₹6528

(c) ₹6268

(d) ₹6628

57. If books are bought and sold at the prices ranging from ₹150 to ₹350, what is the greatest possible profit that might be made in selling 15 books?

(a) Cannot be determined
(b) ₹750

(c) ₹4,250

(d) ₹3,000

58. A got 30% concession on the label price of an article. He could sell the article for ₹8,750 with a 25% profit on the price he bought. The label price was

(a) ₹13,000

(b) ₹16,000

(c) ₹12,000

(d) ₹10,000

59. The cost price of 40 articles is the same as the selling price of 25 articles. Find the gain percent.

(a) 65%

(b) 60%

(c) 15%

(d) 75%

60. The cost price of a book is ₹150. At what price should it be sold to gain 20%?

(a) ₹120

(b) ₹180

(c) ₹100

(d) ₹80

61. An article was sold at a profit of 12%. If the cost price would be 10% less and selling price would be ₹5.75 more, there would be a profit of 30%. Then at what price it should be sold to make a profit of 20%?

(a) ₹115

(b) ₹120

(c) ₹138

(d) ₹215

62. A cloth merchant on selling 33 metres of cloth obtains a profit of 11 metres of cloth. The profit is

(a) 40%

(b) 22%

(c) 50%

(d) 11%

63. If 1 purchased 11 books for ₹100 and sold 10 books for ₹110, the percentage of profit per book sold is

(a) 10

(b) 11.5

(c) 17.3

(d) 21

64. A man purchased 150 pens at the rate of ₹12 per pen. He sold 50 pens at a gain of 10%. The percentage gain at which he must sell the remaining pens so as to gain 15% on the whole outlay is

(a) $21\frac{1}{2}\%$

(b) 20%

(c) 17%

(d) $17\frac{1}{2}\%$

65. A dealer sold two types of goods for ₹10,000 each. On one of them, he lost 20% and on the other he gained 20%. His gain or loss percent in the entire transaction was

(a) 2% loss

(b) 2% gain

(c) 4% gain

(d) 4% loss

LEVEL OF DIFFICULTY (II)

1. Amit makes 250 articles at a cost of 80 paise per article. He fixes the selling price such that if only 200 articles are sold, he would have made a profit of 20% on the total outlay. However, 20 articles got spoilt and he was able to sell 230 articles at this price. Find his actual profit percent as the percentage of total outlay assuming that the unsold articles are useless.

(a) 32%

(b) 33%

(c) 38%

(d) 36%

2. Sudhir estimates that on inspection, 20% of the articles he produces will be rejected. He accepts an order to supply 10,000 articles at ₹1.5 each. He estimates the profit on his outlay including the manufacturing of re-

jected articles, to be 20%. Find the cost of manufacturing each article.

(a) ₹1

(b) ₹0.50

(c) ₹1.5

(d) ₹2.50

3. Kavita fixed the selling price of her goods at 30% above the cost price. She sells 60% of the stock at this price, 30% of her stock at a discount of 20% on the original selling price and rest at a discount of 50% on the original selling price. Find the gain percent altogether.

(a) 14.75%

(b) 15.70%

(c) 15.75%

(d) 16. 75%

4. A tradesman marks an article at ₹150 more than the cost price. He allows a discount of 20% on the marked price. Find the profit percent if the cost price is ₹x.

(a) $(12000 - 10x)/x$

(b) $(12000 - 20x)/x$

(c) $(12000 - 30x)/x$

(d) $(12000 + 40x)/x$

5. Daniella goes to a shop to purchase a TV priced at₹80,000. She is offered four 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 40%

   (b) Two successive discounts of 20% each

   (c) Two successive discounts of 30% and 10%

   (d) Two successive discounts of 28% and 12%

6. Ashok marks up the price of his goods by 40% and gives a discount of 20% to the customer. He also uses a 800 g weight instead of a 1 kg weight. Find his percentage profit due to these maneuvers.

   (a) 35.89 %

   (b) 40%

   (c) 30%

   (d) 36%

7. A dishonest dealer marks up the price of his goods by 30% and gives a discount of 20% 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) 28.12%

   (b) 25.54%

   (c) 23.12%

   (d) 27.11%

8. For Question 7, 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) 42.67%

   (b) 46.66%

   (c) 40.33%

   (d) 41.23%

9. Ashok bought some pens at 2 per rupee and an equal number at 3 per rupee. He then sold the entire quantity at 6 for 2 rupees. What is his percentage profit or loss?

   (a) 11.23% loss

   (b) 20% loss

   (c) 8.888% profit

   (d) No profit no loss

10. A watch seller sells watches at ₹6000 per watch. However, he is forced to give two successive discounts of 15% and 10% respectively. However, he recovers the sales tax on the net sale price from the customer at 10% of the net price. What price does a customer have to pay him to buy the watch?

    (a) ₹5390

    (b) ₹5049

    (c) ₹5380

(d) ₹5490

11. Satnam bought 50 kg of rice for ₹1000 and sold it at a loss of as much money as he received for 10 kg rice. At what price did he sell the rice?

    (a) ₹16.67 per kg

    (b) ₹12.16 per kg

    (c) ₹12.5 per kg

    (d) ₹12.33 per kg

12. 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

13. 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. Nine hundred 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? (Assume no other source of revenues apart from sales and advertising)

    (a) ₹730

    (b) ₹720

(c) ₹726

(d) ₹736

14. A shopkeeper makes a profit of x% by selling an object for ₹50. Had the cost price and selling price been interchanged, it would have led to a loss of $0.8x$%. With the latter cost price, what should be the new selling price to get a profit of x%?

(a) ₹50

(b) ₹55

(c) ₹62.5

(d) ₹58.4

15. Find the change in the percentage profit for a fruit vendor who, after finding 30% of the fruits rotten, increased his selling price by 20% over and above 25% that he was already charging?

(a) – 20

(b) +10.5

(c) – 15

(d) – 10.5

Directions for Questions 16 and 17: **Read the following and answer the questions that follow.**

A and *B* decided to sell their bikes each at ₹36,000. While *A* decided to give a discount of 8% on the first ₹8000, 5% on next ₹12,000 and 3% on the rest to buyer *C*, *B* 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 *D*. 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%.

16. 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%

17. If *C* defaults by 1 and 2 weeks in the second and third payments respectively, what would be the profit of *A* in the sale of the car?

    (a) ₹5920

    (b) ₹6240

    (c) ₹5860

    (d) ₹5980

18. 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

19. Find the selling price of goods if two salesmen claim to make 20% profit each, one calculating it on cost price while another on the selling price, the difference in the profits earned being ₹500 and selling price being the same in both the cases.

    (a) ₹15,000

    (b) ₹16,000

    (c) ₹12,000

    (d) ₹25,000

20. Ashok calculates percentage profit on the buying price and Baman on the selling price. What will be their difference in profits if both claim a profit of 10% on goods sold for ₹6000?

    (a) ₹68.33

    (b) ₹54.44

    (c) ₹36.67

    (d) ₹70

21. A pen company made 5000 pens at a cost of ₹9600. The company gave away 1000 pens to stationary shopkeepers as free samples. A discount of 10% was allowed on the printed price. Find the ratio of profit if the marked price is raised from ₹3.00 to ₹4.00 per pen and if at the latter price, samples to shopkeeper were done away with. (New profit/old profit) Assuming all other things as constant.

    (a) 1: 3

    (b) 2:5

(c) 1: 7

(d) 7: 1

22. Saurav makes a profit of 10% 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) 244.44%

(b) 125%

(c) 133.33%

(d) 122.22%

23. A pen costs ₹10 and was marked 20% above the cost price. After two successive discounts of the same percentage, the customer now pays ₹9.48. What would be the change in profit had the price been increased by the same percentage twice successively instead of reducing it?

(a) ₹5.04

(b) ₹5.60

(c) ₹5.10

(d) ₹5.06

24. Aman goes to buy fruits and after a lot of bargaining is able to get the price of a dozen bananas reduced by ₹1 from the initial price, thereby enabling him to get 1 banana extra for every rupee saved. (Getting no discount on the extra bananas). What is the initial price of a dozen banana?

(a) ₹12

(b) ₹16

(c) ₹14

(d) ₹30

25. The balance sheet of a company shows 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

26. Aman has two chairs and one table. The table is worth ₹9000. If he sells the table along with the first chair, he has an amount double that of the value of the second chair. But if he decides to sell the table along with the second chair, the amount received would be less than the value of first chair by ₹3000. What is the value of second chair?

(a) ₹9000

(b) ₹6000

(c) ₹15,000

(d) None of these

Directions for Questions 27 and 28: **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 to pay had she bought them from her uncle Scrooge's shop, getting two chocolates less per rupee. She finally decided to get them from Uncle Scrooge's shop paying only in one rupee coins.

27. How many chocolates did she buy?

    (a) 12

    (b) 9

    (c) 18

    (d) 15

28. How much would she have spent at the market complex?

    (a) ₹6

    (b) ₹12

    (c) ₹9

    (d) ₹5

29. *A* sells his bike to *B* at a loss of 10% who subsequently sells it to *C* at a profit of 20%. *C*, after finding some defect in the bike, returns it to *B* but could recover only ₹4.00 for every ₹5 he had paid. Find the amount of *C*'s loss if *A* had paid ₹2 lakh for the bike.

(a) ₹44,800

(b) ₹43,200

(c) ₹27,200

(d) None of these

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

(a) 30%

(b) 37.50%

(c) 25%

(d) 33.33%

31. A dealer marks articles at a price that gives him a profit of 40%. Twenty percent of the consignment of goods was lost in a fire in his premises, 20% 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) 4%

(b) 2.5%

(c) 3%

(d) 6.0%

32. A pen was sold for a certain sum and there was a loss of 20%. Had it been sold for ₹10 more, there would have been a loss of 10%. What would be the profit if the pen were sold for ₹20 more than what it was sold for?

(a) 15%

(b) 20%

(c) 10%

(d) No profit, no loss

Directions for Questions 33 to 36: Use the following data:

33. A group of 3000 people bought the shares of Mindworkzz of which 65% were male and the rest were female. The male population earned a profit of 10% and the female population earned 5% on an investment of ₹500 each. Find the change in the percentage profit of the group, if the ratio of male to female gets reversed the next year, population and profit percentages for the respective groups remaining the same.

    (a) Drop of 1.5 percentage points

    (b) Increase of 2 percentage points

    (c) Increase of 0.45 percentage points

    (d) Drop of 2.5 percentage points

34. In Question 33, find the change in the percentage profit of the group if the total number of people increases by 20%. (Assume the ratio remains the same)

    (a) Increase of 12%

    (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 20%

    (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 along with the reversal of the ratio of males to females, the profit also increases by 5% for both males and females?

    (a) Drop of 3.0 percentage points

    (b) Increase of 3.5 percentage points

    (c) Increase of 0.8 percentage points

    (d) None of these

37. Two flats were bought by two friends *A* and *B* respectively at prices of ₹4 lakh and ₹4.2 lakh. The price of the first flat rises by 20 percent every year and that of second flat by 10% every year. After two years, they decide to exchange their flats. What is percentage gain of the gainer?

    (a) 37.14%

    (b) 16.36%

    (c) 24.39%

    (d) None of these

38. Ajay is a driver of a cab. He makes a profit of 10% on every trip when he carries 4 passengers and the price of petrol is ₹60 per litre. Find the percentage profit for the same journey if he goes for five passengers per trip and the price of petrol reduces to ₹45 per litre. (Assume that revenue per passenger is the same in both the cases and there is negligible change in the fuel efficiency of the cab when an extra passenger sits in the cab.)

(a) 83.33%

(b) 65.66

(c) 100%

(d) Data inadequate

39. Mithilesh buys 30 pens for ₹4725. Of these, 8 are of type A and the rest are type B. At what price must he sell the pens of type A so that if he sells the type B at 3/4th of this price, he makes a profit of 40% on his outlay?

(a) ₹180

(b) ₹270

(c) ₹360

(d) ₹450

40. Aman, Baman and Chaman invested in a company. Aman invests half of Chaman expecting a return of 10%. Baman invests three-fourths of Chaman, expecting a return of 15% on it. Chaman invests ₹3000 and the profit of the firm is 25% of the total investment. How much would Baman's share of profit be more than that of Aman's share if Baman 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

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 three 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 g when it is actually 800 g. 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 two printers and make a profit of ₹49,000. The remaining monitors and three 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%

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 three 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 and 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 and B

9. The taxi which had the highest percentage profit for the day was

(a) A

(b) B

(c) C

(d) B and C

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 five A/C rooms, which cost ₹600 per day and ten 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 four 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 four classes: The fares of the four classes are as follows:

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

ANSWER KEY

Level of Difficulty (I)

1. (a)
2. (a)
3. (a)
4. (d)
5. (c)
6. (b)
7. (a)
8. (b)

9. (a)
10. (b)
11. (c)
12. (d)
13. (d)
14. (a)
15. (c)
16. (b)
17. (b)
18. (b)
19. (c)
20. (d)
21. (b)
22. (b)
23. (a)
24. (b)
25. (b)
26. (b)
27. (b)
28. (a)
29. (b)
30. (c)
31. (d)
32. (d)
33. (d)
34. (a)
35. (a)

36. (d)
37. (c)
38. (d)
39. (a)
40. (d)
41. (a)
42. (a)
43. (c)
44. (a)
45. (d)
46. (a)
47. (d)
48. (a)
49. (b)
50. (c)
51. (b)
52. (b)
53. (c)
54. (d)
55. (b)
56. (d)
57. (d)
58. (d)
59. (b)
60. (b)
61. (c)
62. (c)

63. (d)
64. (d)

Level of Difficulty (II)

1. (c)
2. (a)
3. (b)
4. (b)
5. (a)
6. (b)
7. (d)
8. (d)
9. (b)
10. (b)
11. (a)
12. (a)
13. (c)
14. (c)
15. (a)
16. (a)
17. (a)
18. (c)
19. (a)
20. (b)
21. (d)
22. (a)

23. (a)
24. (a)
25. (b)
26. (c)
27. (a)
28. (a)
29. (b)
30. (b)
31. (d)
32. (d)
33. (a)
34. (c)
35. (a)
36. (b)
37. (d)
38. (a)
39. (b)
40. (d)
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)

Solutions and Shortcuts

Level of Difficulty (I)

1. 0.9 × Price = 1080 → Price = ₹1200.
2. The SP = 120% of the CP. Thus, CP = 36/1.2 = ₹30.
3. 1.12 × Price = 4480 → Price = ₹4000.
4. A loss of 15% means a cost price of 1000 corresponding to a selling price of 850. CP as a percentage of the SP would then be $\frac{100}{85} \times 100\% = 117.65\%$

5. 1440 = 1.2 × cost price → Cost price = 1200

   Profit at 1500 = ₹300

   Percentage profit = (300/1200) × 100 = 25%

6. CP = 3220/1.15 = 2800. Selling this at 3360 would mean a profit of ₹560 on a CP of ₹2800.

7. The CP will be ₹4000 (got by 3680/0.92). Hence at an S.P. of 3600, the percentage loss will be 10%.

8. CP = 690/1.15 = 600. Thus, the required SP for 25% profit = 1.25 × 600 = ₹750.

9. The buying price is ₹12 per dozen, while the sales price is ₹1.5 × 12 = 18 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 = 52 → CP = 40

    At a selling price of ₹60, the profit percent $\frac{20}{40} \times 100 = 50\%$.

12. Solve using options. Option (d) gives you ₹200 as the cost of the chair. Hence, the table will cost 25% more, i.e. 200 + 50 = ₹250.

    This satisfies the total cost requirement of ₹450.

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 400/100 = 4% loss. (**Note:** This formula is used when

two items are sold at the same price, with one incurring a loss of 'a'%, while there is a profit of 'a'% on the other.)

14. Cost price = ₹160, selling price = 0.8 of 240 = ₹192.

    Net profit = ₹32, percentage profit $= \frac{32}{160} \times 100 = 20\%$ Hence, option (a) is correct.

15. The cost per banana = 150/250 = ₹0.6 = 60 paise. Cost of 2 million bananas = 1200000. But there is a discount of 10% offered on this quantity. Thus, the total cost for 2 million bananas is 90% of 1200000 = 1080000.

16. On a marked price of ₹125, a discount of 20% would mean a selling price of ₹100. Since this represents a 25% profit we get:

    1.25 × CP = 100 → CP = ₹80.

17. The thought process in this question would go as follows:

    Two consecutive discounts of 10% are equal to a discount of $10 + 10 - \frac{10 \times 10}{100} = 19\%$ discount.

    Selling price = 81% of 125 = ₹101.25

18. For ₹12600, we can buy ten shirts. Hence, for ₹16000 we can $\frac{16000}{12600} \times 10 = 12.69$ or 12 shirts.

19. 100 → 80 (after 20% discount) → 60 (after 25% discount) → 48 (after 20% discount).

    Thus, the single discount which would be equivalent would be 52%.

20. 2250 × 0.8 × x = 1485 → x = 0.825

which means a 17.5% discount.

21. If you assume the CP as 100, the SP should be 125 after a 20% discount on Marked Price.

    Thus, $MP = \frac{125}{0.8} = 156.25$. Hence, the mark up should be 56.25%.

22. Let the marked price = ₹100

    Selling price = 100 – 10% of 100 = ₹90

    Cost price = 90/1.5 = ₹60

    Required profit percentage = $\frac{100-60}{60} \times 100 = 66.66\%$

23. The customer pays ₹108 after a discount of 10%. Hence, the list price must be ₹120.

    This also means that at a 20% discount, the retailer buys the item at ₹96.

    Hence, the profit for the retailer will be ₹12 (108 – 96).

24. The profit would be given by the percentage value of the ratio $\frac{12}{96} \times 100 = 12.5\%$.

25. The labor price accounts for ₹1000. Since the profit percentage gives a 10% profit on this component. i.e. 100.

    Hence, the marked price is 2200 + 100 = ₹2300.

    26. The costs in 2019 were 800, 1000 and 400 respectively. An increase of 10% in material → increase of 80. An increase of 10% in labor → increase of 100. Increase of 20% in overheads → increase of 80.

    Total increase = 80 + 100 + 80 = 260. New cost = 2200 + 260 = ₹2460

27. For a 10% profit on labour cost, he should mark his goods at 2460 + 10% of 1100 = ₹2570.

28. SP = 1640 = 0.82 × CP → CP = 2000. To gain a profit of 15%, the marked price should be 115% of 2000 = ₹2300.

29. The SP per article = ₹3. This represents a profit of 10%. Thus, CP = 3/1.1. 88 articles would cost ₹240 and hence selling at 200 would represent a loss of ₹40, which would mean 16.67% loss on ₹240.

30. The percentage profit = $\frac{\text{Goods left}}{\text{Goods Sold}} \times 100.$

    = 10/20 × 100 = 50%

    (**Note:** This formula can be used if the money received and money spent is equated.)

31. In the question, *A*'s investment has to be considered as ₹40,000 (the bike he puts up for sale).

    He sells at ₹44,000 and buys back at ₹44000 − 8800 = ₹35200. Hence, his profit is ₹8800.

    Required answer = (8800 × 100/40000) = 22%

32. CP = 96/16 = ₹6, SP = 192/24 = ₹8

    Required percentage gain= $\frac{8-6}{6} \times 100 = 33.33\%$

33. 1950/1500 = 1.3 → the profit percentage would be 30%, if sold at ₹1950. Thus, the increase in profit percent = 30% − 10% = 20%.

34. Aman's selling price = 1.1 × 500 = ₹550. Charan's cost price = Baman's selling price = 660/1.1 = 600. Thus, Baman's profit = ₹50 and his profit percent = 50 × 100/550 = 9.09%.

35. A 20% reduction in price increases the consumption by 25% (Refer Table 4.1). But the increase in consumption is 7.5 kg.

    Hence, the consumption (original) will be 7.5 × 4 = 30 kg.

    Hence, original price = 132/30 = ₹4.4 per kg.

    Hence, reduced price = ₹4.4 – 20% of 4.4 = ₹3.52 per kg.

36. Total cost = 20 × 10 + 30 × 15 = ₹650. Total revenue = 50 × 13 = 650. As total revenue is equal to total cost. Hence, option (d) is correct.

37. Percentage profit = $\frac{\text{Goods left}}{\text{Goods sold}} \times 100$

    = 2/10 × 100 = 20%

    Hence, option (c) is correct.

38. The profit percent would be equal to 50 × 100/250 = 20%.

39. Cost price per banana = ₹6 and the selling price after a 12.5% profit = ₹6.75

40. *B* sold the table at 20% profit at ₹90. Thus, cost price would be given by:

    $CP_B \times 1.2 = 90$

    B's Cost price = ₹75.

    We also know that *A* sold it to *B* at 25% profit.

    Thus,

    A's Cost price × 1.25 = 75

    → *A*'s cost price = 60.

41. From the options, checking option (a): 300 (*P* buys at this value) → 330 (sells it to *Q* at a profit of 10%) → ₹396 (*Q* sells it back to *P* at a profit of

20% gaining ₹66 in the process). Thus, *P*'s original cost = ₹300.

42. Net loss = $(10/10)_2$ = 1% of cost price. The cost price of the item sold at 10% loss would be 4800/0.9 = 5333.333. Also, the cost price of the item sold at 10% profit = 4800/1.1 = 4363.63. Total cost price of the two items = 4363.63 + 5333.33 = 9696.96. The loss is 1% of this value = ₹96.96.

43. CP × 0.9 = 198 → CP = ₹220, Loss per kg = ₹22. To incur a loss of ₹8800, we need to sell 8800/22= 400 kg.

44. The CP of the table → CPT × 0.9 = 39,600 → CPTV = ₹44,000

    The CP of the VCP → CPc × 1.1 = 39,600 → CPc = 36,000.

    Total sales value 39,600 × 2 = 79,200.

    Total cost price = 44000 + 36000 = 80,000.

    Loss = 80,000 − 79,200 = ₹800.

45. The profit of 10% amounts to ₹60,00. This should also be the actual loss on the second TV.

    Thus, the actual loss = ₹6000 (20% of C.P.)

    Hence, the CP of the second set = ₹30,000. SP of the second TV set = 30,000 − 6,000 = ₹24,000.

46. Solve using options. The correct option (a) would work as follows: If CP = 1000, the man sells at 1200 (after 20% profit). If he bought for 25% less, he would have bought it at ₹750. Also, selling for ₹200 less than ₹1200, means he would have sold at 1200 − 200 = ₹1000. This represents the required profit of 33.33% on his new cost price of 750. Hence, this option is correct. (**Note:** For the wrong options, the last percentage profit would not match the required 33.33% profit).

47. Let the cost price be P. Then, $P \times 0.85 \times 2 = P \times 1.15 + 33 \rightarrow P = ₹60$. Alternately, you could have solved this using options, as shown in the previous question.

48. 20 – 12 = 8% of the cost price = ₹600

    Cost price = ₹7500.

    Hence, Selling Price = 7500 × 1.12 = 8400.

49. From the last statement we have: Chaman's cost price = 27500/1.1 = 25,000 = Baman's selling price. Then, B's CP would be given by the equation: CP for Baman = 30000 = SP for A

    Also, A gains 50%. Hence, CP for Ashok → CP × 1.5 = 30000 → CP for Ashok = ₹20,000.

50. Solve through the values given in the options. Option (c) is correct because at 2/5 × 300 + 5/2 × 600- 900 = ₹720 we see that the profit earned = ₹720.

51. Check the options: Option (b) cost of the lower priced book = ₹200

    Selling price = 200 + 20% of 200 = ₹240

    Selling price of 2nd book = (600-200) – 40% of (600 – 200) = 60% of 400 = ₹240

    As selling prices are same for both the books.

52. Let the cost price of both the phones be 100x. If first phone was sold at 130x then second phone must be sold at 130x- 2500.

    According to the problem:

$$130x+130x-2500=200x+200x\times\frac{5}{100}=210x$$

$$50x = 2500$$
$$x = 50$$

Hence the cost price of one phone = 100 × 50 = ₹5000

53. Let the cost price of the article be ₹x, according to the question:

$2(x - 8000) = 9800 - x$

$3x = 9800 + 16000 = 25800$

$x = 8600$

To earn 20% of profit he must sell the article at 8600 + 20% of 8600 = ₹10320

54. He sold 1/3rd of the oranges at 20% loss, it means he sold 1/3rd of the oranges at ₹320. To gain 10% overall profit, he must sell all oranges at ₹1320. Therefore A must sell rest of the oranges at ₹1000. Hence, he must sell the rest of the oranges at $\frac{1000-800}{800}\times100=25\%$

55. After giving 25% discount on ₹12,000, he sells the article at ₹9000. In this case, he incurred 10% loss therefore, the cost price of the article must be ₹10000. To gain ₹440, he must sell the article at ₹10440, so he must allow a discount of $\frac{12000-10440}{12000}\times100=13\%$ ..

56. Total profit = $84\times420\left(1-\frac{15}{100}\right)-84\times240-3200$ = ₹6628

57. When CP is minimum and SP is maximum then profit will be maximum.

Minimum CP = 150 × 15 = ₹2250

Maximum SP = 350 × 15 = ₹5250

Maximum possible gain = 5250 – 2250 = ₹3000

58. Let the marked price be ₹x.

$$\therefore CP = x(1-\frac{30}{100}) = \frac{7x}{10}$$

$$\therefore \frac{7x}{10}\times(1+\frac{25}{100}) = 8750$$

$$\Rightarrow x = \frac{8750\times1000}{7\times125} = ₹10000$$

59. Gain percent = $\frac{40-25}{25}\times100 \Rightarrow \frac{15}{25}\times100 = 60$

60. SP of book = 150 + 20% of 150 = ₹180

61. Let the CP of the article be ₹x.

$$\therefore SP = x(1+\frac{12}{100})$$

After reducing the CP by 10% then new CP = ₹$\frac{9x}{10}$

$$\text{SP} = \frac{9x}{10}\times\left(1+\frac{30}{100}\right) = ₹\frac{117x}{100}$$

Now according to the question:

$$\frac{117x}{100}-\frac{112x}{100} = 5.75$$

$$\Rightarrow \frac{5x}{100} = 5.75$$

$$\Rightarrow x = \frac{5.75\times100}{5} = ₹115$$

$$\therefore \text{Required SP} = \frac{115\times120}{100} = ₹138$$

62. CP = SP − gain = 33 − 11 = 22

$$\therefore \text{Gain } \% = \frac{33-22}{22} \times 100 = 50\%$$

63. Percentage of profit per book = $\frac{\frac{110}{10} - \frac{100}{11}}{\frac{100}{11}} \times 100 = 21\%$. A better way to solve this question is to find the cost price and selling price of 110 books. CP of 110 books = 1000, SP of 110 books = 1210. Hence, percentage profit = 21%.

64. Total cost = 150 × 12 = 1800.

Total selling price = 1800 + 15% of 1800 = 2070

Selling price of first 50 pens = 50 × (12 + 1.2) = 660

Rest of the pens must be sold at 2070 − 660 = 1410.

Percentage profit on remaining pens = $\frac{1410-1200}{1200} \times 100 = 17.5\%$

[Hint: Try to solve this question using alligations.]

65. As we know there is always a loss in this case.

$$\text{Loss percent} = \left(\frac{20}{10}\right)^2 = 4\%$$

Level of Difficulty (II)

1. Total outlay (initial investment) = 250 × 0.8 = ₹200.

By selling 200, he should make a 20% profit on the outlay. This means that the selling price for 200 articles must be 1.2 × 200 → ₹240

Thus, selling price per article = 240/200= 1.2. Since, he sells only 230 articles at this price, his total recovery = 1.2 × 230 = 276.

Profit percent (actual) = (76/200) × 100 = 38%

2. As only 8000 articles will be accepted so the total revenue would be ₹1.5 × 8000 = ₹12000.
   After selling the article at ₹12000, he earns a 20% profit, so the cost price of 10000 articles must be ₹12000/1.2 = ₹10000.

   Cost of manufacturing of each article = 10000/10000 = ₹1. Hence, option (a) is correct.

3. Assume that she sells 100 articles and the cost price of each article is ₹1 and the selling price of each article is ₹1.30

   Recovered amount = 60 × 1.3 + 30 × (1.3 − 20% of 1.3) + 10 × (1.3 − 50% of 1.3)

   = 78 + 31.20 + 6.5 = 115.70

   Hence, profit percent = 15.70%

4. Cost price = x

   Marked Price = x + 150

   Selling Price = 0.8x + 120

   Profit = (0.8x + 120) − x = 120 − 0.2x.

   Percentage Profit = 120 − 0.2x) ₹100/x = (12000 − 20x)/x

5. She should opt for a straight discount of 40% as that gives her the maximum benefit.

6. 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 ₹1120 (after an increase of 40% followed by a decrease of 20%).

   But, since he gives away only 800 grams, the cost for him would be ₹800.

   Thus, he is buying at 800 and selling at 1120 – a profit percentage of 40%

7. While buying:

   He buys 1100 gram instead of 1000 gram (due to his cheating).

   Suppose he bought 1100 gram for ₹1000

   While selling:

   He sells only 900 gram when he takes the money for 1 kg.

   Now according to the problem, he sells at a 4% profit (30% mark up and 20% discount).

   Hence, his selling price is ₹1040 for 900 gram.

   To calculate profit percentage, we either equate the goods or the money.

   In this case, let us equate the money as follows:

   Buying;

   1100 gram for ₹1000

   Hence 1144 gram for ₹1040

   Selling: 900 gram for ₹1040

   Hence, profit% = $\frac{244}{900} \times 100 = 27.11\%$

   (using goods left by goods sold formula)

8. The new situation is

   Buying: 1100 gram for ₹900

   Hence, for ₹1040, he would buy: $1100 \times \frac{1040}{900}$ = 11440/9 = 1271.11 gram

   (using Unitary method)

   Selling: 900 gram for ₹1040

   Profit % = 371.11/9 = 41.23%

9. Assume he bought 30 pens each. Net investment ⇒ ₹15 + ₹10 = ₹25 for 60 pens. He would sell 60 pens @ (60 × 2)/6 = ₹20 → Loss of ₹5 or 20% loss on ₹25 investment.

10. 6000 – 15% of 6000 = 5100. 5100 – 10% of 5100 = 4590. 4590 + 10% of 4590 = ₹5049

11. The problem is structured in such a way that you should be able to interpret that if he had sold 60 kg of rice he would recover the investment on 50 kg of rice.

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

   (−10/60) × 100 = 16.66% loss.

   Since, cost price for Satnam is ₹20; selling price per kg would be ₹16.67. (Using 20 – 16.67% of 20)

12. 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.

13. 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.

14. Cost price $(1 + x/100) = 50$

$$\text{Cost price} = \frac{5000}{100+x}$$

$$50\left(1-\frac{0.8x}{100}\right)=\frac{5000}{100+x}$$

    On solving the above equation, we get $x = 25$

    Latter cost price = ₹50

    New selling price must be 50 × 1.25 = ₹62.5

15. Assume the price of 1 kg as 100. He initially sells 1 kg at 125. (As his original profit is 25%.)

His new profit percentage = 50% (As he marks up successively by 25% and then 20%).

When he is able to sell only 70% of his items: his new revenue would be given by 70 × 1.5 = 105 on a cost of 100. Profit percentage = 5%

Change in profit percent = − 20 (It drops from 25 to 5). Hence, option (a) is correct.

16. *A*'s total discount:

8% on 8000 = ₹640

5% on 12000 = ₹600

3% on 16000 = ₹480

Total = ₹1720 on ₹36000.

Hence, realised value for *A* = 34280.

B'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 *A*.

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 = 28800 → PCG thinking)

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

17. In the case of the given defaults, the discount for *A* 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, *A*'s profit would have gone up by ₹440 in all and would yield his new profit as:

    5480 + 440 = ₹5920.

18. The following working would show the answer:

    A's discounts

    7% on 8000 = ₹560

    4% on 12000 = ₹480

    2% on 16000 = ₹320

    Total = ₹1360 on ₹36,000.

    B'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).

19. Let the cost price is ₹100.

Selling price (when percent profit is calculated on cost-price) = ₹120.

Profit = 120 − 100 = ₹20

Selling price (when percent profit is calculated on selling-price) = ₹120 (**Note:** we have to take this as 120, as the problem tells us that the selling price is the same in both the cases). The given percentage profit for this case is seen as: 20% of the selling price = 24. Thus, in this case the CP would be 120 − 24 = 96.

Profit = 120 − 96 = ₹24

Difference in profit = ₹4 which is equivalent to ₹500.

₹120 is equivalent to $\frac{120}{4} \times 500 = ₹15,000.$ Hence, option (a) is correct.

20. The first one would get a profit of ₹500.

Ashok:

SP − CP = 10% of CP

1.1CP + CP = 6000

CP = ₹6000/1.1 = ₹60000/11 = ₹5454.54

Profit = 6000 − 5454.54 = ₹545.46

Baman:

(SP − CP)/SP = 0.1

SP − CP = 0.1SP

0.9SP = CP

CP = ₹5400

Profit = 6000 − 5400 = ₹600.

Difference in profit = 600 − 545.56 = ₹54.44

21. Find out the total revenue realisation for both the cases:

Case 1: (Old) Total sales revenue = 4000 × 3.00 × 0.9 = 10800

$\text{Profit}_{\text{old}}$ = 10800 − 9600 = ₹1200

Case 2: (New) Total sales revenue = 5000 × 4.00 × 0.9

$\text{Profit}_{\text{new}}$ = 18000 − 9600 = ₹8400

The ratio of profit will be given 8400/1200 = 7 : 1.

22. Let the cost price of the article = ₹100

Selling price of the article = ₹110

New cost price = 100 − 10% of 100 = ₹90

New selling price = 110 + 10% of 110 = 121

New profit percentage = $\frac{121-90}{90}\times 100 = 34.44\%$

Change in percentage profit = $\frac{34.44-10}{10}\times 100 = 244.44\%$

23. Cost price = ₹10

Marked price = ₹12

Selling price = 9.48

Discount = (12-9.48)/12 = 21% (which is equivalent to two successive 10% discounts.)

New selling price, if these had been successive increases = 12 + 21% of 12 = ₹14.52

Required change = 14.52 − 9.48 = ₹5.04

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

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

25. 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%

26. Let the values of the first chair and second chair are ₹x and ₹y respectively.

    According to the question:

    $x + 9000 = 2y$ (1)

$y + 9000 = x + 3000$ (2)

On solving equation 1 and equation 2, we get: y = ₹15000. Hence, option (c) is correct.

Solutions for Questions 27 and 28:

Using options from question 28. Suppose she had spent ₹6 at the market complex, she would spend ₹3 at her uncle's shop. The other condition (that she gets two chocolates 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.

29. $A\,(100) \rightarrow B\,(90) \rightarrow C\,(108) \rightarrow B\,(86.4)$

C's loss corresponds to ₹21.6 when A buys the bike for ₹100.

Hence, B's loss would be ₹43200 when A buys the bike for ₹2,00,000.

30. While purchasing he would take 1100 gram for the price of 1000 gram.

While selling he would sell 800 gram for the price of 1000 gram.

Since CP = SP, the profit earned is through the weight manipulations. It will be given by:

Goods left/goods sold = 300 × 100/800 = 37.50%

31. Assume that for 100 items, the cost price is ₹100, then the selling price is ₹140. Since 20 is sold at half the price, he would recover 20 × 1/2 = ₹10 (since it is sold at half the cost price)

The remaining 60 would be sold at 60 × 1.4 = ₹84.

Total revenue = 84 + 10 = 94 → a LOSS of 6% (on a cost of 100).

32. An increase in the price by ₹10 will correspond to 10% of the CP.

    Hence, the CP is ₹100 and initially the book was being sold at ₹80. Hence, if there is an increment of ₹20 in the selling price, there would be no profit or loss.

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

    Number of males = 3000 × 0.65 = 1950

    Number of females = 3000 × 0.35 = 1050

    Old Profit Percentage =

$$\frac{0.65\times10\%+0.35\times5\%}{1}=8.25\%$$

    New Profit Percentage =

$$\frac{0.35\times10\%+0.65\times5\%}{1}=6.75\%$$

    Drop of 1.5% points.

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

35. The profit would increase by 20% as there is an increase of 20% in the number of people, with no change in the percentage profit.

36. New Profit Percentage =

$$\frac{0.35\times15\%+0.65\times10\%}{1}=11.75\%$$

Hence, we can see an increase of 3.5% percentage points (from 8.25% profit percentage to 11.75% profit percentage). Hence, option (b) is correct.

37. After two years, the first flat would be worth ₹57,6000, while the second flat would be worth ₹48,4000. *B* would be the gainer and the profit percentage of the gainer would be given by:

$$\left(\frac{92000}{484000}\right) \times 100 = 19.01\%$$

Hence, option (d) is correct.

38. 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 75 (because of 25% reduction in petrol price). Also, initially since his profit is 10%, his revenue would be 110. When he takes 5 passengers instead of 4, his revenue would go up by 25% to 1101.25 = 137.5 – and his profit would become 83.33% (cost 75 and revenue 137.5).
39. Let the selling price of type *A* pens be x. The price of type *B* pens would be $0.75x$.

Then, we would get: $p \times 8 + 0.75p \times 22 = 1.4 \times 4725 \rightarrow x = 270$.

Alternately, we can also think through this question as follows:

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

Hence, the targeted sales realisation 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 and c get eliminated automatically. Also, it is quite evident that a value of p as 450 would be too large to fit the situation. Hence, you can identify the correct option as 270.

40. Le the amounts invested by Aman, Baman and Chaman be A, B and C respectively.

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:

$A = 150$, $B = 337.5$. However, we can see that Chaman's expectations are not known. We are also not given clearly what Baman's share of 8% for managing the business is referring to – it could mean an additional 8% of the profit, or it could mean that Baman is getting an additional 8% over the amount he got. Due to these issues, you cannot answer the question asked.

Hence option (d) is correct.

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 gram for ₹12. Since a kg costs ₹10,800 gram 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 five printers (2 + 3) and 20 monitors. He sells two 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 = 289000

    Hence, loss of ₹48,500

48. Loss% = $\frac{48,500}{3,37,500} \times 100 \times 100 = 14.37\%$

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%