Chapter: Percentage

01. Rahman got discount of 20% over the retail price of a book. He eventually saved taka 300 on his total purchase of the books. How many books did he buy if the retail price of a book is 50 taka?
02. 10% of the voters did not cast their vote in an election between two candidates, 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1,620 votes. Find the number of voters enrolled on the voters list.
03. A basket ball team has won 15 games and lost 9. If these games represent $16\frac{2}{3}$ percent of the games to be played, then how many more games must the team win to average 75 percent for the season?
04. A man's income from interest and wages is Tk. 500. He doubles his investment and also gets an increase of 50% in wages and his income increases to Tk. 800. What was his original income separately in terms of interest and wages?
05. Mr. Amin invests Tk. 24,000 in Southeast Bank at 7.5%. How much additional money must be invest at 10% so that the total annual income will be equal to 9.25% of his entire investment?
06. Mr. Jones gave 40% of the money he had, to his wife, He also gave 20% of the remaining amount to each of his three sons. Half of the amount now left was spent on miscellaneous items and the remaining amount of Tk. 12,000 was deposited in the bank. How much money did Mr. Jones have initially?
07. Mr. X, a sales person earns 5% commission on all sales between Tk. 20,000 and 40,000, and 8% on all sales exceeding Tk. 40,000 in a month. He does not earn any commission if sales in a month amount to less than Tk. 20,000. His monthly salary is Tk. 60,000; he has to pay 20% tax on his basic salary. But no tax on commission. In April, 2001, the total net income (salary + commission) of the sales person was Tk. 65,000. How much were the sales in April?
08. In 2005, the number of pairs of the shoes that a company sold to retailers decreased by 20 percent, while the price per pair increased by 20 percent from that of the previous year. The company's revenue from the sales of the shoes in 2005 was Tk. 3,00,000. What was the revenue from the sale of the shoes in the previous year?
09. In an election between two candidates, one got 55% of the total valid votes. 20% of the votes were invalid. If the total number of votes was 7500, what was the number of valid votes that the other candidate got?
10. In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is 2323 of the number of students of 8 years of age which is 48. What is the total number of students in the school?

Chapter: Fraction and Decimal

11. Runa spent $\frac{1}{3}$ of her money for books and $\frac{1}{2}$ of the remaining for clothing. After that $3/4^{th}$ of the remaining for foods, then She had Tk 500 left. How much amount Runa starts with?
12. In Applied Statistics department of University of Dhaka 70% of male students and $\frac{4}{5}$th of female students opt Econometrics. Among the students who opt Econometrics $\frac{4}{5}$th of the male and 70% of the female students submitted their thesis proposal for paper publications. What fraction of the total students in the department submits their thesis proposal on Econometrics?
13. In a school, 50% students of group - A and 80% students of group - B are interested for picnic, 80% students whom are interested for picnic from Group - A choose Jamuna Resort as picnic spot and 50% of the students of group - B whom are interested to picnic choose the same. If two group contain equal number of people, What fraction of people choose 'Jamuna Resort' as their picnic spot?

14. 40% of the respondents refused to choose 'Pizza' as their lunch. Those who like "pizza", 50% of them like "Italian Pizza" as lunch. If this research contains total 90 respondents. How many people like Pizza but not Italian Pizza as their lunch?
15. Two tanks, X and Y, are filled to capacity with jet fuel. Tank X holds 600 gallons more than tank Y. If 100 gallons of fuel were to be pumped from each tank, tank X would then contain 3 times as much fuel as tank Y. What is the total number of gallons of fuel in the two full tanks?
16. Abul, kalam and Bashar had lunch together. Bashar's meal cost 50% more than Kalam's meal and Abul's meal cost $\frac{5}{6}$ as much as Bahar's meal. If Kalam paid Tk. 1.000 for his meal, what was the total that Abul and Kalam paid together for lunch?
17. A shocks four types of caps. there are $\frac{1}{3}$ as many red caps as blue caps and $\frac{1}{2}$ as many green caps as red caps. There are equal numbers of green caps and yellow caps. If there are 42 blue caps, then what percent of the total caps in the shop are blue?
18. Before anybody could notice, Arif took $\frac{1}{3}$ of the chocolates from a box. Later, his three sisters arrived and the remaining chocolates were distributed equally among the four of them. Arif received a total of 48 chocolates. How many did each of her sisters receive?

Chapter	Profit & Loss

19. A man interest and wages from his investment tk. 5000. If he invests double then the wages increased 50% and total amount is tk. 8000. What is his actual income in terms of wages and interest
20. A man sells an article at a profit of 25%. If he had bought it at 20% less and sold it for Tk. 10.50 less, he would have gained 30%. Find the cost price of the article?
21. The price of balcony seat in a theater is 1/3 the price of a seat in the Orchestra When the theater is completely sold out, the total receipts from the 600 orchestra seats and the 450 balcony seats are Tk. 4500. What is the price of one orchestra seat?
22. A lamp is manufactured to sell for tk. 35 which yields a profit of 25% of cost. If the profit is to be reduced to 15% of cost, what will be the new retail price of the lamp?
23. Arif's salary is twice that of Babu's salary. Kabir's salary is 1/3 of Arif's and Malek's salary is 2/3 of that Babu's salary.Total salary of Kabir and Malek are what proportion of Babu's salary?
24. If 12 candies is sold for tk 10 then there is a loss of x%. If 12 candies is sold for tk 12 then there is a profit of x%. What is the value of x?
25. In a certain office, 1/3 of the workers are women, 1/2 of the women are married and 1/3 of the married women have children. If 3/4 of the men are married and 2/3 of the married have children, what part of the workers are without children?
26. A shirt sold at 6% profits. If the purchase price was 4% less and selling price was TK 4 more, the profit be 12.5%.What was the purchase price of the shirt?
27. The cost of two watches total 840 taka. If selling one watch gets 16% profit and other watch makes 12%Loss, and there is no gain and loss then what is the cost of two watches?
28. When a producer allows 36% commission on the retail price of his product, he earns a profit of 8.8%. What would be his profit percent if the commission is reduced by 24%?
29. Mr. Akbar is a potato seller in a local bazaar. When he brings potatoes from the village market to his shop in the town, he has to pay a minimum of Tk 100 toll up to total sale of Tk 1000. For any amount of sale above Tk 1000, he has to pay an additional toll of 7.5% on incremental amount. If the total amount of toll paid was Tk. 257.50 then what was his total sales proceeds from the potatoes?

30. A dishonest business man makes a profit of 10% both on buying and selling of a commodity. If his profit is Tk. 1,050, what is the cost of the commodity?
31. The percentage profit earned by selling an article for Tk. 1920 is equal to the percentage loss incurred by selling the same article for Tk. 1280. At what price should the article be sold to make 25% profit?
32. A shopkeeper lost 7.5% by selling an article. If he had bought it at 10% less and sold it for Tk. 31 more, he would have gained 20%. Find the cost price of the article.
33. A trader, while selling a book, was asking for a price that will enable him to offer a 25% discount and still make a profit of 20% on cost. If the asking price for the book was Tk. 80, what was the cost of the book?
34. A producer produces a product and sells it to the wholesaler at 25% profit over the production cost. The wholesaler makes a 20% profit on his purchase price and sells it to the retailer. The retailer sells it to the final consumer at Tk. 900 making a profit of 20% over his purchase price. What was the production cost of the product? What was the overall increase (in percent) in price paid by the final consumer from the production cost?
35. Sagar purchased a product and sold it at a loss of 10%. If the selling price were increased by Tk. 45, there would have been a 5% profit. What was the purchase price of that product? What would be the selling price of that product if Sager wants to make 20% profit?
36. An article is sold for Tk. 190, hence gaining a certain amount. Had the article been sold for Tk. 175, he would have suffered loss equal to 50% of the gain in the first case. Find cost price of the article.
37. The cost price of two watches taken together is Tk. 840. If by selling one at a profit of 16% and the other at a loss of 12% there is no loss or gain in the whole transaction, find the cost price of the two watches.
38. A trader sold a product at a loss of 25%. If the selling price was Tk. 1040 more, he would have made a profit of 40%. What was the original price of the product
39. 10% fruit of a seller was damaged during transportation and another 15% was rotten. At what profit (in percentage) should he sell the rest of the goods so that he can make an overall profit of 20%?
40. A manufacturer of boxes wants to make a profit of x taka. When she sells 5,000 boxes if costs Tk. 5 a box to make the first 1,000 boxes and then it costs Tk. Y a box to make the remaining 4,000 boxes. What price in taka should she charge for the 5,000 boxes?
41. A book sells for Tk. 65. This price gives the seller a profit of 30% on his cost. What will be the new selling price if he cuts his profit to 10% of its cost?
42. A seller incurs a loss of 15 percent when a table is sold at Taka 10,200. At what price the table should be sold to make a profit of 35 percent?
43. In a certain store, the profit was 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit now?
44. In 1995 a certain store had 1,800 tools in stock that had been purchased for Tk. 30 each. If 1,000 of these tools were sold in 1995 for Tk. 40 each and the remaining 800 were sold in 1996 for Tk. 50 each, how many greater was the gross profit on the tools sold in 1996 than the gross profit on those sold in 1995?
45. Fariha sold her chicken for Tk 2,000 and her paddy for Tk 960. She made a profit of 25% on the cost in the chicks sale and 4% loss in paddy sale. Find out her overall profit /loss on the cost from the sale of these two items.
46. Zen Corporation's profits have doubled for each of the 4 years it has been in existence. If the total profits for the last 4 years were Tk 60 lacs, how much profit did it make in the first year of operation?
47. A trader bought some mangoes for Tk. 150 per dozen and an equal number of apples for Tk. 100 per dozen. If he sells all the fruits for Tk. 140 per dozen, what be his profit/loss in percentage?
48. A person sells two articles. He bought each for the same price Tk.1040 and he incurs 20% loss on the first and 10% loss on the second. Find his overall percentage of loss.
49. Mr. A purchased a house for Tk. 1,00,0000 in 1995, he spent Tk. 100000 for routine maintenance & upkeep of the house. 1n 1999 he sold the house for 25% of more than what he paid for it. He paid 5% of the proceeds as gain tax & he has to pay 50% of his net profit to the broker, what is his net income?

50. Mr. Reach sold two properties P1 & P2 for Tk 50000 each. He sold property P1 for 20% more then what he paid for it & sold P2 less than 20% what he paid for it. What was his total gain or loss, if any, on the scale of two properties?
51. A video magazine distributor made 3500 copies of the May issue of the magazine at a cost of Tk. 400,000. He gave 500 cassettes free to some key video libraries. He also allowed a 25% discount on the market price of the cassette. In this manner, he was able to sell all the 3500 cassettes that were produced. If the market price of cassettes was Tk.160, what is his gain or loss for the May issue of the video magazine?
52. The cost price of two watches taken together is Tk. 840. If by selling one at a profit of 16% and the other at a loss of 12% there is no loss or gain in the whole transaction, find the cost price of the two watches.
53. 10% fruit of a seller was damaged during transportation and another 15% was rotten. At what profit (in percentage) should he sell the rest of the goods so that he can make an overall profit of 20%?

Chapter	Summation of Series

54. A worker is hired for 7 days. Each day, he is paid $10 more than what he is paid for the preceding day of work. The total amount he was paid in the first 4 days of work equaled the total amount he was paid in the last 3 days. What was his starting pay?
55. a, b, c, d and e are five consecutive numbers in increasing order of size. Deleting one of the five number from the set decreased the sum of the remaining numbers in the set by 20%. Which one of (the numbers was deleted from a, b, c, d and e?)
56. The sequence of numbers a, ar, ar^2 and ar^3 are in geometric progression. The sum of the first four terms in the series is five time the sum of first two terms and $r \neq -1$ and $a \neq 0$. How many times larger in the fourth term than the 2^{nd} terms.

Solution	Percentage

01. Here, Retail price of per piece of book = tk. 50
At, 20% discount, savings of per piece of book = 20% of 50 = tk. 10
No. of books have to purchase = $\frac{300}{10}$ = 30 **(Ans)**

02. Let, Total enrolled voters = 100x
Total polled vote = (100-10)% of 100x = 90x Total cast vote = (100-10)% of 90x = 81x
∴ According to problem,
(54-46)% of 81x = 1620 ∴ x = 250
∴ Total enrolled voters = 100×250 = 25000 **(Ans)**

03. Let, Total match = x
∴ According to problem, $16\frac{2}{3}$ % of x = (15+9) ∴ x = 144
∴ Have to win = (75% of 144) – 15 = 93 **(Ans)**

04. Let, Income from interest and wages is x and y respectively
∴ So, x + y = 500 ------- (i) and 2x + 1.5y = 800 -------- (ii)
Solving (i) and (ii), x = 100 and y = 400 **(Ans)**

05. Let, Additional investment = tk. x
∴ According to problem, 7.5% of 24000 + 10% of x = 9.25% (24000 + x) ∴ x = 56,000 **(Ans)**

06. Let, Mr. Jones initially have tk. 100x
For his wife, He spent = 40% of 100x = 40x He remain = (100x – 40x) = 60x
For his 3 sons, He spent = 3×20% of 60x = 36x He remain = (60x – 36x) = 24x

For miscellaneous, He spent = 50% of 24x = 12x He remain = (24x – 12x) = 12x

∴ According to problem, 12x = 12000 ∴ x = 1000

∴ Mr. Jones initially have = tk. 100×1000 = tk. 1,00,000 **(Ans)**

07. Tax on monthly salary = 20% of 60,000 = 12,000

∴ Net Monthly Salary = 60,000 – 12,000 = 48,000

∴ Commission in April, 2001 = 65,000 – 48,000 = 17,000;

Let, sales in April = x

∴ According to problem,

5% of 40,000 + 8% of (x – 40,000) = 17,000 $\Rightarrow 0.05\times40{,}000 + 0.08(x - 40{,}000) = 17{,}000$

∴ $2000 + 0.08x - 3200 = 17{,}000 \Rightarrow 0.08x = 18{,}200$

$\Rightarrow x = \frac{18{,}200}{0.08} = \frac{18{,}200{,}00}{8} = 2{,}27{,}500,$ So we get that the sales in April = Tk 2,27,500 **(Ans)**

08. Suppose, 100 pairs of shoes in the previous year was sold and after decreasing 20% in 2005, the number was (100 – 10 × 20%) = 80 pairs;

And, say, price per pair was Tk. 1 in 2004,

So, total revenue in 2004 = 100 × 1 = 100 Tk.

Again, after increasing the price 20% per pair in 2005,

The price revenue was (80 + 80 × 20%) = Tk. 96.

∴ If the revenue was Tk. 96 in 2005, then the revenue in 2004 = Tk. 100

" " " " 1 " " " " $= \frac{100}{96}$

" " " " 300, 000 " " " " $= \frac{100\times300000}{96}$ = Tk. 3,12,500 **(Ans)**

09. Total number of votes = 7500

Here, 20% votes were invalid. Therefore, 80% votes were valid.

i.e., total valid votes =7500×80/100

1st candidate got 55% of the total valid votes.

Hence 2nd candidate got 45% of the total valid votes

Therefore, valid votes that the 2nd candidate got = 7500 × 80/100 × 45/100 = 2700 **(Ans)**

10. Let, the total number of students = x

∴ According to problem, 80% of x =48+32=80 ∴ x = 100 **(Ans)**

Solution	Fraction and Decimal

11. Let, Runa starts with = tk. x.

for books, she spent = $\frac{1}{3}$ of x = $\frac{x}{3}$; she remain = x – $\frac{x}{3}$ = $\frac{2x}{3}$

for clothing, she spent = $\frac{3}{4}$ of $\frac{x}{3}$ = $\frac{x}{4}$; she remain = $\frac{x}{3} - \frac{x}{4} = \frac{x}{12}$ ∴ Now, $\frac{x}{12}$ = 500; ∴ x = 6000.

∴ Runa starts with Tk. 6000. (Ans)

12. Let, male student = 100x; female student = 100y

∴ Male Econometrics researcher = $\frac{4}{5}$ of 70% of 100x = 56x

∴ Female Econometrics researcher = 70% of $\frac{4}{5}$ of 100y = 56y

$\therefore$ Fraction = $\frac{56x+56y}{100x+100y} = \frac{56}{100} = 0.56$ **(Ans)**

13. Let, group – A = 100x; Group – B = 100y.
$\therefore$ Group – A in picnic = 80% of 50% of 100x = 40x.
$\therefore$ Group – B in picnic = 50% of 80% of 100y = 40y.
$\therefore$ Fraction = $\frac{40x + 40y}{100x + 100y} = \frac{40}{100} = \frac{2}{5}$ **(Ans)**

14. If 40% refuse pizza 60% like pizza.
$\therefore$ like Italian Pizza = 60% of 50% of 90 = $\frac{3}{5} \times \frac{1}{2} \times 90 = 27$ **(Ans)**

15. Let, capacity of tank – Y is 'a' liter. So, capacity of tank – X is (a + 600) liter.
$\therefore$ According to problem, (a + 600) – 100 = 3 (a – 100); $\therefore$ a = 400.
$\therefore$ Total fuel = 400 + (400 + 600) = 1400 liters. **(Ans)**

16. Here, Kalam paid = Tk. 1000.
$\therefore$ Baskar paid = 1000 + 50% of 1000 = 1500Tk. $\therefore$ Abul paid = $\frac{5}{6}$ of Bashar = $\frac{5}{6} \times 1500 = 1250$Tk.
$\therefore$ Answer : 1500tk & 1250tk.

17. Here, Blue cap = 42
Now, Red = $\frac{1}{3}$ of blue = $\frac{1}{3} \times 14 = 7$. $\therefore$ Green = $\frac{1}{2}$ of red = $\frac{1}{2} \times 14 = 7$.
$\therefore$ Blue = $\frac{42}{42 + 14 + 7} \times 100\% = 66.67\%$ **(Ans).**

18. Let, total chocolate = x.
$\therefore$ After kept $\frac{1}{3}$, the remaining chocolate = $x - \frac{1}{3}$ of $x = \frac{2x}{3}$ $\therefore$ Each sister and arif received = $\frac{\frac{2x}{3}}{3} = \frac{x}{6}$
$\therefore$ Arif received = $\frac{x}{3} + \frac{x}{6} = \frac{x}{2}$. $\therefore$ Now, $\frac{x}{2} = 48$, $\therefore$ x = 96. $\therefore$ Each sister received = $\frac{x}{6} = \frac{96}{6} = 16$. **(Ans)**

Solution — Profit & Loss

19: Let, Interest income be X and Wages income be Y
According to the 1st condition, X +Y= 5000.....(i)
According to the 2st condition, 2X + 1.5 Y= 8000.....(ii)
Now, Subtracting equation (ii) from (i)*2 We get, x=1000 and Y=4000
Investment= 1000 and wages=4000 (Ans.)

20: Let, the cost price of the article is Tk. 100
At 25% profit, selling price=(100+25% of 100)= Tk. 125
At 20% less, cost price=(100-20% of 100)=80 TK
At 30% profit, selling price=(100+30% of 100)=130 TK
Now, Cost price TK 100 then Selling price=130 TK
Cost price TK 80 then selling price=(130*80/130)=104 TK
Differences of two selling price=(125-104)=21 Tk
When TK 21 less then cost price=100 TK
TK 10.50 less then cost price=(100*10.50)/21=50 TK(Ans.)

21: Let, the price of one orchestra seat= x Tk. and balcony seat= 1/3 of x = x/3

ATQ, 600x+(450x/3)=4500; 1800x+450x= 13500; x = 6 (Ans.)

22: Given that, selling price = tk 35
At 25% profit, cost price=35*100/125=28 tk
At 15% profit, when cost price 100 tk selling price=115 tk
When cost price 28 tk selling price =115*28/100=32.20 tk (Ans)

23: Let, Babu's salary= x Arifs salary = 2x
Kabirs salary =1/3*2x=2x/3 Maleks salary=2/3*x=2x/3
Required proportion= (Kabir+Malek)/Babu=(2x/3+2x/3)/x=4/3 (Ans.)

24: Let, cost price be tk 100
At x% loss, selling price =tk 100-x If selling price tk 100-x then cost price=tk 100
If selling price tk 10 then cost price= tk 100x*10/100-x
Similarly, at x% profit, selling price= 100+x tk If selling price tk 100+x then cost price=tk 100
If selling price tk 12 then cost price= tk 100x*12/100+x
ATQ, 100x*10/100-x = 100x*12/100+x Or x= 100/11=9.09 (Ans.)

25: Let, the number of workers in the office is x.
So, the number of women = x/3, and the number of men = x - x/3 = 2x/3.
So, the number of married women = (x/3)/2 = x/6, and the number of married men = (2x/3) × 3/4 = x/2.
So, the number of women having children = (x/6)/3 = x/18,
And the number of men having children = (x/2) × 2/3 = x/3.
Total workers having children = x/18 + x/3 = (x+6x)/18 = 7x/18.
Total workers having no children = x - 7x/18 = 11x/18
Required worker no children=(11x/18)/x=11/18 (Ans.)

26: Cost price of the article=100 TK
At 6% profit, selling price=(100+100 of 6%)=106TK
At 4% less, cost price=(100-100 of 4%)=96 TK
At 12.5% profit, selling price=(100+100 of 12.5%)=112.5 TK
Now, Cost price TK 100 then selling price =112.5 TK
Cost price TK 96 then selling price =(112.5*96/100)=108 TK
Differences of two selling price=(108-106)=2 TK
When, TK 2 more then cost price=100 TK
TK4 more then cost price =(100*4)/2=200 TK (Ans.)

27: Let, cost price of first watch is x, so cost price of second watch is 840 - x
ATQ, 16% of x = 12% of (840 - x)
or, 16x = 12*840 - 12x or, 28x = 12*840 or, x = 360
So, cost price of two watches are 360 & 480 (Ans.)

28. Let, Market Price = tk. 100x
At 36% commission, Sell price = 100x – 36x = 64x
At 8.8% profit, Cost Price = $\frac{64x \times 100}{100+8.8} = 58.82x$
Now, At (36-24) = 12% commission, Sell price = 100x – 12x = 88x
Profit = (88x-58.82x) = 29.18x
$\therefore$ % of Profit = $\frac{29.18x}{58.82x} \times 100 = 49.60\%$ (Ans.)

29. Let, additional sell = x,
$\therefore$ According to problem, 100 + 7.5% of x = 257.50
$\therefore$ x = 2500

∴ Total sell = 1000 + 2100 = Tk. 3100 **(Ans)**

30. Let, Cost of the commodity is tk.100x
From Buyer, He has taken 110x instead of 100x & to seller, he has sold 90x instead of 100x.
Total turnover = $\frac{110x}{90x} \times 100x = \frac{1100x}{9}$
Net profit on turnover = $\frac{1100x}{9} - 100x = \frac{200x}{9}$
∴ According to problem, $\frac{200x}{9} = 1050 \Rightarrow x = 47.25$
∴ Cost of the commodity = 100×47.25 = Tk. 4,725 **(Ans)**

31. Let, Initial cost price = 100x
If seller make 10% profit on cost, that mean he educes 10% cost
So, Actual cost price = 90x
∴ If he make 10% on initial cost price then sell price = 110x.
∴ According to problem, 110x – 90x = 1050 ⇒ 20x = 1050 ∴ x = $\frac{105}{2}$

∴ Cost of the commodity = $100 \times \frac{105}{2}$ = 5250. **(Ans)**

32. Let, the cost price be tk x
We get profit = $(1920 - x)$ and the loss = $(x - 1280)$
Profit percentage = $\left(\frac{1920-x}{x} \times 100\right)\%$
And the loss percentage = $\left(\frac{x-1280}{x} \times 100\right)\%$
We get, $\frac{1920-x}{x} \times 100 = \frac{x-1280}{x} \times 100 \Rightarrow 1920 - x = x - 1280 \Rightarrow 2x = 3200 \quad \therefore x = 1600$
∴ At 25% profit the selling price will be = (1600 + 25% of 1600) = (1600 + 400) = 2000 Tk **(Ans)**

33. Let the cost price be Tk 100.
When loss 7.5%, then selling price (100 –7.5) = Tk 92.5
At 10% less, cost price will be (100 –10) = Tk 90
At 20% gain, on 90 tk cost, selling price will be (90 + 20% of 90) = Tk 108
∴ Difference of selling price = (108 – 92.5) = Tk 15.5
When selling price is Tk 15.5 more, then cost price is Tk 100
∴ " " " " " 1 " " " " " $\frac{100}{15.5}$
∴ " " " " " 31 " " " " " $\frac{100 \times 31}{15.5}$ or Tk 200 (∴ AnsTk 200)

34. Given that, the asking price for the book is Tk. 80
∴ Selling price = (80 – 80 × 25%) = 80 – 80 × $\frac{25}{100}$ = 80 – 20 = 60 Tk.
At 20% profit,
If selling price is 120, cost price = 100
∴ " " 1 " " = $\frac{100}{120}$

$\therefore$ " " 60 " " $= \frac{100 \times 60}{120}$ = Tk.50 $\therefore$ Cost is 50 Tk. **(Ans)**

35. Let the producer cost of production = Tk. 100
Producer cost 100 $\therefore$ at 25% profit, selling price = 125 = wholesaler cost
$\therefore$ at 20% profit, selling price = 125 + 125 × 20% = 150 = Retailer cost
In the same way, at 20% profit, selling price = 150 + 150 × 20% = 180 = consumer cost.
$\therefore$ We get,
If the consumer cost is 180 production cost = 100 Tk.

$\therefore$ " " " " " 1 " " $= \frac{180}{100}$

$\therefore$ " " " " " 900 " " $= \frac{100 \times 180}{900} = 500$ Tk.

$\therefore$ Production cost is Tk. 500

Increase in percent = $\frac{900-500}{500} \times 100 = \frac{400 \times 100}{500} = 80\%$

(Ans. Cost is Tk. 500; Percentage increase 80%.)

36. Let the purchase price be Tk. 100; At 10% loss, the selling price = 100 – 10 = Tk 90; Again, at 5% profit , selling price = 100 + 5 = Tk 105. Difference between two selling prices = 105 – 90 = Tk 15;
If selling price increases by Tk 15 purchase price = 100

$\therefore$ " " " " 45 " " $= \frac{100 \times 45}{15}$ = Tk. 300

$\therefore$ Purchase price of that product = Tk. 300

At 20% profit, selling price = 300 + 300 × 20% = 300 + $\frac{300 \times 20}{100}$ = 300 + 60 = Tk 360

(Ans. Purchase price = Tk 300; Selling price = Tk 360)

37. Let the cost price be Tk. x
$\therefore$ Profit = (190 – x) and loss = (x – 175) Tk.

$\therefore$ According to the question, 50% of (190 – x) = (x – 175) $\Rightarrow \frac{190-x}{2}$ = (x – 175)

$\Rightarrow$ 190 – x = 2x – 350 $\Rightarrow$ 3x = 540 $\Rightarrow x$ = 180
$\therefore$ Cost price is Tk. 180 **(Ans.)**

38. Let, the cost price of one watch be Tk. x;
So, cost price of another watch be Tk. (840 – x)
Profit from 1st watch will be $x \times$ 16% = $\frac{16x}{100}$;

Loss from another watch will be (840 – x) 12% = (840 – x) × $\frac{12}{100}$;

According to the question, $\frac{16x}{100} = (840-x) \times \frac{12}{100}$

$\Rightarrow$ 16x = (840 – x) × 12 $\Rightarrow$ 4x = (840 – x) × 3 $\Rightarrow$ 4x = 2520 – 3x $\Rightarrow$ 7x = 2520

$\Rightarrow x$ = 360 = cost of one watch
So, another watch = Tk. (840 – 360) = Tk. 480 (Ans.)

39. Let the original price of the product be TK. 100.
At 25% loss,
selling price of the articles = (100 – 100 of 25%) = Tk. 75
At 40% profit,
selling price of the articles (100 + 100 × 40%) = Tk. 100 + 40 = Tk. 140
Difference in selling price (140– 75) = Tk. 65
When selling price Tk. 65 more cost price is Tk. 100

" " " Tk. 1 " " " $\frac{100}{65}$

" " " Tk. 1040 " " $\frac{100\times1040}{65}$ = Tk. 1600 **(Ans.)**

(**Answer: Tk. 20000)08:** Total loss = (10 + 15)% = 25%
At 20% profit, selling price = 100 + 20 = 120;
At 25% loss / damage, remaining fruit = 100 – 25 = 75 fruits of Tk. 75 (suppose) have to be sold at Tk. 120.

% Profit = $\frac{120-75}{75}\times100 = \frac{45}{75}\times100 = 60\%$ (**Ans. 60%**)

40. The price of first 1000 Box = 1000 × 5 = 5000 Tk.
Remain the of first 4000 box = 4000 × y = 4000y
∴ Total cost = 5000 + 4000y
∴ To make a profit of x taka
selling price will be = (5000 + 4000y + x) Tk. **(Ans)**

41. We know that 30% profit means 130% of cost price and 10% profit means 110% of cost price according to the question.
130% of cost = 65 Tk.

∴ 1% " " = $\frac{65}{130}$ Tk.

∴ 110% " " = $\frac{65\times110}{130} = 55$ Tk.

∴ New selling price = 55 Tk. **(Ans)**

42. Let, the cost price be TK. 100
If selling price Tk is 85, then the cost price TK. 100

" " " Tk. 1 " " " " TK. $\frac{100}{85}$

" " " Tk. 10,200 " " " TK $\frac{100\times10200}{85}$ = TK. 12000

When 35% gain,
If cost price TK. 100, then selling price TK. 135

" " " TK.1 " " " " TK. $\frac{135}{100}$

" " " TK. 12000 " " " " TK $\frac{135\times12000}{100}$ = TK. 16200 **(Ans.)**

43. Let the cost is Tk. 100
∴ So, the profit is Tk.320
∴ Selling price = (100+ 320) = Tk. 420
After increasing 25%,
Cost price will be = (100+25) = Tk. 125
Since the selling price Remains constant
So, profit will be = (420 – 125) = Tk. 295

∴ The required Percentage = $\frac{profit}{Selling\ price}\times100 = \frac{295}{420}\times100 = 70.23 = 70\%$ **(Ans)**

44. The cost price of 1000 tools = (1000 × 30) = 30000 Tk.
and " " " 800 tools = (800 × 30) = 24000 Tk.
∴ The selling price of 1000 tools in 1995 = 1000 × 40 = 40,000 Tk.
The selling price of 800 tools in 1996 = (800 × 50) = 40000 Tk.
∴ Profit in 1995 = (SP – CP) = (40,000 – 36,000) = 10,000 Tk.
and, the profit in 1996 = (40,000 – 24000) = 16,000 Tk.
∴ Difference is (16000 – 10,000) = 6000 Tk.

45. At 25% profit, if selling price is 125, cost price = 100

∴ " " " 2000 " " = $\frac{100\times2000}{125}$ = 1600

At 4% loss, if selling price is 96, cost price = 100

∴ " " 960 " " $\frac{100\times960}{96}$ = 1000

Total cost price = 1600 + 1000 = 2600 and selling price = 2000 – 960 = 2960

∴ Profit = 2960 – 2600 = 360 TK. **(Ans.)**

46. Let profit of 1st year be x lac
According to question, $x + 2x + 4x + 8x = 60 \Rightarrow 15x = 60 \Rightarrow x = 4$. **(Ans: 4 lac)**

47. Given that the cost price of 1 dozen mangoes and 1 dozen apples = Tk (150 + 100) = Tk 250.
According to the question the average selling price is Tk 140 per dozen.
∴ Total selling price = 140 × 2 = Tk. 280. Profit = 280 – 250 = Tk. 30.
Percentage of profit = $\left(\frac{30}{250}\times100\right)\%$ = 12% ∴ **Answer: 12%**

48. Cost price of each article = Tk 1040. Total cost = 1040 × 2 = Tk 2080
Loss on the first article = 20% of 1040 = Tk 208. Loss on the second article = 10% of 1040 = Tk 104
∴ Total loss = 208 + 104 = Tk 312
∴ Percentage of overall loss = $\frac{312}{2080}\times100\% = 15\%$ **Answer: Overall percentage of loss is 15%**

49. Here, purchasing cost + routine maintenance & upkeep cost

= (10,00,000 +1,00,000) =11,00,000 Tk

Profit gained at 25% on cost = $\frac{11,00,000 \times 25}{100}$ = 2,75,000 Tk

Tex paid at 5% on sales proceeds = 2,75,000 × 5%

= 13,750 Tk

Net profit = (2,75,000 – 13,750) = 2,61,250 Tk
Net income after deducting broker's commission
= 261250 × 50% = 1,30,625 Tk **(Answer)**

50. At 20% Profit of P1,
When selling price Tk. 120 the cost Tk. 100

When selling price 1 = Tk. $\frac{100}{120}$

When selling price 50,000 Tk. $\frac{100 \times 50000}{120} = \frac{125000}{3}$ Tk

At 20% less of P2,
When selling price Tk. 80 the cost Tk. 100

When selling price 1 Tk. $\frac{100}{80}$

When selling price 50,000 Tk. $\frac{100 \times 50000}{80}$ = 62,500Tk

Total cost = $\frac{125000}{3}$ + 62,500

= 1,04,166.67 Tk

Total selling price = 50,000 × 2 = 1,00,000Tk
Total = 1,04,166.67 – 1,00,000 = 4,166.67 Tk **(Answer)**

51. Total cost price = Tk. 400,000
Market price of cassettes is = Tk. 160
After giving 25% discount, the selling price = 160 – 25% of 160 = (160 – 40) = Tk.120
Free given copies = 500
Sold copies = (3500 – 500) = 3000
Total selling price = 3000 × 120 = Tk. 360000
Total loss = (400,000 – 360000) = Tk. 40,000
Answer: Loss is Tk. 40,000

52. Let, the cost price of one watch be Tk. x;
So, cost price of another watch be Tk. $(840 - x)$

Profit from 1st watch will be $x \times 16\% = \frac{16x}{100}$;

Loss from another watch will be $(840 - x)\ 12\% = (840 - x) \times \frac{12}{100}$;

According to the question, $\frac{16x}{100} = (840 - x) \times \frac{12}{100}$

$\Rightarrow 16x = (840 - x) \times 12$
$\Rightarrow 4x = (840 - x) \times 3$

$\Rightarrow 4x = 2520 - 3x \Rightarrow 7x = 2520$

$\Rightarrow x = 360$ = cost of one watch

So, another watch = Tk. (840 – 360) = Tk. 480 **(Answer)**

53. Total loss = 10 + 15 = 25%

At 20% profit, selling price = 100 + 20 = 120;

At 25% loss / damage, remaining fruit = 100 – 25 = 75 fruits of Tk. 75 (suppose) have to be sold at Tk. 120.

% Profit = $\frac{120-75}{75}\times 100 = \frac{45}{75}\times 100 = 60\%$ **Answer: 60%**

Students' Work | Summation of Series

54. Let, Starting payment = x

So, He got x , x + 10, x + 20, x + 30, x + 40, x + 50 and x + 60 on seven consecutive days.

Now, According to problem,

$x + x + 10 + x + 20 + x + 30 = x + 40 + x + 50 + x + 60$

$\Rightarrow 4x + 60 = 3x + 150$

$\therefore x = 90$

$\therefore$ **Starting payment $90. (Ans)**

55. Let a = x; b = x + 1; c = x + 2; d = x + 3 and e = x + 4

Sum = 5x + 10

At 20% decrease = 20% of (5x + 4) = x + 2 = c **Ans : c**

56. If, $r \neq -1$ and $a \neq 0$

$\therefore$ According to problem. $a + ar + ar^2 + ar^3 = 5(a + ar)$

$\Rightarrow \frac{a+ar+ar^2+ar^3}{a+ar} = 5; \Rightarrow \frac{a(1+r+r^2+r^3)}{a(1+r)} = 5; \Rightarrow \frac{(1+r)+r^2(1+r)}{1+r} = 5$

$\Rightarrow \frac{(1+r)(1+r^{2)}}{1+r} = 5; \Rightarrow 1+r^2 = 5; \Rightarrow r^2 = 4; \therefore r = 2$

Now, $\frac{4^{th}\text{ term}}{2^{nd}\text{ term}} = \frac{ar^3}{ar} = r^2 = 2^2 = 4$

$\therefore 4^{th}$ term is 4 times larger than 2^{nd} term. **(Answer: 4 Times)**

বিগত বছরের প্রশ্নাবলী ও বিশদ সমাধান | ২০১৯ সালের জুন/২০১৯ পর্যন্ত অনুষ্ঠিত সকল সরকারী ও বেসরকারী ব্যাংকের প্রশ্নাবলী ও সমাধান

01. If the numrator of fraction is increased by 200% and the denominator is increased by 350%. The resultant fraction is $\frac{5}{12}$. What was the original fractions? Bangladesh Bank, (AD, 19-04-19) [Written]

Solution:

ধরি, ভগ্নাংশটির লব x এবং হর y অতএব, ভগ্নাংশটি $= \frac{x}{y}$

প্রশ্নমতে, $\frac{x + y \text{ এর } 200\%}{y + y \text{ এর } 350\%} = \frac{5}{12} \Rightarrow \frac{x + \frac{200x}{100}}{y + \frac{350y}{100}} = \frac{5}{12} \Rightarrow \frac{x + 2x}{y + \frac{7y}{2}} = \frac{5}{12} \Rightarrow \frac{\frac{3x}{2y + 7y}}{2} = \frac{5}{12}$

$\Rightarrow \frac{\frac{3x}{9y}}{2} = \frac{5}{12}$ $\Rightarrow \frac{3x}{1} \times \frac{2}{9y} = \frac{5}{12}$ $\Rightarrow \frac{2x}{3y} = \frac{5}{12}$ $\Rightarrow \frac{x}{y} = \frac{5 \times 3}{12 \times 2}$ $\therefore \frac{x}{y} = \frac{5}{8}$

অতএব, মূল ভগ্নাংশটি $\frac{5}{8}$

02. The cost of manufacturing a popular model car is made up of three items were in the ratio of 4 : 3 : 2. Next year the cost of the raw material rose by 10%, labour cost increased by 8% but overhead reduced by 5% then % increase into the price of the car?

Sonali Bank, Officer (Cash-19) [Written]

Solution:

Let, the primary cost of raw materials = 4x Tk.

$\therefore$ The primary cost of labor = 3x Tk.

& the primary cost of overheads = 2x Tk.

$\therefore$ $\therefore$ The price of the car = 4x + 3x + 2x = 9x Tk.

$\therefore$ After price increase, the cost of raw materials = 110% of 4x = 4.4x Tk.

$\therefore$ The cost of labor = 108% of 3x = 3.24x Tk.

& the cost of overheads = 95% of 2x = 1.9x Tk.

$\therefore$ $\therefore$ The new price of the car = 4.4x + 3.24x + 1.9x = 9.54x Tk.

$\therefore$ $\therefore$ Percentage increased $= \left(\frac{9.54x - 9x}{9x \times 100}\right)\% = \left(\frac{0.54}{9} \times 100\right)\% = \frac{54}{9}\% = 6\%$

03. The total price of Cricket bat and ball is 1,350. If the price of bat increases 25% and the price of ball decreases 20% then the total price of bat and ball remains same. Find the prices of bat and ball?

NRB Bank Ltd., Management Trainee Officer-19

Solution:

ধরি, ব্যাটের দাম x টাকা এবং বলের দাম y টাকা

প্রশ্নমতে, x + y = 1,350 ..... (i)

এখন, ব্যাটের বর্ধিত মূল্য = x + x এর 25% $= x + \frac{25x}{100} = \left(x + \frac{x}{4}\right) = \frac{5x}{4}$ টাকা

বলের হ্রাসকৃত মূল্য = y – y এর 20% $= y - \frac{20y}{100} = \left(x + \frac{y}{5}\right) = \frac{4y}{5}$ টাকা

প্রশ্নমতে, $\frac{5x}{4} + \frac{৪y}{৫} = ১,৩৫০$

$\Rightarrow \frac{25x + 16y}{20} = 1,350$

$\therefore$ 25x + 16y = 27,000 ..... (ii)

(i) নং কে 25 দিয়ে গুণ করে (i) নং হতে (ii) বিয়োগ করি

25x + 25y = 37,750

25x + 16y = 27,000

9y = 6,750

$\therefore y = \frac{6750}{9} = 750$

04. The percentage of profit earned by selling an article for Tk. 1920 is equal to the percentage of loss incurred by selling the same article for Tk. 1280. At what price should the article be sold to make a profit of 25%?

[Sadharab Bima Corporation Asst. Manager19, Written]

Solution:

Let,

The cost price of the article be x Tk.

According to question,

$$\left(\frac{1920-x}{100}\right)\times 100\% = \left(\frac{x-1280}{x}\right)\times 100\% \Rightarrow 1920 - x = x - 1280 \Rightarrow 2x = 1280 + 1920$$

$$\Rightarrow x = \frac{3200}{2} \quad \therefore x = 1600$$

So, at 25% profit the selling price will be $= \left(1600 + 1600 \times \frac{25}{100}\right)$ Tk. $= (1600 + 400)$ Tk $= 2000$ Tk.

05. A product is made with three components A, B and C the ratio of the prices are 4:3:2. After 1 year price of A increased by 10%, B increased by 8% and C decreased by 5%. What is the percentage of total increase?

[Sonali Bank Ltd. Recruitment Test for Officer-Cash (Written)-19]

Solution:

Let, the price of A = 4x, B = 3x & C = 2x.

$\therefore$ The price of the product = 4x + 3x + 2x = 9x

After price increase, the price of A = 110% of 4x = 4.4x

The price of B = 108% of 3x = 3.24x & the price of C = 95% of 2x =1.9x

$\therefore$ The new price of the product = 4.4x + 3.24x + 1.9x = 9.54x

$\therefore$ Percentage increased $= \left(\frac{9.54x - 9x}{9x}\times 100\right)\% = \left(\frac{0.54}{9}\times 100\right)\% \frac{54}{9}\% = 6\%$

Ans: 6%

06. A man sells an article at a profit of 25%. If he had bought it at 20% less and sold it for Tk 10.50 les, he would have gained 30%. Find the cost price of the article. BB, AD (General Side-2017)

Solution:

At 25% Profit, the selling price of article be Tk (100+25) = Tk 125

At 20% less, the buying price be Tk (100–20) = Tk 80

At 30% profit, the selling price be Tk (100 + 30) = Tk 130

If buying price Tk 100 then selling price be Tk 130

" " " Tk 80 " " " " Tk $\frac{130\times 80}{100}$ = Tk 104

Less selling price be Tk (125 – 104) = Tk 21

If less selling price be Tk 21 then cost price be Tk 100

$\therefore$ " " " " Tk 10.50 " " " " Tk $\frac{100\times 10.50}{21} = \frac{100\times 1050}{21\times 100}$ = Tk 50

Ans: 50 Tk

07. The number of girls in a school in 160 more than 1/3 of the total enrollment in the school. The number of boys is 280 more than 1/7 of the total enrollment in the school. How many pupils in the school are girls and boys? BSC, Senior (Officer-2018) [Written]

Solution:

Let,

Total enrollment of students be T and the number of boys and girls be B and G respectively. According to question.

$$B = 280 + \frac{T}{7}$$

and $G = 160 + \frac{T}{3}$

$\therefore T = B + G$

$\Rightarrow T = 280 + \frac{T}{7} + 160 + \frac{T}{3}$

$\Rightarrow T - T/7 - T/3 = 440$

$\Rightarrow \frac{21T - 3T - 7T}{21} = 440$

$\Rightarrow 11T = 440 \times 21$

$\Rightarrow T = \frac{440 \times 21}{11}$

$\therefore T = 840$

So,

Number of girls $= \left(160 + \frac{840}{3}\right)$

$= 440$

$\therefore$ " " boys $= 280 + \frac{840}{7}$

$= 400$ (Ans)

08. In a certain class, $\frac{1}{5}$ of the boys are shorter than the shortest girls in the class and $\frac{1}{3}$ of the girls are taller than the tallest boy in the class. If there are 16 students in the class and no two people have the same height, what percent of the students are taller than the shortest girl and shorter than the tallest boy? Sonali Bank Ltd., Officer (Cash -2018) [Written]

Solution:

Total students 16

According to question we can say that boys must multiple of 5 and girls must multiple of 3

So, total boys 10 total girls 6

Shorter boys $= \left(10 \times \frac{1}{5}\right) = 2$

and taller girls $\left(6 \times \frac{1}{3}\right) = 2$

Again, shortest girl 1 and tallest boy 1

So, number of students taller than shortest girls and shorter than tallest boy

$= \{16 - (2 + 1 + 2 + 1)\} = 16 - 6 = 10$

So, required rate $\left(\frac{10}{16} \times 100\right)\% = 62.5\%$

Ans. 62.5%

09. A dealer buys dry fruit at the rate of Tk 100/-, Tk 80/- and Tk 60/- per kg. He bought them in the ratio 12:15:20 by weight. He in total gets 20% profit by selling the first two and at last he finds he has no gain no loss in selling the whole quantity which he had. What was the parentage loss he suffered for the third quantity? Janata Bank Ltd., Asst. Relationship (Officer-2018) [Written]

Solution:

Let, The dealer buys 12x kg of 100 Tk per kg

The dealer buys 15x kg of 80 Tk per kg

The dealer buys 20x kg of 60 Tk per kg

$\therefore$ Total cost price of first two quantity = $(100 \times 12x + 15x \times 80)$ Tk $= (1200x + 1200x)$ Tk $= 2400x$ Tk

$\therefore$ Selling price of first two quantity $= \left(2400x + 2400x \times \frac{20}{100}\right)$ Tk $= 2880x$ Tk

Again,

Selling price of three quantity $= (12x \times 100 + 15x \times 80 + 20x \times 60)$ Tk $= 1200x + 1200x + 1200x = 3600x$

As, Total selling price = Total cost price

$\therefore$ Loss $= (1200x - 720x)$ Tk $= 480x$ tk

$\therefore$ Percentage $= \frac{480x}{1200x} \times 100\% = 40\%$

Ans. He suffered 40% loss for third quantity

10. A man's salary in 2015 was Tk. 20,000 per annum and it increased by 10% each year. Find how much he earned in the years 2015 to 2017 inclusive. *[Agrani Bank Ltd. (Officer-Cash)-18]*

Solution:

Here, the man's salary in 2015 was = 20,000 Tk.

$\therefore$ At 10% increase, the man's salary in 2016 = 20,000 + 20,000 × 10% = 20,000 + 2,000 = 22,000 Tk.

$\therefore$ Similarly, the man's salary in 2017 = 22,000 + 22,000 × 10% = 22,000 + 2,200 = 24,200 Tk.

So, he earned in the years 2015 to 2017 inclusive = 20,000 + 22,000 + 24,200 = 66,200 Tk.

Ans. Total earnings 66,200 Tk.

11. Cost a goods sold is Tk 16,000, profit margin on sales is 20%, then determine sales revenue.

Agrani Bank Ltd., Senior Officer (Auditor-2018)

Solution:

দেয়া আছে, বিক্রয়মূল্য = ১৬,০০০ টাকা

২০% লাভে বিক্রয়মূল্য = (১০০ + ২০) = ১২০ টাকা

বিক্রয়মূল্য ১২০ টাকায় ক্রয়মূল্য ১০০ টাকা

$\therefore$ " ১ " " $\frac{২০০}{১২০}$ "

$\therefore$ " ১৬,০০০ " " $\frac{১৬,০০০ \times ১০০}{১২০} = ১৩,৩৩৩$ টাকা

$\therefore$ লাভ হয় (১৬,০০০ − ১৩,৩৩৩) = ২,৬৬৭ টাকা

12. A shopkeeper sells two shirts at the same price. He makes 10% profit on one and loses 10% on the other. How much in percentage does he gain or lose?

Agrani Bank Ltd., Senior Officer (Auditor-2018)

solution:

Let, The selling price of 1st shirt is 100 Tk.

" " " of 2nd shirt is 100 Tk.

$\therefore$ At 10% profit,

If selling price is 110 then the cost price is = 100 Tk

" " " " 1 " " " " " $= \frac{100}{110}$ "

" " " " 100 " " " " " $= \frac{100 \times 100}{110} = \frac{1000}{11}$ "

At 10% loss,

If selling price is 90 then cost price is = 100 Tk

" " " " 1 " " " " $= \frac{100}{90}$ Tk

" " " " 100 " " " " $= \frac{100\times100}{90}$ Tk

" " " " 100 " " " " $= \frac{100\times100}{90}$ Tk

$= \frac{1000}{9}$ Tk

$\therefore$ Total cost price $= \frac{1000}{11} + \frac{1000}{9} = \frac{9000 + 11000}{99} = \frac{20,000}{99}$ Tk

$\therefore$ Total selling price = (100 + 100) Tk = 200 Tk

$\therefore$ loss $= \frac{20,000}{99} - 200 = \frac{20,000}{99} - 200 = \frac{20,000-1980}{99} = \frac{200}{99}$

In $\frac{20000}{99}$ Tk loss $= \frac{200}{99}$ Tk

" 1 " " $= \frac{200 \times 99}{99 \times 20000}$ Tk

" 100 " " $= \frac{200 \times 99\times100}{99 \times 20000} = 1$ Tk

$\therefore$ 1% loss. (Ans.)

13. A shopkeeper sells two shirts at the same price. He makes 10% profit on one and loses 10% on the other. How much in percentage does he gain or lose? Rupali Bank Ltd., Officer (Cash-2018)

Solution:

Let, The cost price of 1st shirt be x taka.

" " " " 2nd " be y taka.

Now, at 10% profit the selling price of 1st shirt $= \left(x + x \times \frac{10}{100}\right)$ taka

$= \frac{11x}{10}$ taka

at 10% loss the selling price of 2nd shirt $= \left(y - y \times \frac{10}{100}\right)$ taka

$= \frac{9y}{10}$ taka

Here, $\frac{11x}{10} = \frac{9y}{10}$ [since the selling price of two Shirts are equal]

$\therefore x = \frac{9}{11}y$

Now, Cost price of two shirts = $x + y = \left(\frac{9}{11} + y\right)$ taka= $\frac{20y}{11}$ taka

Selling price of two shirts = $2.\frac{9y}{10} = \frac{9y}{5}$ taka

$\therefore$ loss $= \left(\frac{20y}{11} - \frac{9y}{5}\right)$ taka

$= \left(\frac{100y - 99y}{55}\right)$ taka

$= \frac{y}{55}$ taka.

$$\text{Percentage of loss} = \frac{\frac{y}{55}}{\frac{20y}{11}} \times 100\%$$

$$= 1\%$$

Ans: 1% loss.

Alternative method:

Let, selling price of each shirt be tk x

∴ Total selling price be tk 2x — At 10% profit

If selling price tk 110 then cost price Tk. 100

" " " tk x " " " Tk $\frac{100x}{110}$

$$= \text{Tk } \frac{10x}{11}$$

Similarly, At 10% loss cost price Tk. $\frac{10x}{9}$

Total cost price Tk. $\left(\frac{10x}{11} + \frac{10x}{9}\right) = \frac{200x}{99}$

$$\therefore \text{ Rate of loss} = \left(\frac{\frac{200x}{99} - 2x}{\frac{200x}{99}} \times 100\right) = \left(\frac{2x}{99} \times \frac{99}{200x} \times 100\right)\% = 1\%$$

14. যন্ত্রাংশে ৪০%, দালানে ২৫%, কাঁচামালে ১৫% এবং আসবাবপত্র ৫% টাকা খরচ করার পর হাসানের হাতে ১৩০৫ টাকা থাকে। তার কাছে কত টাকা ছিল?

Karmasangsthan Bank (Data Entry Operator 2018)

সমাধান:

ধরি, হাসানের কাছে ছিল ১০০ টাকা

সুতরাং, তিনি মোট খরচ করেন = (৪০ + ২৫ + ১৫ + ৫) টাকা

= ৮৫ টাকা

সুতরাং তার কাছে অবশিষ্ট রইল = (১০০ − ৮৫) টাকা = ১৫ টাকা

এখন, অবশিষ্ট ১৫ টাকা হলে মোট টাকার পরিমাণ ১০০ টাকা

" ১ " " " " " $\frac{১০০}{১৫}$ "

" ১ " " " " " $\frac{১০০}{১৫}$ "

" ১৩০৫ " " " " " $\frac{১০০ \times ১৩০৫}{১৫}$ " = ৮৭০০ টাকা

উত্তর: ৮৭০০ টাকা।

15. একটি বই ৬৫ টাকায় বিক্রি করলে বিক্রেতা ৩০% লাভ করে। ১০% লাভে বিক্রি করতে চাইলে নতুন বিক্রয় মূল্য কত হবে?

Karmasangsthan Bank (Data Entry Operator 2018)

সমাধান:

ধরি, বইটির ক্রয়মূল্য = ১০০ টাকা

∴ ৩০% লাভে, বিক্রয়মূল্য = (১০০ + ৩০) = ১৩০ টাকা

সুতরাং, বিক্রয়মূল্য ১৩০ টাকা হলে ক্রয়মূল্য ১০০ টাকা

∴ " ১ " " " $\frac{১০০}{১৩০}$ "

∴ ” ৬৫ ” ” ” $\frac{১০০\times৬৫}{১৩০}$ ” = ৫০ টাকা

সুতরাং, ১০% লাভে নতুন বিক্রয়মূল্য = $\left(৫০ + ৫০\,\frac{১০}{১০০}\right)$ টাকা = ৫৫ টাকা

উত্তর: ৫৫ টাকা।

16. Selling 12 candies at a price of Tk. 10 yields a loss of x% and selling 12 candies at a price of Tk. 12 yields a profit of x%. What is the value of x? *[Dhaka Bank Ltd. (TACO)-18]*

Solution:

Let, c be the cost price of 12 Chocolate.

Since selling 12 candies at a price of Tk 10 yields a loss of x%, so we have

$\frac{c-10}{c} = \frac{x}{100}$ ..... (i)

Again, as selling 12 candies at a price of Tk 12 yields a profit of x%, so we have

$\frac{12-c}{c} = \frac{x}{100}$ ..... (ii)

Now, from the equation (i) & (ii), we have $\frac{c-10}{c} = \frac{12-c}{c} \Rightarrow (c-10) = (12-c) \;\; \therefore c=11$

Now, putting the value of 'c' in the equation (ii), we have

$\frac{12-11}{11} = \frac{x}{100} \Rightarrow \frac{1}{11} = \frac{x}{100} \;\; \therefore x = \frac{100}{11}$

Ans. The value of x is $\frac{100}{11}$

17. A shopkeeper sells two shirts at the same price .He makes 10% profit on one and loses 10% on the other .How much in percentage does he gain or lose? *[Agrani Bank Ltd. (SO-Auditor)-18]*

Solution:

Let, Cost price of shirt =x tk And, Cost price of second shirt= y tk

According to the question,

$x+x\times10\% = y - y\times10\%$

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

$\Rightarrow 11x = 9y$ [Multiplying both sides by 10] $\therefore \frac{x}{y} = \frac{9}{11}$

That means cost price of first shirt 9 Tk. & second shirt 11 Tk.

∴ Total cost = 9 + 11 = 20 Tk.

Now at 10% profit on first shirt the selling price will be = $9 + 9\times10\% = 9.9$ Tk.

At 10% loss on second shirt the selling price will be = $11 - 11\times10\% = 9.9$ Tk.

∴ Total selling price will be = 9.9 + 9.9 = 19.8 Tk. ∴ Loss amount = 20 – 19.8 = 0.2 Tk.

Percentage of loss = $\frac{0.2}{20}\times100 = 1\%$,

Ans: Loss 1%

18. A man's salary in 2015 was Tk. 20,000 per annum and it increased by 10% each year. Find how much he earned in the years 2015 to 2017 inclusive. *[Agrani Bank Ltd. (Officer-Cash)-18]*

Solution:

Here, the man's salary in 2015 was = 20,000 Tk.

∴ At 10% increase, the man's salary in 2016 = $20,000 + 20,000\times10\% = 20,000 + 2,000 = 22,000$ Tk.

$\therefore$ Similarly, the man's salary in 2017 was = 22,000 + 22,000 × 10% = 22,000 + 2,200 = 24,200 Tk.
So, he earned in the years 2015 to 2017 inclusive = 20,000 + 22,000 + 24,200 = 66,200 Tk.
Ans. Total earnings 66,200 Tk.

19. 12. Prove that the sum of the numbers from 1 to 125 inclusive is equal to the sum of the odd numbers from 169 to 209 inclusive. Agrani Bank Ltd., Officer (Cash-2018)

Solution:

We can write a sequence 1 + 3 + 5 + ... + 125
Here a = 1 and d = 3 – 1 = 2

nth term = a (n ×1) × d $\Rightarrow 125 = 1 + (n-1) \times 2 \Rightarrow 125 = 1 + 2n - 2 \Rightarrow 2n = 125 + 1 \Rightarrow n = \frac{126}{2} \therefore n = 63$

So, the sum of nth term odd numbers is $s_n = n^2 \Rightarrow S_{63} = (63)^2 \Rightarrow 63 \times 63 \therefore S_{63} = 3969$
Again, we can write a sequence 169 + 171 + 173 + ... + 209
Here, a = 169, d = 171 – 169 = 2

n^{th} term = a + (n – 1) d $\Rightarrow 209 = 169 + (n-1) \times 2 \Rightarrow 209 = 169 + 2n - 2 \Rightarrow 2n = 209 - 167 \Rightarrow n = \frac{42}{2} \therefore n = 21$

$\therefore s_{21} = \frac{21}{2} \{2 \times 169 + (21-1) \times 2\} = 21 \{169 + 20\} = 21 \times 189 = 3969 \quad \therefore S_{63} = S_{21}$ (Proved)

20. A man works for certain hours. If his hourly payment increase by 20%, what percent of working hours he may reduce so that total income remain unchanged? *[Basic Bank Ltd. (Cashier)-18]*

Solution:

Let, the man works for x hours & his hourly income = 100y Tk.
$\therefore$ total income= x × 100y= 100xy tk
At 20% hourly payment increase, his present hourly salary = 100y + 20% of 100y = 120y Tk.
Again let, he works for R hours to remain the total income unchanged at 120y tk hourly payment.

According to problem, $R \times 120y = 100xy \Rightarrow R = \frac{100x}{120} \therefore R = \frac{5x}{6}$

$\therefore$ Reduced hours= $(x - \frac{5x}{6}) = \frac{x}{6}$ hours

$\therefore$ He will reduce his working hour by = $\left(\frac{\frac{x}{6}}{x} \times 100\right)\% = \left(\frac{x}{6} \times \frac{1}{x} \times 100\right)\% = \frac{50}{3}\% = 16\frac{2}{3}\%$

Ans: $16\frac{2}{3}$ %

21. TV was marked by 120% of its cost price. Then shopkeeper sold the TV at 10% discount. After that his profit was 2,400. Find cost price. *[Premier Bank Ltd. (TJO)-18]*

Solution:

Let, the cost price be x Tk. $\therefore$ Marked price = 120% of $x = \frac{120x}{100} = \frac{6x}{5}$ Tk.

At 10% discount on Tk. $\frac{6x}{5}$,selling price will be = $\left(\frac{6x}{5} - 10\% \text{ of } \frac{6x}{5}\right) = \left(\frac{6x}{5} - \frac{10}{100} \times \frac{6x}{5}\right)$

$= \left(\frac{6x}{5} - \frac{3x}{25}\right) = \frac{30x - 3x}{25} = \frac{27x}{25}$ Tk.

$\therefore$ Profit = $\left(\frac{27x}{25} - x\right) = \frac{27x - 25x}{25} = \frac{2x}{25}$ Tk.

According to question, $\frac{2x}{25} = 2{,}400 \Rightarrow x = \frac{2400 \times 25}{2} \quad \therefore x = 30{,}000 \quad \therefore$ cost price is 30,000 Tk.

Ans. Tk. 30,000

22. A farmer sold a cow and an ox for Tk. 80,000 and got a profit of 20% on the cow and 25% on the ox. If he sells the cow and the ox for Tk. 82,000 he gets a profit of 25% on the cow and 20% on the ox. Find the individual cost price of the cow and ox. *[Uttara Bank Ltd. (PO)-18]*

Solution:

Let, the cost price of Cow be x Tk.

And the cost price of Ox be y Tk.

According to the questions,

$120\%x + 125\%y = 80{,}000 \Rightarrow \frac{120x}{100} + \frac{125y}{100} = 80{,}000$

$\Rightarrow 120x + 125y = 80{,}000 \times 100$

$\therefore 24x + 25y = 16{,}00{,}000$ ..... (i) [Dividing both sides by 5]

Again, $125\%x + 120\%y = 82{,}000 \Rightarrow \frac{125x}{100} + \frac{120y}{100} = 82{,}000$

$\Rightarrow 125x + 120y = 82{,}000 \times 100$

$\therefore 25x + 24y = 16{,}40{,}000$ ..... (ii) [Dividing both sides by 5]

Performing (i) $\times 25 -$ (ii) $\times 24$, $\Rightarrow 49y = 6{,}40{,}000 \quad \therefore y = 13{,}061.22$

Putting the value of $y = 13{,}061.22$ in equation (i),

$24x = 16{,}00{,}000 - 25 \times 13{,}061.22 \Rightarrow 24x = 12{,}73{,}469.4 \quad \therefore x = 53{,}061.22$

Ans: The cost of the Cow is Tk. 53.061.22 & The cost of the Ox is Tk. 13,061.22

23. The percentage profit earned by selling an article for Tk. 1,920 is equal to the percentage loss incurred by selling the same article for Tk. 1,280. At what price should the article be sold to make 25% profit?

[Southeast Bank Ltd. (TJO)-18]

Solution:

Let, the cost price be Tk. x

$\therefore$ Profit = Selling price – Cost price.

& Loss = Cost price – Selling price.

Now, According to question

$1{,}920 - x = x - 1{,}280 \Rightarrow x + x = 1{,}280 + 1{,}920 \Rightarrow 2x = 3{,}200 \Rightarrow x = \frac{3200}{2} \quad \therefore x = 1{,}600.$

Now at 25% profit, the selling price will be $= \left(16000 + 1600 \times \frac{25}{100}\right)$ Tk. $= (1{,}600 + 400)$ Tk. $= 2{,}000$ Tk.

Ans. 2,000 Tk.

24. A department store receives a shipment of 1,000 shirts, for which it pay Tk. 9,000. The store sells the shirts at a price 80% above cost for one month, after which it reduces the price of the shirts to 20% above cost. The store sells 75% of the shirts during the first month and 50% of the remaining shirts afterward. How much gross income did sales of the shirts generate? *[City Bank Ltd. (MTO)-18]*

Solution: The cost price of 1,000 shirts is 9,000 Tk.

$\therefore$ The cost price of 1 shirt is $\frac{9000}{1000} = 9$ Tk.

Sales in 1st month = (75% of 1,000) = 750 Shirts

$\therefore$ Selling price of 750 shirt in 1st month $= (750 \times 9) + (750 \times 9)$ of $80\% = 6{,}750 + \frac{750 \times 9 \times 80}{100}$

$= 6{,}750 + 5{,}400 = 12{,}150$ Tk.

$\therefore$ Remaining shirt = 1,000 – 750 = 250

$\therefore$ 50% of remaining shirt after 1st month's sale = 250 of 50% = $\frac{250}{2}$ = 125 shirts

Then selling price is (125×9)+ (125×9) of 20% = $(125\times 9) + \frac{125 \times 9 \times 20}{100} = 1{,}125 + 225 = 1{,}350.$

$\therefore$ Total sales = 12,150 + 1,350 = 13,500 Tk. $\therefore$ Gross Income = 13,500 Tk.

Ans: 13,500 Tk

25. At a football game, $\frac{4}{5}$ of the seats in the lower deck of the stadium were sold. If one-fourth of all the seating in the stadium is located in the lower deck, and If $\frac{2}{3}$ of all the seats in the stadium were sold, what fraction of the unsold seats in the stadium were in the lower deck? *[City Bank Ltd. (MTO)-18]*

Solution:

এখানে $\frac{4}{5}, \frac{1}{4}, \frac{1}{3}$ এর হর 5, 4, 3 এর ল.সা.গু. 60

	Sold	Unsold	Total
Lower Deck	$\frac{4}{5}\times 15 = 12$	$15 - 12 = 3$	$\frac{1}{4}\times 60 = 15$
Upper Deck			
Total	$\frac{2}{3}\times 60 = 40$	$60 - 40 = 20$	60

$\therefore$ **Fraction of the unsold seats in the lower deck** = $\frac{\text{Usnsold+Lower Deck}}{\text{Total Unsold}} = \frac{3}{20}$.

Ans: $\frac{3}{20}$

26. In 2017, the number of pairs of the shoes that a company sold to retailers decreased by 20%, while the price per pair increased by 20% from that of the previous year. Company's revenue from the sales of the shoes in 2017 was Tk. 6,00,000. Find out the difference between the sales revenue of the year 2017 and 2016? *[One Bank Ltd. (SCO)-18]*

Solution:

Let, In 2016, the number of products sold= x And the unit price of the product = y Tk.

Sales revenue in 2016 = xy Tk.

Now, in 2017 the number of product sold will be = x – 20% of x = $x - \frac{20x}{100} = \frac{4x}{5}$ Tk.

And the unit price of the product will be = y + 20% of y = $\frac{6y}{5}$ Tk.

$\therefore$ Sales revenue in 2017 = $\left(\frac{4x}{5}\times\frac{6y}{5}\right) = \frac{24xy}{25}$ Tk.

According to question, $\frac{24xy}{25} = 6{,}00{,}000$ $\therefore$ $xy = \frac{600000\times 25}{24} = 6{,}25{,}000$

$\therefore$ Difference between sales revenue of 2016 and 2017 = 6,25,000–6,00,000 = 25,000 Tk.

Ans: 25,000 Tk.

27. A shopkeeper buys 100 mangoes at TK.12 each .He sells 60 mangoes at TK.17.40 each and x mangoes at TK. 11.31 each. The shopkeeper makes a profit of at least 10%.Find the least possible value of x.

[Dhaka Bank Ltd. (MTO)-18]

Solution:

The cost of 100 mangoes is Tk. (100 ×12) = Tk. 1,200

Selling price of 60 mangoes is Tk. (17.40 × 60) = Tk. 1,044
And selling price of x mangoes is Tk. (x× 11.31) = Tk. 11.31x
As, the shopkeeper made at least 10% profit, so his total selling price would be

Tk. $(1{,}200 + 1{,}200 \times 10\%) = \text{Tk.} \left(1200 + \frac{1200 \times 10}{100}\right) = \text{Tk.}\ (1{,}200+120) = \text{Tk.}\ 1{,}320$

According to the question,

$1{,}044+11.3x \geq 1{,}320 \quad \Rightarrow 11.31x \geq 1{,}320 - 1{,}044 \quad \Rightarrow 11.31x \geq 276 \Rightarrow x \geq \frac{276}{11.31} \quad \therefore x \geq 24.403$

As the number of mangoes can not be the decimal number so the least possible value of mangoes will be 25.

Ans: 25 mangoes.

28. A merchant purchased a Jacket for Tk.60 and then determined a selling price that equaled the purchase price of the jacket plus a markup that was 25 percent of the selling price. During a sale, the merchant discounted the selling price by 20 percent and sold the jacket. What was the merchant's gross profit on this sale? *[Dhaka Bank Ltd. (TO)-18]*

Solution:
Let, the selling price of the jacket is Tk. x
That means, this x will be equal to (60 + 25%% of x)
So, we can write up

$x = 60 + \frac{25\times 25x}{100} \quad \Rightarrow x = \frac{6000 + 25x}{100} \Rightarrow 100x - 25x = 6{,}000 \quad \Rightarrow 75x = 6{,}000 \quad \therefore x = \frac{6000}{75} = 80$

Now, after discounting 20% on selling price, the actual selling price would be

$= (80 - 20\% \text{ of } 80)\ \text{Tk.} = \left(80 - \frac{20\times 80}{100}\right)\ \text{Tk.} = (80 - 16)\ \text{Tk.} = 64\ \text{Tk.}$

∴ Gross profit = 64 – 60 = 4 Tk.
Ans:4 tk

29. *[Dhaka Bank Ltd. (TO)-18]*

Price	**company X**	**company Y**
	Tk.75	**Tk.530**
Surcharge as a percent of price	**4%**	**3%**
Installation charge	**Tk.82.50**	**Tk.93.00**

The table above a shows the various charge made by two companies for the same air conditioner. What is the total amount that can be saved on the purchase and installation of the air conditioner by dealing with the company that offers the lower total charge?

Solution:
At first, for company x.

Amount of surcharge = (4% of 75) Tk. $= \left(\frac{4}{100} \times 75\right)$ Tk. = 3 Tk.

Amount of installation charge = 82.50 Tk.
∴ Total cost for company x is Tk. (75 + 3 + 82.50) = 160.50 Tk.
Secondly, for company Y

Amount of surcharge = (3% of 530) Tk. $= \left(\frac{3}{100} \times 530\right)$ Tk. = 15.9 Tk.

Amount of installation charge is 93 Tk.
∴Total cost for company Y is Tk. (530 + 15.9 + 93) = 638.9 Tk.
So, one can save = 638.9–160.50 = 478.4 Tk. by buying X company's air conditioner.
Ans: 478.4 Tk.

30. The cost of tow watches taken together is Tk.840 . If , by selling one at a profit of 16% and the other at a loss of 12% , there is no loss or gain in the whole transaction , find the cost of each of the two watches.

[NRBC Bank Ltd. (MTO)-18]

Solution:

Let, the cost price of one watch is x Tk.

∴ The cost price of another watch is (840–x) Tk.

∴ Selling price at 16% profit= x + 16% of x = $x + \frac{16x}{100} = \frac{116x}{100}$ Tk.

Again, price at 12% loss = (840–x) – 12% of (840 –x) Tk. $= (840 - x) - \frac{12(840-x)}{100}$ Tk. $= (840 - x) - \frac{2520-3x}{25}$ Tk. $= \frac{21000-25x-2520+3x}{25}$ Tk. $= \frac{18480-22x}{25}$ Tk.	According to the question, $\frac{116x}{100} + \frac{18480-22x}{25} = 840$ $\Rightarrow \frac{116x+73920-88x}{100} = 840$ $\Rightarrow 28x + 73920 = 84{,}000$ $\Rightarrow 28x = 84000 - 73{,}920$ $\Rightarrow 28x = 10{,}080$ $\therefore x = \frac{10080}{28} = 360$

The cost price of one watch is 360 Tk.

∴ The cost price of another watch = (840– 360) = 480 Tk.

Ans: The cost price of one watch is 360 Tk. & another watch is 480 Tk.

31. A car Owner buys petrol at Tk.75, Tk.80 and Tk.85 per liter for three successive Years .What approximately is the average cost per liter of petrol if he spends Tk.40,000 each year in this concern?

[Joint Recruitment Test for 5 Banks (Officer)-18]

Solution:

Amount of petrol used in 3 years = $\left(\frac{40000}{75} + \frac{40000}{80} + \frac{40000}{85}\right)$ Liter

$= 40{,}000\left(\frac{1}{75} + \frac{1}{80} + \frac{1}{85}\right)$ Liter $= 40{,}000 \times \frac{1}{5}\left(\frac{1}{15}+\frac{1}{16}+\frac{1}{17}\right)$ Liter $= 8{,}000\left(\frac{1}{15} + \frac{1}{16} + \frac{1}{17}\right)$ Liter

$= 8{,}000 \times \frac{272+255+240}{4080}$ Liter $= 8{,}000 \times \frac{767}{4080}$ Liter $= \frac{76700}{51}$

Total cost = 3 × 40,000 = 120,000 Taka ∴ Average cost = $\frac{12000 \times 51}{76700}$ = 79.79 Taka (Approximately)

Alternative solution:

In first year he buys = $\frac{40000}{75}$ = 533.33 liters petrol

In Second year he buys = $\frac{40000}{80}$ = 500 liters petrol

In third year he buys = $\frac{40000}{85}$ = 470.59 liters petrol

∴ Total petrol = (533.33 + 500 + 470.59) liters = 1503.93 liters

Now, Total cost = (3 × 40000) = 120000 Tk

∴ Average cost per liter = $\frac{120000}{1503.93}$ Tk = 79.79 Tk (approximately)

32. A dealer buys dry fruit at the rate of Tk. 100, Tk. 80 and Tk. 60 per kg. He bought them in the ratio 12: 15 : 20 by weight. He in total gets 20% profit by selling the first two and at last he finds he has o gain no loss

in selling the whole quantity which he had. What was the percentage loss he suffered for the third quantity? *[Janata Bank Ltd. (EO)-18]*

Solution:

Let, the quantity bought be 12x,15x and 20x kg respectively

$\therefore$ Total cost price= (100×12x)+ (80×15x) + (60× 20x)= 3600x tk.

$\therefore$ cost price of first two=(100 × 12x + 15x × 80) Tk = = 2400x Tk

$\therefore$ Selling price at 20% profit of first two=$\left(2400x + 2400x \times \frac{20}{100}\right)$ Tk = 2880x Tk

Since there is no gain or no loss So,Total selling price of all= Total cost of all = 3600x Tk

So, Selling price of third quantity= 3600x– 2880x= 720x Tk

$\therefore$ Loss Amount = (1200x – 720x) Tk = 480x tk

$\therefore$ Loss Percentage = $\frac{480x}{1200x} \times 100\% = 40\%$

Ans. He suffered 40% loss for third quantity

33. A man has donated 30% of his property as charity and then gave the rest to his wife. The wife has contributed 50% of her property as charity. If wife has contributed Tk. 21,000 what was the contribution of the man as charity? *[Joint Recruitment Test for 4 Banks Senior Officer (IT/ICT)-180*

Solution:

Let, the man has the property worth's x Tk.

He gave as charity = 30% of x = 0.3x Tk.

Remaining property worth's = x – 0.3x = 0.7x Tk.

$\therefore$ 0.7x Tk. was given to his wife.

Now, wife gave as charity = (50% of 0.7x) = 0.35x Tk.

Now, the wife has = 0.7x – 0.35x = 0.35x Tk.

According to question,

0.35x = 21,000

$\therefore$ x = $\frac{21000}{0.35}$ = 60,000 Tk.

$\therefore$ The man contributed = 30% of 60,000 Tk.= 20,000 tk

Ans: 20,000 tk

34. There was a shipment of cars. Out of which half was black in colour. Remaining cars were equally blue, white and red. 70% of black cars, 80% of blue cars, 30% of white cars, 40% of red cars were sold. What percentage of total cars were sold? *[Basic Bank Ltd. (AM)-18]*

Solution:

Let, total number of cars = x $\quad\quad$ $\therefore$ The number of black cars = $\frac{x}{2}$

$\therefore$ The remaining number of cars = x – $\frac{x}{2}$ = $\frac{x}{2}$

$\therefore$ The number of blue car = $\frac{x}{2} \times \frac{1}{3} = \frac{x}{6}$ $\quad$ $\therefore$ The number of white car = $\frac{x}{2} \times \frac{1}{3} = \frac{x}{6}$

$\therefore$ The number of red car = $\frac{x}{2} \times \frac{1}{3} = \frac{x}{6}$

Now, the number of black cars that are sold = $\frac{x}{2} \times 70\% = \frac{x}{2} \times \frac{70}{100} = \frac{7x}{20}$

$\therefore$ The number of blue cars that are sold = $\frac{x}{6} \times 80\% = \frac{x}{6} \times \frac{80}{100} = \frac{2x}{15}$

$\therefore$ The number of white cars that are sold = $\frac{x}{6} \times 30\% = \frac{x}{6} \times \frac{30}{100} = \frac{x}{20}$

$\therefore$ The number of red cars that are sold $= \frac{x}{6} \times 40\% = \frac{x}{6} \times \frac{40}{100} = \frac{x}{15}$

$\therefore$ The total number of cars that are sold $= \frac{7x}{20} + \frac{2x}{15} + \frac{x}{20} + \frac{x}{15} = \frac{36x}{60} = \frac{3x}{5}$

$\therefore$ Percentage of cars that are sold $= \left(\frac{\frac{3x}{5}}{x} \times 100\right)\% = \left(\frac{3x}{5} \times \frac{1}{x} \times 100\right)\% = 60\%$

Ans:60%

35. In a certain class, $\frac{1}{5}$ of the boys are shorter than the shortest girls in the class and $\frac{1}{3}$ of the girls are taller than the tallest boy in the class. If there are 16 students in the class and no two people have the same height, what percent of the students are taller than the shortest girl and shorter than the tallest boy? *[Sonali Bank Ltd. (Officer-Cash) 18]*

Solution:

Given, total students = 16

As, the number of boys is the multiple of 5

So, the possible number of boys may be 5, 10, 15, 20.....

And the number of girls is the multiple of 3

So, the possible number of girls may be 9, 12, 15 .....

According to the question,

The number of boys may be = 10 and the number of boys may be = 6

$\therefore$ The number of boys shorter than the shorter girl $= 10 \times \frac{1}{5} = 2$

And the number of girls taller than the tallest boy $= 6 \times \frac{1}{3} = 2$

Here, there is 1 shortest boy and 1 tallest girl.

$\therefore$ The number of students taller than the shortest girl and the shorter than the tallest boy

$= 16 - (2 + 2 + 1 + 1) = 10$

$\therefore$ Required percentage $= \left(\frac{10}{16} \times 100\right)\% = 62.5\%$

Ans: 62.5%

36. The sum of three numbers in Arithmetic Progression is 30, and the sum of their squares is 318. Find the numbers. *[Bangladesh Krishi Bank Ltd. (OC)-18]*

Solution: Let, second term = a, Common difference = d

First term will be = a – d, And third term will be = a + d

According to question,

$a - d + a + a + d = 30 \Rightarrow 3a = 30 \Rightarrow a = \frac{30}{3} \therefore a = 10$

So, second term = 10 $\therefore$ First term = (10 – d), And third = (10 + d)

According to question,

$(10 - d)^2 + (10)^2 + (10 + d)^2 = 318$

$\Rightarrow (10)^2 - 2 \times 10 \times d + d^2 + 100 + (10)^2 + 2 \times 10 \times d + d^2 = 318$

$\Rightarrow 100 - 20d + d^2 + 100 + 100 + 20d + d^2 = 318 \Rightarrow 2d^2 + 300 = 318$

$\Rightarrow 2d^2 = 318 - 300 \Rightarrow 2d^2 = 18 \Rightarrow d^2 = \frac{18}{2} = 9 \Rightarrow d = \sqrt{9} \therefore d = 3$

So 1^{st} term = 10 – 3 = 7; 2^{nd} term = 10 and 3^{rd} term = 10 + 3 = 13

Ans. The numbers are 7, 10 & 13

37. A novelist earned Tk. 1,00,000 from royalties on her book. She paid 20% income tax on the royalties. She invested Tk. 50,000 at one rate and the rest at a rate that was 1% lower, earning 6,100 taka annual interest on the two investment. What was the lower rate? *[Agrani Bank Ltd. (Officer-Cash)-18]*

Solution:

Here, Earned royalties = 1,00,000 Tk.

Remaining royalties after tax = 1,00,000 – (1,00,000 × 20%%) = 80,000 Tk.

Invested at higher rate = 50,000 Tk.

∴ Invested at lower rate = 80,000 – 50,000 = 30,000 Tk.

Let, Higher rate be = x%

∴ Lower rate be = (x – 1)%

According to the question,

$(50{,}000 \times x\% \times 1) + \{30{,}000 \times (x-1)\% \times 1)\} = 6{,}100$

$\Rightarrow 50{,}000 \times \frac{x}{100} + 30{,}000 \times \frac{x-1}{100} = 6{,}100 \Rightarrow 500x + 30(x-1) = 6{,}100$

$\Rightarrow 500x + 300x - 300 = 6{,}100 \Rightarrow 800x = 6{,}100 + 300 \quad \therefore x = \frac{6400}{800} = 8$

∴ Higher race = 8% So, lower rate = 8 – 1 = 7%

Ans: 7%

38. Mrs. Barbara invests Tk. 2,400 in the National Bank at 5%. How much additional money must she invest at 8% so that the total annual income will be equal to 6% of her entire investment?

[Modhumoti Bank Ltd. (PO)-18]

Solution: Let, Tk. X is the additional money Mrs. Barbara invests at 8% interest

∴ Her total investment = (x + 2,400) Tk.

According to the question,

$(2{,}400 \times 5\%) + (x \times 8\%) = (2{,}400 + x) \times 6\% \Rightarrow 120 + \frac{8x}{100} = (2{,}400 + x) \times \frac{6}{100}$

$\Rightarrow 120 + \frac{8x}{100} = 144 + \frac{6x}{100} \Rightarrow \frac{8x}{100} - \frac{6x}{100} = 144 - 120 \Rightarrow \frac{2x}{100} = 24 \Rightarrow \frac{x}{50} = 24 \quad \therefore x = 1{,}200$ Tk.

Ans. 1,200 Tk.

39. *[Dhaka Bank Ltd. (TO)-18]*

Monthly Kilowatt hours	≤ 500	≤1,000	≤1,500	≤2,000
Present	Tk.24.00	Tk.41.00	Tk.57.00	Tk.73.00
Proposed	Tk.24.00	Tk.45.00	Tk.62.00	Tk.79.00

The table above shows present rates and proposed rates for electricity for residential customers. For which of the monthly kilowatt hours shown would the proposed rate be the greatest percent increase over the present rate?

Solution:

For ≤ 500 kilowatt hours per month

Percent of increase $= \left(\frac{26-24}{24} \times 100\right)\% = \left(\frac{2}{24} \times 100\right)\% = 8.33\%$

For ≤ 1,000 kilowatt hours per month

Percent of increase $= \left(\frac{45-41}{41} \times 100\right)\% = \left(\frac{4}{41} \times 100\right)\% = 9.76\%$

For ≤ 1,500 kilowatt hours per month

Percent of increase $= \left(\frac{62-57}{57} \times 100\right)\% = \left(\frac{5}{57} \times 100\right)\% = 8.77\%$

For ≤ 2,000 kilowatt hours per month

Percent of increase = $\left(\frac{79-73}{73} \times 100\right)\% = \left(\frac{6}{73} \times 100\right)\% = 8.22\%$

So, we found 9.76% is the greatest percent of increase which lies in ≤ 1,000 kilowatt hours per monthly.

Answer: Required range is ≤ 1,000.

40. Mr. Karim gave 40% of the money he had, to his wife. He also gave 20% of the remaining amount to each of his three sons. Half of the amount now left was spent on miscellaneous items and the remaining amount of Tk. 12,000 was deposited in the bank. How much money did Mr. Karim have initially?

[Janata Bank Ltd. (EO)-18]

Solution:

Let, Mr. Jones has = x Tk.

$\therefore$ He gave to his wife = 40% of x $= \frac{40}{100} \times x = \frac{2x}{5}$

Remaining = $x - \frac{2x}{5} = \frac{5x-2x}{5} = \frac{3x}{5}$

$\therefore$ He gave to his three sons = $3 \times \left\{20\% \text{ of } \frac{3x}{5}\right\} = \frac{9x}{25}$

$\therefore$ Remaining = $\frac{3x}{5} - \frac{9x}{25} = \frac{6x}{25}$

According to the question

$\frac{1}{2}$ of $\frac{6x}{25} = 12{,}000 \Rightarrow x\,\frac{12000 \times 25 \times 2}{6} = 1{,}00{,}000.$

Ans: Mr. Jones has = 1,00,000 Tk.

41. A family has 480kg of rice for X number of weeks. If they need to use the same amount for 4 more weeks, they need to cut down their weekly assumption of rice by 4kg. What is the value of X?

[Rupali Bank Ltd. (Officer-Cash)-18]

Solution:

Given, the number of weeks= x & The amount of rice is 480kg.

In the beginning per week consumption=$\frac{480}{x}$ & Next per week consumption= $\frac{480}{(x+4)}$

According to the problem,

$\frac{480}{x} - \frac{480}{(x+4)} = 4 \Rightarrow 480\left(\frac{1}{x} - \frac{1}{x+4}\right) = 4 \Rightarrow \frac{1}{x} - \frac{1}{x+4} = \frac{4}{480} = \frac{1}{120} \Rightarrow \frac{x+4-x}{x(x+4)} = \frac{1}{120}$

$\Rightarrow \frac{4}{x^2+4x} = \frac{1}{120} \Rightarrow x^2 + 4x = 480 \Rightarrow x^2 + 4x - 480 = 0 \Rightarrow x^2 + 24x - 20x - 480 = 0$

$\Rightarrow x(x+24) - 20(x+24) = 0 \Rightarrow (x+24) - 20(x+24) = 0 \Rightarrow (x+24)(x-20) = 0$

Here, $x - 20 = 0 \Rightarrow x = 20 \therefore x = 20$

But, $x = -24$ is not acceptable.

$\therefore$ The value of x is 20.

Ans: 20

42. A man has donated 30% of his property as charity and then gave the rest to his wife. The wife has contributed 50% of her property as charity. If wife has contributed Tk. 21,000 what was the contribution of the man as charity? *[Joint Recruitment Test for 4 Banks Senior Officer (IT/ICT)-180*

Solution:

Let, the man has the property worth's x Tk.

He gave as charity = 30% of x = 0.3x Tk.

Remaining property worth's = x – 0.3x = 0.7x Tk.

$\therefore$ 0.7x Tk. was given to his wife.
Now, wife gave as charity = (50% of 0.7x) = 0.35x Tk.
Now, the wife has = 0.7x – 0.35x = 0.35x Tk.
According to question,
0.35x = 21,000

$\therefore x = \frac{21000}{0.35} = 60{,}000$ Tk.

$\therefore$ The man contributed = 30% of 60,000 Tk.= 20,000 tk
Ans: 20,000 tk