**2. Percentage**

**Solutions Exercise – Easy**

1. (a) : % of 5000 = 

2. (b) : Required answer = 

or Amount lost by leakage = 

∴ Required answer = 425 − 34 = 391 litres

3. (a) : Given that *a* = 25%

According to the formula,

Reduction in consumption

= 

= 

**Alternate Method:**

Let original price be Rs. 100.

Then, increased price = Rs. 125

If price increases from 100 to 125 then the consumption have to decrease from 125 to 100 to keep the expenditure same.

∴ Reduction in consumption = 

4. (c) : This can simply be solved by multiplying the two multiplication factors to get the effective multiplication factor. e.g. multiplication factor for 30% increase = 1.30.

Multiplication factor for 20% decrease = 0.8. Hence, 1.30 × 0.8 = 1.04. This multiplication factor (*i.e*. 1.04) indicates that there is a 4% increase in total revenue. So the answer is + 4.

**Alternative Method:**

By using the formula 

∴ *x* = +30% ; *y* = 20%

⇒ 

= 30 – 20 – 6 = +4%

5. (b) : Let the initial price be Rs. 10 and initial sales be 10 units.

∴ Initial revenue = 10 × 10 = Rs. 100

( Revenue = Price × Sales)

As price is increased by 50%, new price = Rs. 15

Also new sales = 7(30% decrease on 10)

∴ New revenue = 15 × 7 = Rs. 105

∴ Revenue increases by 5%

Alternatively the problem can be done using the following formula.

Net effect = 

⇒  = 5% increase

6. (d) : According to the question,

Change in length of rectangle = − 50% = *a*

Change in breadth of rectangle = 100% = *b*

Net effect = 

= 

7. (c) : 

Required percentage = 

8. (b) : Let Rajesh's salary by Rs. 100.

∴ Naresh's salary will be = 100 + 40% of 100 = Rs. 140.

∴ Rajesh gets Rs. 40 less than Naresh's salary.

∴ Required percentage = 

9. (c) : Let the original price = 100

Now, Price = 120

Change = 

10. (d) : Population after 2 years = 

5000 × 1.04 × 1.04 = 5408

11. (b) : If the third number is 100 then the number are 140 and 150

∴ First number is 10 less than the second number.

∴ Required percentage = 

12. (c) : If the third number is 100 then the first two numbers are 125 140.

∴ The first number as a percentage of the second

⇒ 

13. (c) : Let 1st number be *x* and 2nd number be *y*.

According to the question,

48% of *x* = 60% *y*

⇒ 

* 

∴ *x* : *y* = 5 : 4

14. (c) : 50% are male,

∴ The remaining 50% are females.  
20% of the females are married and 10% of them have children.

∴ % of females who have children = 

∴ 98% of females do not have children.

15. (c) : It is known that

8 weeks = 8 × 7 = 56 days

and 1 leap year = 366 days

∴ The percentage of 8 weeks in a leap year

=

16. (c) : Discount I = 

Discount II = 

∴ Required difference = Rs. (630 − 600) = Rs. 30

17. (d) : Let the total number of votes be *x*.

Now, according to the question,

62% of *x* − 38% of *x* = 144

or 

∴ *x* = 600

18. (c) : Number of boys present ⇒ 96 − 16 = 80

Number of boys who did not do home work = 35%

∴ Number of boys who did their homework

65% of 80 = 0.65 × 80 = 52

20. (a) : Net effect on area

= 

= (− 10 − 2)% = − 12%

Now, after this mistake new area

= (100 − 12)% of 200 (as original area = 200 sq. cm)

= 

21. (c) : The amount is certainly more than Rs. 4800. And each year, the new amount is added. So, the sum should be multiplied by

= 

∴ The required amount = 

**Alternate Method:**

By Multiplying Factor,

= 20 × 1.25 × 4800

= 7200

22. (c) : Go through option

|  |  |  |
| --- | --- | --- |
| **Boys** | **Girls** | **Total** |
| 14 | 11 | 25 |
| 56 | 44 | 100 |
| 12 | |  |

Since out of 100 students number of boys are greater than the number of girls by 12 *i.e*., 12%.

**Alternate Method:**

Let the number of boys and girls be *x* and *y* respectively.

Then, 

⇒ 

23. (c) : Required marks *i.e*. 50% of (180 + 150) = 165

Marks scored in first paper = 54

Marks required to be scored in second paper = 111

∴ Required percentage = 

24. (a) : Let the total number of votes be *x*.

Now according to the question 

∴ *x* = 3000

25. (d) : Let the monthly salary of Mohit be Rs. *x*.

Then, [100 − (25 + 20)]% of [100 − (24 + 15)]% of *x* = 10736

⇒ 55% of 61% of *x* = 10736

⇒ 

⇒ 

26. (b) : (1,00,000) × 0.75 × 0.80 × 0.85 = Rs. 51,000

27. (c) : Quantity of salt in 6 litres of solution

= 

Percentage of salt in 5 litres of solution

= 

28. (c) : Go through option (40 × 0.4) + (40)2 = 1616



**Alternate Method:**

(*x* × 0.4) + *x*2 = 

⇒ *x*2 = 40*x*

⇒ *x* = 40

29. (b) : Present price of 1 kg of a commodity = 120 percent of the former price of 1 kg.

=  of the former price of 1 kg.

= former price of  kg.

Former price of 1 kg = present price of  kg.

Therefore, in order that the expenditure may remain the same as before, for 1 kg consumed formerly,  kg must be consumed now, that is, the consumption must be reduced by.

30. (a) : New Revenue = Consumption × Tax

= (115% × 80%) of the original

=  of the original

=  of original = 92% of original

**Solutions Exercise – Medium**

1. (a) : Marks obtained by Sushant = 1080

Marks obtained by Mohit = 1.2 × 1080 = 1296

Marks obtained by Rajesh = 

So, percentage of marks obtained by Rajesh

= 

2. (c) : The performance of the two candidates can be represented as 20% of maximum = *P* − 30 ..... (1)

Where '*P*' is pass mark

32% of maximum = P + 42 ..... (2)

Hence, (32 − 20)% of maximum = P + 42 − (P − 30)

12% maximum = 72.

100% of maximum = 

Maximum marks = 600

3. (c) :

I. Due to reduction in the rate by 25% on sugar saving on purchase = 

∴ Reduced price per kg of sugar = 

II. Original price per kg of sugar

=  (as original price is 25% more)

= Rs. 16/kg

4. (c) : Let the price of sugar be Rs. *x* per kg.

∴ Initial expenditure = Rs. 30*x*

New expenditure = Rs. 33*x*

∴ New monthly consumption = 

5. (a) : Let original price be *x*.

New price per kg. = 

According to the question,

= 

⇒ 

⇒ (3850 − 3080) = 14*x*

⇒ 14*x* = 770

∴ 

6. (b) : Total matches = 60 + 90 = 150

90% of 150 = 

∴ Required number of matches to be won to ensure 90% success rate is 135.

Matches to be won = 135 − 48 = 87 matches to be won out of 90 matches.

∴ Success % for remaining matches = 

⇒ 

7. (a) : 30 × 25 × 35 = *x* × 30 × 27

⇒ *x* = 32.40

It means 33 pages.

So, the percentages increases in the number of pages

= 

8. (d) :

|  |  |
| --- | --- |
| **Men** | **Women** |
| 40% | 60% |

Out of 40% men, 75% earn more than Rs. 25,000.

Hence, 30% of the company (men) earn more than Rs. 25,000.

But,in all 45% of the employees earn more than Rs. 25,000.

Hence, among women 15% earn more than Rs. 25,000 and the remaining (60 – 15)% earn less than or equal to Rs. 25,000.

Therefore, the fraction of women =.

9. (b) : The two equations can be written

=  = 700

= 

The equations can be simplified to *x + y* = 35 and 2*x* + 3*y* = 90. Solving these two equations simultaneously, we get *x* = 15%.

10. (b) : Every week, the sales increase by 50%.

Hence, difference in the sales of the 3rd week and of the 2nd week = 50% of sales of 2nd week.

Value of this is given as 450.

So, 2nd week sale is 900 and 50% of 2nd week sales is 450.

Sales in 3rd week = (100% + 50%) of sales of 2nd week

= 150% of 450 = 1350

11. (b) : Let maximum marks be *x*.

According to the question,



⇒ 

∴ 

12. (c) : Let, Mr. Arihant has *x* shares of 5.5%

*x* × 92 = 32,200

⇒ *x* = 350 shares

Income = 350 × 5.5 = 1925

Now, after investment his income is

=

= 525 + 560 + 920 = 2005

Profit = 2005 − 1925 = Rs. 80

13. (b) : Let the total number of students in the examination = 100

Number of students passed in English *n*(*E*) = 50

Number of students passed in Maths *n*(*M*) = 60

Number of students passed in both English and Maths *n*(*M**S*) = 20.

∴ Number of students who passed either in English or in Maths or in both = *n*(*M**S*).

⇒ *n*(*M**S*) = *n*(*M*) + *n*(*S*) − *n*(*M**S*) = 50 + 60 − 20 = 90

∴ Number of students who failed in both English and Maths = 100 − 90 = 10%

14. (d) : Let the length , breadth and height of the room be 3*x*, 2*x* and *x* respectively.

Area of four walls = 2(*bh + he*)

= 2 (2*x*2 + 3*x*2)

= 10*x*2

New length = 2(3*x*) = 6*x*

New breadth = 

New height = 

New Area of four walls =  = 7*x*2

Change = 

= 

15. (a) : Let price of a table = Rs. *x*

Then, price of a chair = Rs. (*x* + 400)

∴ Price of (6 chairs + 6 tables) = Rs. 4800

⇒ 6(*x* + 400 + *x*) = 4800

⇒ 12*x* + 2400 = 4800

⇒ *x* = 200

∴ Price of a table = Rs. 200

and price of a chair = Rs. 600

Required percentage = 

16. (d) : Since we don't have sufficient data. Further any value is possible as the required income tax.

17. (b) : Given a man's savings is 25%, expenses = 75%

20% increase in expenses means 20% of 75 = 15

Total expenses = 75 + 15 = 90

Present savings = 100 − 90 = 10% of salary,

10% of salary = Rs. 1,800

100% of salary = 

18. (c) : Since the inflation rate in 1994 & 1995 is 8% each, the rate of increase in price of sugar = 10%. Hence, if price of sugar on Jan 1, 1994 is 20, It will be 22 on Jan 1, 1995 and 24.20 on Jan 1, 1996.

19. (b) : Quantity of alcohol in 5 litres of solution

= 

Quantity of alcohol in 6 litres solution = 2 litres

∴ Strength of alcohol in new solution

= 

20. (a) : Let there be 100 voters in all. So initially there were 40 of these who promised to vote for *P*, while 60 of them promised to vote for *Q*. On the last day, (15% of 40) = 6 voters shifted their interest from *P* to *Q* and (25% of 60) = 15 voters shifted their interest from *Q* to *P*. So finally, *P* would end up getting (40 – 6 + 15) = 49 votes and *Q* would end up getting (60 – 15 + 6) = 51 votes. Hence, margin of victory for *Q* = (51 – 49) = 2, which matches the data given in the question. Hence, there were 100 voters in all.

21. (d) : Here, 10% of 150 kg = 15 kg

∴ Good quality of wheat is 135.

Now, low quality wheat is 5% of total = 15



Total = 300

∴ We add 150 kg of good quality wheat.

22. (c) : The number of goats remain the same.

If the percentage that is added every time is equal to the percentage that is sold, then there should be a net decrease. The same will be the case if the percentage added is less than the percentage sold.

The only way, the number of goats will remain the same is if *p > q*.

***Solutions for questions 23 and 24:***

|  |  |  |
| --- | --- | --- |
|  | **Noida** | **Dwarka** |
|  | **(M : F)** | **(M : F)** |
| Last year : | 600 ← (2 : 1) | (5 : 6) → 1100 |
| This year : | 750 ← (2 : 1) | (unknown) → 1200 |

23. (d) : Since we don't know the number of female employees in the Dwarka office this year so we cannot determine.

24. (b) : 1100 + 600 = 1700

25. (b) : Let us look at the two equations. Let (5 pens + 7 pencils + 4 erasers) cost be Rs. *x*. Hence, (6 pens + 14 pencils + 8 erasers) will cost Rs. 1.5*x*. Had, in the second case, Rajan decided to buy 10 pens instead of 6, the quantity of each one of them would have doubled over the first case and hence it would have cost me Rs. 2*x*. So (10 pens + 14 pencils + 8 erasers) = Rs. 2*x*. Now, subtracting the second equation from the third, we get 4 pens cost Rs. 0.5*x*. Since 4 pens cost Re 0.5*x*, 5 of them will cost Re 0.625*x*. This is the amount that I spent on pens. Hence, fraction of the total amount paid = 0.625 = 62.5%.

26. (d) : Let the weight of fresh grapes be *x*.

Quantity of water in it = 

Quantity of pulp in it = 

Quantity of water in 500 kg dry grapes

= 

∴ Quantity of pulp in it = (500 − 50) = 450 kg

∴ 

∴ *x* = 2250 kg [**Note:** Plup remains same in fresh and dry grapes.]

27. (a) : Let *x* be the total number of people the college will ask for donations.

∴ People already solicited = 0.6*x*

Amount raised from the people solicited = 600 × 0.6*x* = 360*x*

Now 360*x* constitutes 75% of the amount.

Hence, remaining 25% = 120*x*

∴ Average donation from remaining people

= 

28. (c) : Let the marks scored in five subjects be 6*x*, 7*x*, 8*x*, 9*x* and 10*x*

Average score = 60%

⇒ 

⇒ 8*x* = 0.6

*x* = 0.075

So, the marks are 0.45, 0.525, 0.6, 0.675 and 0.75.

Number of times the marks exceed 50% is 4.

29. (a) : Let the quantity of haematite mined be *x* kg.

Then, 

⇒ 

30. (d) : Let there be 100 employees in Sun Metals.

∴ 40 employees are general graduates.

60 employees are engineers.

∴ 0.75 × 60 = 45 engineers earn more than Rs. 5 lakh.

As 50% employees earn more than Rs. 5 lakh, according to our consideration there will be 50 employees who earn more than Rs. 5 lakh. Among these, 45 are engineers.

∴ 50 − 45 = 5 general graduates earn more than 5 lakh.

∴ 35 general graduates earn Rs. lakh or less.

∴ Required proportion = .

**Solutions Exercise – Difficult**

1. (d) :

|  |  |  |
| --- | --- | --- |
|  | ***A*** | ***B*** |
| Initial support of candidates (%) | 64.0 | 36. |
| Shift away (%) + shift (%) | − 12.8 | − 5.4 |
|  | +5.4 | +12.8 |
|  | 56.6 | 43.4 |

A must now strive to shift 6.6% of the total respondents to tie with *S* at 50 each.

2. (c) : Let *x* be the number not cast for Praja Party in the previous polls. So, the number of votes not cast for the party in this assembly polls would be 1.25*x*. This means that the number of votes cast for the party in the two polls would be

(260000 – *x*) and (260000 – 1.25*x*) respectively.

Margin of victory in the previous polls = (votes cast) – (votes not cast) = (260000 – *x*) – *x* = (260000 – 2*x*).

Margin of loss in this years polls = (votes not cast) – (votes cast) = 1.25*x* – (260000 – 1.25*x*) = (2.5*x* – 260000).

Now, it is said that (Margin of loss this year) = 2*x* (Margin of victory last year).

Therefore, (2.5*x* – 260000) = 2(260000 – 2*x*).

Solving this equation we get, *x* = 120000.

This means that 120000 votes were not cast for the party in the previous assembly polls. So, the number of cast for the party = (260000 – 120000) = 140000.

3. (c) : If he gets *x* questions wrong, then

= 

⇒ 

∴ *x* = 24

Accuracy % = 

With the same accuracy he gets 90 the second time. Let *y* be the number of attempts. Then, 80 % of *y* − 20% of *y* = 90,

∴ *y* = 150

So, the % increase in number of attempts is

= 

4. (a) : Since Group (B) contains 23 questions, the marks associated with this group are 46.

Now check for option (a). If Group (C ) has one question, then marks associated with this group will be 3. This means that the cumulative marks for these two groups taken together will be 49. Since total number of questions are 100, Group (A) will have 76 questions, the corresponding weightage being 76 marks. This satisfies all conditions and hence is the correct option. It can be easily observed that no other option will fit the bill.

5 (c) : Since Group (C) contains 8 questions, the corresponding weightage will be 24 marks. This figure should be less than or equal to 20% of the total marks. Check from the options . Option (c) provides 13 or 14 questions in Group (B), with a corresponding weightage of 26 or 28 marks. This means that number of questions in Group (A) will either be 79 or 78 and will satisfy the desired requirement.

6. (d) : Let *x*, *y* and *z* be the number of managers, associates and bearers respectively.

Then, 1200*x* + 450*y* + 180*z* = 440 (*x + y + z*)

760*x* + 10*y* − 260*z* = 0 ..... (1)

After increase, 1260*x* + 480*y* + 200*z* = 470 (*x + y + z*)

790*x* + 10*y* − 270*z* = 0 ..... (2)

(1) & (2) give 30*x* − 10*z* = 0,

*z* = 3*x* ..... (3)

Substituting (3) in (1), we get 760*x* − 780*x* + 10*y* = 0,

*y* = 2*x* ..... (4)

∴ % of managers = 

7. (d) : Let *x* = 0.100100100......

⇒ 1000*x* = 100.100100......

= 100 + 0.100100......

⇒ 999*x* = 100, or *x* = .

As the number of students is a whole number, the number should be a multiple of 999, which has a factor of 9. Among the answer options, only 10989 is a multiple of 9. So, 10989 could be a possible value for the number of students.

8. (a) : Let *x* = 0.272727......

⇒ *x* = 

So, 27.272727......%

=

So, the number of students who study only during exam time

= . So, the number of students who do not study at all = 10989 − (2997 + 11) = 7981.

9. (a) : When fresh grapes turns into dry grapes the weight reduces to  of the original weight (since pulp that consists 30% is now 60% of the weight in dried grapes).

So, the final weight as *x*% of the original weight be:

=  (60°) + (40%) = 70%

Loss or reduction of weight

= 100 − 70 = 30%

**Note:** Quantity of pulp always remains same in freash and dried grapes.

10. (d) : We can reduce the problem in successive change of

+ *a* − *a* +  and

+ *b* − *b* + 

= 

= 

11. (d) : Let the volume of sphere *P* be 27 unit.

Therefore volume of sphere *Q* = 27 − of 27

= 27 − 19 = 8 units

The volumen of *R* = 8 −  times of 8 = 8 − 7 = 1 unit

So, the volume ratio would be

*P* : *Q* : *R* = 27 : 8 : 1

So, the surface area will be

*P* : *Q* : *R* = 9 : 4 : 1

Surface area of *R* is less than the surface area of shpere *P*.

9 − 1 = 8

Now,  × 100 = 88.88%

12. (b) : Original profit = 70000 − 42000 − 12000

= 16000

14.28% machine remains closed means 2 out of 14 machines did not give any output through out the year.

New output would be = 

Manufacturing cost would be

= 12 × 3000 + 12000

= 36000 + 12000

= 48000

(As manufacture cost per machine are 3000 and 12000 is fixed cost)

New Profit = 60,000 − 12000 = 4000

Percentage drop in profit = 

13. (b) : At the moment the shortfall is discovered, let there be *n* days worth of provision left.

Now, 3*n* − *n* = 2*n* extra days worth of provisions lasts for the 12 additional days.

⇒ 3*n* last for 18 days *i.e*. 18 days are left for the month to end.

But if the provisions are only doubled and the strength becomes, then the provisions will last for

12 ×  = 16 days

*i.e*. shortfall of 18 − 16 = 2 days.

14. (c) : Let AC-III's ticket be *x*.

then,

AC-II's ticket would be = 1.3*x*.

AC-I's ticket would be = .7*x* + 1.3*x* = 2*x*

3-tier would be = .4*x*

and general would be = .26*x*

AC-II's price is 650 = 1.3*x*

*x* = 500

So, 3-tier ticket would be = .4 × 500 = 200

General ticket would be = .26 × 500 = 130

Ticket Difference = 70.

15. (d) : Price of each ticket would be

AC-I = 2*x* = 2 × 500 = 1000

AC-II = 1.3*x* = 1.3 × 500 = 650

AC-III = *x* = 500

3-tier = .4*x* = 4 × 500 = 200

General = .26*x* = .26 × 500 = 130

Total = 1000 + 650 + 500 + 200 + 130

= 2480.