SOLUTION BOOKLET- 4th SEMESTER

CHAPTER 1- SIMPLIFICATION

Q1. Answer: B
Explanation: 78 - [5 + 3 of (25 - 2 × 10)]
= 78 - [5 + 3 of (25 - 20)]= 78 - [5 + 3 of 5]
= 78 - [5 + 3 × 5]= 78 - [5 + 15]= 78 - 20= 58.

Q2. Answer: C
Explanation: 52 - 4 of (17 - 12) + 4 × 7
= 52 - 4 of 5 + 4 × 7, (Simplifying '**parenthesis**' 17 - 12 = 5)
= 52 - 4 × 5 + 4 × 7, (Simplifying '**of**')
= 52 - 20 + 4 × 7, (Simplifying '**multiplication**' 4 × 5 = 20)
= 52 - 20 + 28, (Simplifying '**multiplication**' 4 × 7 = 28)
= 32 + 28, (Simplifying '**subtraction**' 52 - 20 = 32)
= 60. (Simplifying '**addition**' 32 + 28 = 60)

Q3. Answer: B
Explanation: (4444 / 40) + (645 / 25) + (3991 / 26)
=(1111/10) + (129/5) + (307 / 2)
=(1111 + 258 + 1535) /10=2904/10=209.4.

Q4. Answer: B
Explanation: $37.5 \div [\frac{1}{2}\ of\ (24+33) - 13\frac{1}{2}] = ?$
=>$37.5 \div \left[\frac{57-27}{2}\right] = ?$
=> ? = 2.5.

Q5. Answer: B
Explanation: Here, $35^2 \div \sqrt[3]{125} + 25^2 \div 125 = ?$
=>(1225/5)+(625/125)=?
=> ? = 250.

Q6. Answer: B
Explanation: Use the formula- $(a^2-b^2)=(a+b)(a-b)$.

Q7. Answer: B
Explanation: Use the formula- $(A+B)^2-(A-B)^2= 4AB$.

Q8. Answer: A
Explanation: Use normal rule of divisibility.

Q9. Answer: A
Explanation: Here, $\frac{5^2\times14+1450}{5} = 1998 \div x$
We apply the BODMAS rule to solve this expression. We get x=5.55.

Q10.Answer: A
Explanation: [(15.5 × 28) ÷ 16 - 1230 ÷ 240] = ? × 5
⇒ 434 ÷ 16 - 5.125 = ? × 5

⇒ 27.125 - 5.125 = ? × 5
⇒ 22 = ? × 5 ⇒ ?=22/5 = 4.4

Q11. Answer: A

Explanation: Here, $\frac{216^{\frac{1}{2}}\times 26^4\times 39^4}{12^4\times 3\times 2^{-2}} = 13^x$
=>$13^8 = 13^x \quad => x = 8.$

Q12. Answer: C
Explanation: Here, $[144^2 \div 48 \times ?] \div 22 = 216$
=> ? = (216 X 22)/432 = 11.

Q13. Answer: D
Explanation: Here,

Sol. Here,
$(?)^2 + (65)^2 = (160)^2 - (90)^2 - 7191$
$\Rightarrow (?)^2 = (160)^2 - (90)^2 - 7191 - (65)^2$
$\Rightarrow (?)^2 = 25600 - (8100 + 7191 + 4225)$
$\Rightarrow (?)^2 = 25600 - 19516$
$\Rightarrow (?)^2 = 6084 \Rightarrow (?) = \sqrt{6084} = 78$

Q14. Answer: B
Explanation:

Sol. Here,
$7^{2.3}\times 7^{2\times 4.7}\times (7\times 9)^{3.4}\times (9^2)^{5.85} = 63^?$
$\Rightarrow 7^{2.3+9.4+3.4}\times 9^{3.4+11.70} = (63)^?$
$\Rightarrow 7^{15.1}\times 9^{15.1} = (63)^?$
$\Rightarrow (63)^{15.1} = (63)^?$
$\Rightarrow ? = 15.1$

Q15. Answer: A
Explanation:

Sol. Here, $\frac{1}{2}$ of 3842 + 15% of ? = 2449
$\Rightarrow \frac{1}{2}\times 3842 + \frac{15}{100}\times ? = 2449$
$1921 + \frac{15}{100}\times x = 2449 \qquad [\text{put x} = ?]$
$\Rightarrow 1921 + \frac{15}{100}\times x = 2449$
$\Rightarrow \frac{15x}{100} = 2449 - 1921 \Rightarrow \frac{15x}{100} = 528$
$\Rightarrow x = \frac{528\times 100}{15} = 35.2\times 100 = 3520$

Q16. Answer: D
Explanation: Use addition- subtraction rule of decimals.

Q17. Answer: C
Explanation: Convert percentage into fraction and simplify it.

Q18 to 22(Try by yourself)
Q18. Answer: A **Q19. Answer: D** **Q20. Answer: B**
Q21. Answer: D **Q22. Answer: B**

Q23. Answer: C
Explanation: Use $(a+b)^2=a^2+2ab+b^2$

Q24. Answer: C
Explanation: Use divisibility rule for decimals.

Q25. Answer: D
Explanation: Sqrt[0.09 × 0.9 × a] = 0.009 × 0.9 ×sqrt(b)
On squaring both side,
$81x10^{-3}$ a = $81x81x10^{-8}$ b
=> a/b = 81 $x10^{-5}$

Q26. Answer: B
Explanation: (3/5) [4 + (1/3)] [2 + (2/3)] [3 + (4/3)] [7 + (5/3)] [1 - (12/13)]
=3/5 x 13/3 x 8/3 x 13/3 x 26/3 x 1/13 = 2704/135 .

Q27. Answer: A
Explanation:

Sol. Here, $1\frac{1}{3}+2\frac{1}{6}-3\frac{1}{9}=1\div x$

$\Rightarrow \frac{4}{3}+\frac{13}{6}-\frac{28}{9}=1\div x$

$\Rightarrow \frac{24+39-56}{18}=1\div x$

$\Rightarrow \frac{7}{18}=1\div x$

$\Rightarrow x=\frac{18}{7}=2\frac{4}{7}$

Q28. Answer: C
Explanation:

Sol. Here,

$\frac{9}{13}$ of $221+1\frac{4}{9}$ of $378=241+?$

$\Rightarrow 9\times 17+13\times 42=241+?$

$\Rightarrow 153+546=241+?$

$\Rightarrow x=458$

Q29.Answer: D
Explanation: Solve by yourself by using fraction rule.

Q30.Answer: C
Explanation: Solve by yourself by using fraction rule.

Q31. Answer: D
Explanation: Use the rule of changing recurring decimal into fraction
(646-6)/99=640/99

Q32. Answer: C

Explanation: $101\ \frac{27}{100000} = 101 + \frac{27}{100000} = 101 + .00027 = 101.00027$

Q33. Answer: D

Explanation: [3+ (87/99)]-[2+(59/99)]=1+(28/99)=$1.\overline{28}$

Q34. Answer: D

Explanation: $\sqrt{\frac{4}{9}} = \frac{2}{3} = 0.\bar{6}$

Q35. Answer: D

Explanation: (2145-21)/990=2124/990 .

Q36. Answer: D

Explanation: Let $(17)^{3.5} \times (17)^{x} = 17^{8}$.

Then, $(17)^{3.5 + x} = 17^{8}$.

$\therefore$ $3.5 + x = 8 \Rightarrow x = (8 - 3.5) \Rightarrow x = 4.5$

Q37. Answer: C

Explanation:

Given $\left(\frac{a}{b}\right)^{x - 1} = \left(\frac{b}{a}\right)^{x - 3}$

$\Rightarrow \left(\frac{a}{b}\right)^{x - 1} = \left(\frac{a}{b}\right)^{-(x - 3)} = \left(\frac{a}{b}\right)^{(3 - x)}$

$\Rightarrow x - 1 = 3 - x$

$\Rightarrow 2x = 4 \Rightarrow x = 2.$

Q38. Answer: A

Explanation: Laws of indices $(x^{m})^{n} = x^{mn}$ and $x^{m} \times x^{n} = a^{m + n}$

$$\frac{(2^{5})^{(n/5)} \times 2^{2n + 1}}{(2^{2})^{n} \times 2^{n - 1}} = \frac{(2)^{5 \times (n/5)} \times 2^{2n + 1}}{2^{2n} \times 2^{n - 1}} = \frac{2^{n} \times 2^{2n + 1}}{2^{2n} \times 2^{a - 1}}$$

$$\frac{2^{n} \times 2^{2n + 1}}{2^{2n} \times 2^{n - 1}} = \frac{2^{n + 2n + 1}}{2^{2n + n - 1}} = \frac{2^{3n + 1}}{2^{3n - 1}}$$

$$\frac{x^{m}}{x^{n}} = x^{m - n}$$

$$\frac{2^{3n + 1}}{2^{3n - 1}} = 2^{3n + 1 - (3n - 1)} = 2^{2} = 4$$

Q39. Answer: B

Explanation: $5^{3} = 125$, $5^{4} = 625$, $3^{6} = 729$

$$\frac{1}{(5^3)^{-(2/3)}} + \frac{1}{(5^4)^{-(3/4)}} + \frac{1}{(3^6)^{-(3/6)}}$$

Hint:

Law of indices $(x^m)^n = x^{mn}$

$$\frac{1}{(5)^{-2}} + \frac{1}{(5)^{-3}} + \frac{1}{(3)^{-3}}$$

Therefore,

$$\frac{1}{(5)^{-2}} + \frac{1}{(5)^{-3}} + \frac{1}{(3)^{-3}} = 5^2 + 5^3 + 3^3 = 177$$

Q40. Answer: A

Explanation: $2^x \times 8^{(1/4)} = 2^{(1/4)}$

As bases are not equal we cannot add the indices, hence first convert all the numbers with same base.

$2^x \times (2^3)^{(1/8)} = 2^{(1/4)}$

Hint:

Law of Indices $(x^m)^n = x^{mn}$

$2^x \times 2^{(3/4)} = 2^{(1/4)}$

$2^{[x + (3/4)]} = 2^{(1/4)}$

$x + 3/4 = 1/4 \Rightarrow x = 1/2$

Q41. Answer: C

Explanation: $x^m \times x^n = x^{m+n}$

$9^x - 9^{x-1} = 648 \Rightarrow 9^{x-1}(9 - 1) = 648 \Rightarrow 9^{x-1} = (648/8) = 81 \Rightarrow 9^{x-1} = 9^2$

$x - 1 = 2 \Rightarrow x = 2 + 1 = 3$

$\Rightarrow x^x = 3^3 = 27$

Q42. Answer: D

Explanation: $4^{(x-y)} = 64$

$4^{(x-y)} = 64 = 4^3$

Equation 1) $x - y = 3$

$4^{(x+y)} = 1024 = 4^5$

Equation 2) $x + y = 5$

Solving equation (1) and (2), we get

$x = 4$ and $y = 1$

Q43. Answer: D

Explanation: $121 = 11^2$, hence value of a = 11 and b = 2 can be considered.

Therefore, the value of $(a - 1)^{b+1} = (11 - 1)^{2+1} = 10^3$

Q44. Answer: D

Explanation: $(32/243)^{-4/5} = (243/32)^{4/5} = [(3/2)^5]^{4/5} = 81/16$

Q45. Answer: C

Explanation: $(1/216)^{-2/3} \div (1/27)^{-4/3} = 216^{2/3} \div 27^{4/3} = (63)^{2/3} \div (33)^{4/3} = 4/9$

Q46. Answer: D
Explanation: $(2^{n+4} - 2.2^{n})/2.2^{n+3} + 1/2^{3} = 7/8 + 1/8 = 1$

Q47. Answer: A
Explanation: $5^{3/2} * 5^{3} \div 5^{-3/2} = 5^{a+2}$
$5^{3/2} + 3 + 3/2 = 5^{a+2}$
$\Rightarrow 3/2 + 3 + 3/2 = a+2$
$\Rightarrow a+2=6;\ a=4$

Q48. Answer: D
Explanation: $(\sqrt{2})^{n} = 64 \Rightarrow 2^{n/2} = 64 = 2^{6}$
$n/2=6;\ n=12.$

Q49. Answer: B
Explanation:

Given Exp. $= \dfrac{1}{\left(1 + \dfrac{x^b}{x^a} + \dfrac{x^c}{x^a}\right)} + \dfrac{1}{\left(1 + \dfrac{x^a}{x^b} + \dfrac{x^c}{x^b}\right)} + \dfrac{1}{\left(1 + \dfrac{x^b}{x^c} + \dfrac{x^a}{x^c}\right)}$

$= \dfrac{x^a}{(x^a + x^b + x^c)} + \dfrac{x^b}{(x^a + x^b + x^c)} + \dfrac{x^c}{(x^a + x^b + x^c)}$

$= \dfrac{(x^a + x^b + x^c)}{(x^a + x^b + x^c)}$

$= 1.$

Q50. Answer: C
Explanation: X=5+2 sqrt(6) and 1/x= 5-2 sqrt(6).
So, x- 1/x= 4 sqrt(6).

Q51. Answer: A
Explanation:

$$\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 = x + \frac{1}{x} - 2$$

$$= (3 + 2\sqrt{2}) + \frac{1}{(3 + 2\sqrt{2})} - 2$$

$$= (3 + 2\sqrt{2}) + \frac{1}{(3 + 2\sqrt{2})} \times \frac{(3 - 2\sqrt{2})}{(3 - 2\sqrt{2})} - 2$$

$$= (3 + 2\sqrt{2}) + (3 - 2\sqrt{2}) - 2$$

$$= 4.$$

$$\therefore \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right) = 2.$$

Q52. Answer: C
Explanation: $(\sqrt{8})^{1/3} = (8^{1/2})^{1/3} = 8^{1/6} = (2^{3})^{1/6} = 2^{1/2} = \sqrt{2}.$

Q53. Answer: D
Explanation: $256=16^2$, $81=9^2$, $36=6^2$ and $16=4^2$.

Q54. Answer: A
Explanation: $0.000729 = (0.027)^2$ and $0.027= (0.3)^3$.

Q55. Answer: B
Explanation: If number is in form of n x (n+1) with positive sign in square root, then the answer is (n+1).
12=3x(3+1)=3x4. So, the answer is 4.

Q56. Answer: B
Explanation: If number is in form of n x (n+1) with negative sign in square root, then the answer is n.
56=7x(7=1)=7x8. So, the answer is 7.

Q57.ANS-A

Explanation: $The\ rule\ is \sqrt{A\sqrt{A\sqrt{A}}} \dots\dots\dots\dots\infty = A$

Q58. Answer: D
Explanation:
$N^{(\frac{2^n-1}{2^n})} = 6^{\frac{2^3-1}{2^3}} = 6^{\frac{7}{8}}$.
Here, N is the number and n is number of roots repetition.

Q59. Answer: A
Explanation: $1 - \{1 + (a^2 - 1)^{-1}\}^{-1} = 1 - \{1 + 1/a^2 - 1\}^{-1} = 1 - \{a^2 / a^2 - 1\}^{-1} = 1 - (a^2 - 1)/a^2 = 1/a^2$.

Q60. Answer: A
Explanation: Make the nth root equal by taking the lcm of given roots.
LCM of (3,2,4)=12.
$\sqrt[3]{6} = \sqrt[12]{6^4}$
$\sqrt{3} = \sqrt[12]{3^6}$
$\sqrt[4]{8} = \sqrt[12]{8^3}$
6^4=1296 , 3^6= 729 and 8^3=512.
So, 1296>729>512

Q61. Answer: D
Explanation: $(0.2)^2$=0.04, 1/0.2=5 and $0.\overline{2}$ =2/9=0.222…

Q62. Answer: B
Explanation: Let the price of a saree and a shirt be Rs. *x* and Rs. *y* respectively.
Then, 2*x* + 4*y* = 1600 .... (i)
and *x* + 6*y* = 1600 .... (ii)
Divide equation (i) by 2, we get the below equation.
=> x + 2y = 800. --- (iii)
Now subtract (iii) from (ii)
x + 6y = 1600 (-)
x + 2y = 800

4y = 800

Therefore, y = 200.
Now apply value of y in (iii)
=> x + 2 x 200 = 800
=> x + 400 = 800
Therefore x = 400
Solving (i) and (ii) we get x = 400, y = 200.
$\therefore$ Cost of 12 shirts = Rs. (12 x 200) = Rs. 2400.

Q63.ANS-A
Let the total number of shots be x. Then,
Shots fired by A = $\frac{5}{8}x$
Shots fired by B = $\frac{3}{8}x$
Killing shots by A = $\frac{1}{3}$ of $\frac{5}{8}x = \frac{5}{24}x$
Shots missed by B = $\frac{1}{2}$ of $\frac{3}{8}x = \frac{3}{16}x$
$\therefore \frac{3x}{16} = 27$ or $x = \left(\frac{27 \text{ x } 16}{3}\right) = 144$.
Birds killed by A = $\frac{5x}{24} = \left(\frac{5}{24} \text{ x } 144\right) = 30$.

Q64. Answer: B
Explanation: Suppose commodity X will cost 40 paise more than Y after z years.
Then, (4.20 + 0.40z) - (6.30 + 0.15z) = 0.40
$\Rightarrow$ 0.25z = 0.40 + 2.10
$\Rightarrow z = \frac{2.50}{0.25} = \frac{250}{25} = 10$.
$\therefore$ X will cost 40 paise more than Y 10 years after 2001 i.e., 2011.

Q65. Answer: C
Explanation: 5 > 4 and 1/2 > 1/4
$5^{1/2} > 4^{1/4}$
$4^{1/4}$ cannot be the greatest. Hence $3^{1/4}$ also cannot be the greatest.
$3^{7/10} = (3^7)^{1/10} = (2187)^{1/10}$
$5^{1/2} = 5^{5/10} = (5^5)^{1/10} = (3125)^{1/10}$
$6^{1/5} = 6^{2/10} = (6^2)^{1/10} = (36)^{1/10}$
As $(3125)^{1/10} > (2187)^{1/10} > (36)^{1/10}$, $5^{1/2}$ is the greatest.

Q66. Answer: C
Explanation: There are 7 portions (6 small portions of equal size of one half and one half of original ice-cream brick.)
1 small portion = 20 grams
6 small portion = 6*20 = 120 grams
Therefore weight of original ice-cream brick = 120*2 = 240 grams

Q67. Answer: A

Explanation: 17 items were sold out of 36 in A, similarly 15 out of 84,3 out of 504,but 2 are returned back in A,so now we have (15/36)+(15/84)+(3/504) by doing this we get (210+90+3)/504=303/504.

Q68. Answer: C
Explanation: 0.75(200+x)=120+x
150+.75x=120+x => 30=.25x =>x=120.

Q69. Answer: C
Explanation: A. 8p = 2^3 * p ,Perfect cube
B. pq will be a perfect cube since its a product of 2 perfect cubes
C. pq + 27
Not necessarily a perfect cube
if p = 8 and q= 27
pq+ 27 = 8*27 + 27 = 27(8+1)
=3^3 * 3^2=3^5 ,Not a perfect cube
D. -p ,Perfect cube

Q70. Answer: A
Explanation: Use- $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$.

CHAPTER 2 –RATIO,PROPORTION AND PARTNERSHIP

Q1. Answer: C

Explanation: Let their current salaries be 20, 30 and 50 respectively. After increments they are 23, 33 and 60.

Q2. Answer: A

Explanation:

Total No. of Students in a class is 125.

Students who can dance (20% of 125) is = 25

Students who can sing(2/5th of 125) is = 50

Students who are good at sports {2/5th of (125-75)} is =20

Dance : Sports = 25:20 =5: 4

Q3. Answer: B

Explanation: Z will get 5/ (3+2+5)*500 = 250

Q4. Answer: B

Explanation: Ratio of tax=4:5 =>Ratio of Income=5:4

New Income= (10000*4)/5 =8000

Q5. Answer: C

Explanation:

Share of 1 grand child = 1/10 * 1.25 lakhs = 0.125 lakhs

Share of 1 son = 8 * 0.125 lakhs = 1 lakh ==> Share of 3 sons = 3 * 1 lakhs = 3 lakhs

Share of 2 daughters = 2 * 1.25 lakhs = 2.5 lakhs

Total share of two sons and daughters = (3 + 2.5 lakhs) = 5.5 lakhs

Share of wife = 4/10 * 5.5 lakhs = 2.2 lakhs

Q6. Answer: A

Explanation:

Let B gets Rs.x. Then we can say A gets Rs.(x + 20) and C gets Rs.(x + 35)

x + 20 + x + x + 35 = 385 => 3x + 55 = 385 => 3x = 330 => x = 110.

C's share = Rs.(110 + 35) = Rs.145.

Q7. Answer: B

Explanation: A: B: C=2:3:5 =>5x-3x=6000 =>x=3000

A receives 3000*2=6000,B receives 3000*3=9000

Then, the total amount received by A+B=6000+9000=15000

Q8. Answer: A

Explanation: A: (B+C) = 2:3 And B: (A+C) = 3:7

So, A = $\frac{15,600}{5}$ x 2 = Rs. 6240 and B = $\frac{15,600}{10}$ x 3 = Rs. 4680

Thus, C = Rs. 15,600 – (6240 + 4680) = Rs. 4680

Q9. Answer: B

Explanation: Total number of coins = 180

Let x be number of 10p coins and y be number of 25p coins

x+y=180-----(i)

Step (ii) Given 10p coins and 25p coins make the sum = Rs. 36.90

10x/100+25y/100=36.90

10x+25y=3690-----(ii)

Solving (i) and (ii),

10x+10y=1800

10x+25y=3690

=> y=126 and x=54

Q10. Answer: C

Explanation: The easiest way is to check the options first. There is only 1 option which facilitates proper ratio of coins as mentioned, that is 60.

Other Way :

First convert the ratio in 1 Re form

$$\begin{array}{ccccc} 4 & : & 6 & : & 9 \\ \downarrow & & \downarrow & & \downarrow \\ 4x & & 6x & & 9x \\ \times 5 \downarrow & & \times 2 \downarrow & & \times 1 \downarrow \\ 20x & & 12x & & 9x \end{array}$$

Now, total Rs. = 410

$[20x + 12x + 9x] = 410$

$x = 10$

$\therefore$ Value of Rs. 2 coin = 12×10

$= 120$

$\therefore$ No. of Rs. 2 coin = $\frac{120}{2} = 60$

Q11. Answer: C

Explanation: let ratio be x.

Hence no. of coins be 5x ,9x , 4x respectively

Now given total amount = Rs.206

=> (.50)(5x) + (.25)(9x) + (.10)(4x) = 206

we get x = 40

=> No. of 50p coins = 200

=> No. of 25p coins = 360
=> No. of 10p coins = 160

Q12. Answer: B

Explanation: Let number of 50, 20 and 10 paisa coins be 4k, 2k and k respectively.
Total value = Rs.12.50 = 1250 paisa
4k×50 + 2k×20 + k×10 = 1250 =>200k + 40k + 10k = 1250
=>250k = 1250 =>k=5
Number of 10 paisa coins = k = 5
OR
50×4x+20×2x+10×1x=250x
1250 / 250 = 5
so x=5 which is the no. of 10 paise coins.

Q13. Answer: C

Explanation: Let the number of 25 p, 10 p and 5 p coins be x, 2x, 3x respectively.

Then, sum of their values = Rs. $\left(\frac{25x}{100} + \frac{10 \times 2x}{100} + \frac{5 \times 3x}{100}\right)$ = Rs. $\frac{60x}{100}$

$\therefore \frac{60x}{100} = 30 \Leftrightarrow x = \frac{30 \times 100}{60} = 50.$

Hence, the number of 5 p coins = (3 x 50) = 150.

Q14. Answer: C

Explanation: Amount received by Mahinder = (Related Ratio/Sum Ratio)*Total Amount
= (6*4200)/12 = 2100

Q15. Answer: C

Explanation: Let the incomes of the four persons A, B, C and D be 5x, 3x, 9x, 4x respectively.
Sum of the incomes of A and C is 84000
14x = 84000
=>x = 6000
Therefore, the difference of the incomes of B and D will be (4x-3x) = x = 6000

Q16. Answer: B

Explanation: Let the incomes of A & B be 3x and 4x and their expenditures be 2y and 3y respectively.
Thus, 3x – 2y = 4x – 3y = 200
Solving this, we get x = 200
So incomes of A & B are 600 and 800.

Q17. Answer: B

Explanation: Ratio their salary is 4:5
Let the original salary of Ramu and Raju be 4k and 5k respectively.

After increasing Rs.6000, the ratio becomes 48:55
That is, (4k+6000)/(5k+6000) = 48/55
55(4k+6000) = 48(5k+6000)
=>220k+330000 = 240k+288000 =>20k= 42000
We have to find the original salary of Raju; that is, 5k.
If 20k = 42000 then 5k = 10500.
Hence the required answer is Rs.10500

Q18. Answer: B
Explanation:

4x/(9x + 32) = 4/17 =>68x = 36x + 128 => x = 4.

So the number of boys in the school is (4 x 4) = 16.

Q19. Answer: B
Explanation: Ratio of Pass: Fail=25:4=25x: 4x
New Ratio=(25x+7):(4x-2)=22:3
No. of students passed increased by 7 because 5 more appeared and 2 less failed.
75 x+21=88x-44
=>13x=65 => x=5
Therefore, no. of students appeared initially =25x+4x=125+20=145

Q20. Answer: C
Explanation:

Let the students in the three classes be 2x, 3x and 5x respectively.

Then, 2x+20+3x+20+5x+20 = 4x+5x+7x

10x + 60 = 16x => 6x = 60 => x= 10.

Therefore, total number of students in the three classes before the increase will be 2x+3x+5x=10x=100.

Q21. Answer: D
Explanation:

Let the number of male participants and the number of female participants be 3x and 1x respectively.

Now, 3x + x – 16 + 6 = 2x + x => x = 10; (since 16 participants left and 6 participants registered).

Therefore, the total number of participants at the start of the seminar will be (3x +x = 4x) 40.

Q22. Answer: B
Explanation:

Let the numerator and denominator of a fraction be 2x, 3x respectively.

$2x-6/3x = 2/3 \times 2x/3x \Rightarrow 6x - 18 = 4x \Rightarrow x = 9.$

Thus, numerator = 2x = 18.

Q23. Answer: A

Explanation: Ratio of fares=3:1

Ratio of Passenger=1:50

Ratio of Money=3:50

Required Amount=(50*1325)/53 =1250

Q24. Answer: A

Explanation:

Let C Subscribe = x, then B = (x + 5000) and A = (x + 5000) + 4000

Total = x + (x +5000) + (x + 5000) + 4000 = 50000

=> 3x + 14000 = 50,000 => 3x = 36,000 => x = 12000

=> Ratio of shares of A: B: C = 21000: 17000: 12000 = 21: 17: 12

Therefore, A's share = 21/ 50 * 35000 = Rs. 14700

Q25. Answer: B

Explanation:

Since periods for which the two amounts are invested, are same.

Therefore, Ratio in which profit is to distributed between A and B is 30000: 50000 = 3: 5

Therefore, A's share in profit = (3/8) * 4000 = Rs. 1500

Q26. Answer: A

Explanation:

(7000*12) / (x*7) = 2/3 => x = 7000*3*12 / (7*2) = 18000

Q27. Answer: C

Explanation: Let the total profit be Rs. x. Then, B = 2x/7 and A = (x - 2x /7) = 5x / 7.

So, A : B = 5x/7 : 2x/7 = 5 : 2.

Let B s capital be Rs. y. Then, (16000 * 8) / (y * 4) = 5/2 <=> (16000 * 8 * 2) / (5 * 4) = 12800..

Q28. Answer: A

Explanation:

Capitals of A, B and C are invested for 12, 8 and 4 months respectively.

Profit sharing ratio = (50000*12) : (60000*8) : (90000*4) = 5: 4: 3

A's share in profit = 5/12 * 36000 = Rs. 15000

Q29. Answer: B

Explanation:

Investment for the 1st year= 5: 6: 8

A's capital for second year = 5 + 60% of 5 = 5+ 3 = 8

C's capital for second year = 8 – 50% of 8 = 8 – 4 = 4

Therefore, Required ratio = (5+8): (6+6): (8+4) = 13: 12: 12

Q30. Answer: A

Explanation:

Ratio of capitals = 45000: 54000 = 5: 6 => Ratio of profits = 2: 1

Therefore, Ratio of periods = Ratio of profits/ Ratio of capitals = 2/5 : 1/6 = 12: 5 => B joined after 7 months.

Q31. Answer: B

Explanation: Ratio of the initial capital of A and B=4:5

Ratio in which profit will be divided

= (4x * 3) + 3/4 * 4x * 7: (5x * 3) + 4/5 * 5x * 7

= (12 + 21) : (15 + 28) = 33: 43

Type 6 - Partnership with Ratio

Q32. Answer: C

Explanation:

Simply multiply profit sharing ratio with investment ratio to get investment amount ratio.

Let X is the total investment

⇒14 x = 5; 8 x = 7; 7x = 8

⇒ Final investment ratio = 20: 49: 64

Q33. Answer: D

Explanation: Let the total profit be Rs. 100.

After paying to charity, A's share = (95*3/5) = Rs. 57.

If A's share is Rs. 57, total profit = Rs. 100.

If A's share is Rs. 855, total profit = (100/57*855) = 1500.

Q34. Answer: A

Explanation: Assume, investment of C=x

Investment of A=2x

Investment of B=4x/3

A:B:C=2:4/3:1 =>6:4:3

B's share =157300× 4/(6+4+3) =157300 × 4/13 = 12100 × 4 = 48400

Q35. Answer: C

Explanation: Let the total profit be Rs. z. Then,

B's share = Rs. 2z/3, A's share = Rs. (z - 2z/3) = Rs. z/3.

A : B = z/3 : 2z/3 = 1:2

Let the total capital be Rs, X and suppose B's money was used for x months. Then.

(1(x) / 4 * 15) / (3x) / 4 * y) = 1/2 <=> y = (15 * 2 / 3) = 10 .

Thus, B's money was used for 10 months.

Q36. Answer: A

Explanation: Ratio of capitals=5:6:8

Ratio of share in profit=5:3:12

Therefore, Ratio of periods = Ratio of profits / Ratio of capitals = 5/5: 3/6: 12/8 = 1: 1/2: 3/2 = 2: 1: 3

Q37. Answer: B

Explanation: Ratio in which profit would be divided = A:B:C

= (4000 x 2) : (3000 x 2) : (4000 x 1.5) = 4:3:3

Share of B = 3/10 x 5000 = 1500

Q38. Answer: A

Explanation:

Ratio in which profit is to distributed between A and B = 100000 * 3: 200000 * 2 = 3: 4

Therefore, Difference in their share in profit = (4-3) / (3+4) * 84000 = Rs. 12000

Q39. Answer: C

Explanation:

P: Q: R = 120000:135000:150000 =120:135:150=24:27:30=8:9:10

Share of P = 56700 × 8/27 = 2100 × 8 = 16800

Share of Q = 56700 × 9/27 = 2100 × 9 = 18900

Share of R = 56700 × 10/27 = 2100 × 10 = 21000

Q40. Answer: A

Explanation: Try to solve it with the help of options.

Q41. Answer: C

Explanation:

Suppose there are all the pigeons then total no of heads are 340 and total no of legs are 680.

Now, since 380 (1060-680) legs are extra, it means there will be 190 (380/2) rabbits. As we know a rabbit has two extra legs than that of a pigeon.

Therefore, number of rabbits =190 and number of pigeons = 340- 190 = 150

Q42. Answer: A

Explanation: Let the two angles be 5x and 9x.

Therefore,110+5x+9x=180 => x=5

The difference of the other two angles will be (9x-5x) = 4x = 20 Degree

Q43. Answer: A

Explanation: Days of working = 30:50:40

Each day salary = 4:3:2

Total Income = 120:150:80 =12:15:8

12 units=144

1 unit = 12

Income of B =12*15=180

Q44. Answer: C

Explanation: The ratio of expenditures is 4:6:8. If we add these up it comes down to 18 which when multiplied by 40 leads to our number 720. So the expenditure on train is 40*4 = 160.

Q45. Answer: D

Explanation: Suppose Ramesh invested Rs. x. Then,

Manoj : Ramesh = 20000 * 6 : x * 12.

120000/12x : 6000/3000

=> x = 120000/24 = 5000

Q46. Answer: D

Explanation: Just take care of the months of investment, rest all will be simple.

Yogesh:Pranab:Atul = 45000*12:60000*9:90000*3 = 2:2:1

Atul's share = Rs. 20000 * (1/5) = Rs. 4000

Q47. Answer: D

Explanation: A:B = 3:2 = 6:4

=> A:C = 2:1 = 6:3 => A:B:C = 6:4:3

B share = (4/13)*157300= 48400

Q48. Answer: B

Explanation: Let the ages of raju and Biju is 3x and x years respectively.

Then, (3x +15)/ (x+15) = 2/1; -> 2x + 30 = 3x + 15 -> x = 15

So, Raju's age = 3*15 = 45 and Biju's age = 15 years

Q49. Answer: A

Explanation: Ratio of time taken: 1/6:1/5: 1/4 = 10: 12 : 15

Q50. Answer: B

Explanation: 10% of MS = 1/4th of FS -> 10MS/100 = 1/4FS => MS = 5/2 FS

:. MS/FS = 5/2 = MS: FS = 5: 2

Q51. Answer: B

Explanation: Let the fixed amount be Rs. X and the cost of each unit be Rs. Y.

On subtracting (i) from (ii), we get 80y = 240 -> y = 3

Putting y = 3 in (i) we get:

540 * 3 + x = 1800 x = (1800-1620) = 180

Fixed charges = Rs.180, Charge per unit = Rs.3.

Total charges for consuming 500 units = 180 +(500*3) = Rs.1680

Q52. Answer: C

Explanation: Let the income of P1 and P2 be Rs. 5x and Rs.4x respectively and let their expenditure be Rs.3y and 2y respectively.

Then, 5x – 3y = 1600 …(i) and 4x – 2y = 1600 ……..(ii)

On multiplying (i) by 2, (ii) by 3 and subtracting, we get : 2x = 1600 -> x = 800

P1's income = Rs 5*800 = Rs.4000

Q53. Answer: A

Explanation: Originally, let the number of seats for Computer science, electronics and civil are 5x : 7x : 8x respectively. Number of increased seats are (140% of 5x), (150% of 7x) and (175% of 8x)

7x : 21x/2 : 14x = 14x : 21x : 28x = 2 : 3 : 4.

Q54. Answer: C

Explanation:

Ratio of investment = 1/2:1/3:1/6 = 3:2:1

Let investment of Ram, Sham and Suresh be 3x, 2x and x respectively.

Ratio of time period = 8:6:12

Let time period of Ram, Sham and Suresh be 8y, 6y and 12y respectively.

Profit = Investment x Time Period

Ratio of Profit of Ram, Sham and Suresh = 3x x 8y:2x x 6y:x x 12y = 2:1:1

Profit of Ram = 18000 x 2/4 = 9000

Q55. Answer: C

Explanation:

Originally, let the number of boys and girls in the college be $7x$ and $8x$ respectively.

Their increased number is (120% of $7x$) and (110% of $8x$).

$\Rightarrow \left(\frac{120}{100} \times 7x\right)$ and $\left(\frac{110}{100} \times 8x\right)$

$\Rightarrow \frac{42x}{5}$ and $\frac{44x}{5}$

$\therefore$ The required ratio = $\left(\frac{42x}{5} : \frac{44x}{5}\right)$ = 21 : 22.

Q56. Answer: B

Explanation:

$$\frac{4}{15}A = \frac{2}{5}B$$

$$\Rightarrow A = \left(\frac{2}{5} \times \frac{15}{4}\right)B$$

$$\Rightarrow A = \frac{3}{2}B$$

$$\Rightarrow \frac{A}{B} = \frac{3}{2}$$

$$\Rightarrow A : B = 3 : 2.$$

$$\therefore \text{ B's share} = \text{Rs. } \left(1210 \times \frac{2}{5}\right) = \text{Rs. } 484.$$

Q57. Answer: D

Explanation: CP of A and B is 4x and 5x and SP is 5:6.

Given that, Profit of A(Pa)=1/2(4x)=2x and Profit of B=Pb.

We know that , SP=CP + Profit.

=> (4x+2x)/(5x+Pb)=5/6

=>6x*6=25x+5Pb =>Pb= (11/5)x

So, the ratio of Pa/Pb=10/11.

Q58.Answer: C

Explanation: Let the shares of A, B, C and D be Rs. 5x, Rs. 2x, Rs. 4x and Rs. 3x respectively.

Then, 4x - 3x = 1000

$\Rightarrow$ x = 1000.

$\therefore$ B's share = Rs. 2x = Rs. (2 x 1000) = Rs. 2000.

CHAPTER 3 – PERCENTAGES

Q1. Answer: B

Explanation: His saving in Percentage is 33 (1/3) % and it is equal to 1200

Therefore, x * (100/3%) = 1200

=> x/3 = 1200 => x = 3600

And expense = 3600 - 1200 = 2400

Q2. Answer: C

Explanation: 0.8 x A = 0.5 x B => A/B=5/8

Now, B=X% of A => B/A= X/100

=> X= (B/A)*100=(8/5)*100=160.

Q3. Answer: D

Explanation: Given That, x=80% of y =>x=(80/100)*y=(4/5)y

Now, (y/x)*100=(5/4)*100=125%.

Q4. Answer: C

Explanation: 50% of (x -y) = 30 of (x +y)

=>50 (x -y) = 30 (x +y) =>50x - 50y = 30x + 30y

=>20x = 80y =>y/x = 20/80

=> % of x is y = (20*100)/80 = 25%.

Q5. Answer: C

Explanation: A = 2B and B = 3C

=> A = 6C => 500% more

Q6. Answer: D

Explanation: Let x is the maximum marks of the examination

Marks that Arun got = 30 % of x = 30x/100

Given that Arun failed by 10 marks

⇒Minimum Pass Mark =(30x/100)+10.....(Equation 1)

Marks that Sujith got = 40 % of x = 40x/100

Given that Sujith got 15 marks more than the passing marks

⇒40x100=Minimum Pass Mark +15

⇒Minimum Pass Mark =(40x/100)−15.....(Equation 2)

From equations 1 and 2,we have

=>(30x/100)+10=(40x/100)−15

⇒10x/100=10+15=25 ⇒x/10=25 ⇒x=10×25=250

⇒Maximum marks of the examination = x = 250

Substituting the value of x in Equation 1, we have

Minimum Pass Mark = (30x/100)+10=(30×250/100)+10=75+10=85

Short Cut: Difference in % = Difference in marks
(40-30)%=+10-(-15) => 10%=25 =>100%=250.

Q7. Answer: A

Explanation: P = 6q. Difference between p and q = (p) - q = (6q) - q = 5q.
Now q is less than p by 5q.
=> [(5q)/(p)] x 100= [(5q)/(6q)]x100 = (5/6)x100 = 250/3 % = 83 1/3 %.

Q8. Answer: B

Explanation: Let us assume that Chandar's score = 100
Given that, Rafi's score is 10% less than that of Chandar.
Rafi's score = 90
Dipin's score is 15% more than that of Rafi.
Dipin's score = 115% of 90 = 115/100 x 90 = 103.5
Now, the difference between the scores of Dipin and Chandar = 103.5 - 100 = 3.5.
If the difference between the scores of Dipin and Chandar is 3.5 then Rafi's score = 90
If the difference is 14, then Rafi's score = 90/3.5 x 14 = 360
Hence, the required answer is 360.
Short Cut: (115/100)R – (100/90)R=14 =>R=360.

Q9. Answer: D

Explanation: Actual Number: 5/3 X
Wrong Number: 3/5 X
Error: 5/3 X – 3/5 X = 16/15 X
Error% = (Error/True Value) x 100 = (16/15 X) / (5/3 X) * 100 = 64%

Q10. Answer: C

Explanation: We are given that Ritesh & Co. generated revenue of Rs. 1,250 in 2006 and that this was 12.5% of the gross revenue. Hence, if 1250 is 12.5% of the revenue, then 100% (gross revenue) is:
(100/12.5)×1250=10,000
Hence, the total revenue by end of 2007 is Rs. 10,000. In 2006, revenue grew by Rs. 2500. This is a growth of:
(2500/10000)×100= 25%.

Q11. Answer: B

Explanation: 4% of a=8 => a=200
and 8% of b=4 =>b=50
=> c=b/a=50/200=1/4.

Q12. Answer: D

Explanation: 5A + 4B = (2/3)*(6A + 8B)
=> 15A + 12B= 12A + 16B => 3A=4B => A : B=4 : 3.

Q13. Answer: B

Explanation: let there are 100 candidates. Now, 5% are ineligible therefore 95 candidates are eligible .it is given in question that 85% are general then 15% are of other categories. So 15% of 95 of total is 4375

=>14.25=4375
=>100%=30000 which is answer.

Q14. Answer: B

Explanation: Scores made by boundaries and sixes = 3x4 + 8x6 = 60
Score made by running = 110 – 60 =50
Required % = (50/110) x 100 = 45.45% or 45 5/11%.

Q15. Answer: C

Explanation: Let marks of A = Marks of B + 9
Percentage marks of A = 56% of (Marks of A + Marks of B)
=> A = 0.56 x (A + B) => A = 0.56 x (A + A – 9)
=> 5.04 = 0.12 A => A = 42.

Q16. Answer: B

Explanation: Let the original value be x
Final value = 110% of (90% of x) = 0.99 x
Difference = x – 0.99 x = 0.01 x
Hence, the net effect on price is -1%.
Short Cut: Successive % change= [X+Y+(XY/100)]= 10-10-(10*10/100)=-1%.

Q17. Answer: B

Explanation: decrease in salary in single shot =38.8%
first decease =20% let the salary be 100 then it will become 80
2nd decrease is= 15%. 15% of 80 =12 then salary become 68
3rd decrease is of 10% . 10% of 68 =6.8.then salary become 61.2
so overall decrease=38.8%
Short Cut: Use the successive % change formula twice.

Q18. Answer: D

Explanation: 15-15-(15*15/100)=-2.25%.

Q19. Answer: D

Explanation: If with 20% increase, the salary reaches Rs. 6720 => Last year salary was Rs. 6000
With 20% increase, the salary would reach: 1.2 x 6000 = Rs. 7200.

Q20. Answer: B

Explanation: 50-50-(50*50/100)= -25%.

Q21. Answer: D

Explanation: Let the original money be Rs. X.
Money received by each daughter = 224
= $1/3^{rd}$ of (X * 70/100) * 60/100
=> X = 1600
=> Money received by wife = 30% of 1600 = Rs. 480.

Q22. Answer: A

Explanation: Let number of males be X and number of females be (8000 – X).

Then, 110 % of X + 108% of (8000-X) = 109% of 8000

Alternate Way: By Alligation.

Ratio of Men to Women = (Overall change – Women Change) : (Men Change – Overall Change)

= 1:1

Hence, number of men be 4000.

Q23. Answer: C

Explanation: R*100/(100+R)= 20*100/120=16 2/3%.

Q24. Answer: D

Explanation: R*100/(100-R)=30*100/70=300/7%.

Q25. Answer: A

It is based on inverse proportion or product constancy concept. Reduction in price 20% amount of sugar will increase 25%.

It means,25% = 6 Kg. So,

Initially, total Sugar = 6*4 = 24Kg. Thus,

Original price of the sugar was,

240/24 = Rs. 10 per kg

Q26. Answer: B

Explanation: Here question mentions 2 kg for rupees 100...so 1 kg will cost Rs 50

Increased Price per kg **=** (55 x 10)/100 = Rs 5.5 /Kg

Original Price per kg =(5.5 x 100)/ 110 = Rs 5/kg

Q27. Answer: C

Explanation: Let price be 100 and consumption = 100

Total cost = 100 × 100 = 10000 ; Increased price = 125

Then consumption in 10000 = 10000/125 = 80

Reduction = 100 – 80 = 20

% reduction = 20/100 × 100 = 20%

Q28. Answer: B

Explanation: Let the number of apples be 100.

On the first day he sells 60% apples i.e., 60 apples. Remaining apples =40.

He throws 15% of the remaining i.e., 15% of 40 = 6.Now he has 40-6 = 34 apples

The next day he throws 50% of the remaining 34 apples i.e., 17.

Therefore in total he throws 6 + 17 = 23 apples.

Q29. Answer: C

Explanation: Let total number of men = 100
Then, 80 men are less than or equal to 50 years old
(Since 80% of the men are less than or equal to 50 years old)
=> 20 men are above 50 years old (Since we assumed total number of men as 100)
20% of the men above the age of 50 play football
⇒Number of men above the age of 50 who play football = 20 × 20/100 = 4
Number of men who play football = 20 (Since 20% of all men play football)
Percentage of men who play football above the age of 50 = (4/20) x 100 = 20%
=> Percentage of men who play football less than or equal to the age 50 = 100%−20%=80%

Q30. Answer: A

Explanation: Total money = $Rs.(600 \times \frac{25}{100} + 1200 \times \frac{50}{100})$ = Rs. 750.
25 paise coins removed = $Rs.(600 \times \frac{12}{100})$= 72.
50 paise coins removed = $Rs.(1200 \times \frac{24}{100})$= 288.
Money removed = $Rs.(72 \times \frac{25}{100} + 288 \times \frac{50}{100})$ = Rs.162.
Required percentage = $(\frac{162}{750} \times 100)$% = 21.6 %.

Q31. Answer: C
Explanation: Let the percentage of the total votes secured by Party D be x%
Then the percentage of total votes secured by Party R = (x - 12)%
As there are only two parties contesting in the election, the sum total of the votes secured by the two parties should total up to 100%
i.e., x + x - 12 = 100
2x - 12 = 100 or 2x = 112 or x = 56%.
If Party D got 56% of the votes, then Party got (56 - 12) = 44% of the total votes.
44% of the total votes = 132,000. i.e., 44/100*T = 132,000
=> T = 132000*100/44 = 300,000 votes.
The margin by which Party R lost the election = 12% of the total votes
= 12% of 300,000 = 36,000.

Q32. Answer: C
Explanation: Let the number of participants participated from team A = 100.
Percentage of participants qualified to the number of participants participated from team A is 60%. So, number of participants qualified from team A = 60.
And, the number of participants participated in team B is 40% more than the participants participated from team A.
Number of participants participated from team B = 40% more than 100 = 140.
Also, the number of participants qualified from team B is 40% more than the participants qualified from team A.
Number of participants qualified from team B = 40% more than 60 = 140% of 60
= 140 x 60 / 100 = 84.
Therefore, the percentage of participants qualified to the number of participants participated from team B =

Participants	Qualified
140	84
100	?

Required percentage = 84/140 x 100 = 60%.

Q33. Answer: A

Explanation: If after getting 178 marks fail by 22 marks, that means a barely-passing grade is 178 + 22 = 200 marks.
We're told that the minimum passing score is 40%, so 200 is equal to 40% of the maximum marks.
In other words: 200 = 0.4x => 500 = x
So, the maximum score is 500.

Q34. Answer: D

Explanation: Let the total number of employees be p.
Number of men earning more than 25,000 = 0.4×0.75×p
Number of women earning more than 25,000 =0.45p−(0.4×0.75×p)
Number of women employed by company =0.6p
Number of women earning Rs.25,000 per year or less,=0.6p−(0.45p−0.4×0.75×p)=0.45p
Fraction of women earning Rs.25,000 or less =0.45p/0.6p=3/4

Q35. Answer: D

Explanation: Let total no of books be X
Then, 70% of (50% of (80% of X)) = 6300 => X = 22500

Q36. Answer: D

Explanation: Let there be x voters and k votes goes to loser then
=>0.8x - 120 = k + (k + 200) =>k+200 = 0.41x
=> k = 1440 and (k + 200) =1640. Therefore, (1440/3200) x 100 = 45%

Q37. Answer: B

Explanation: Let original consumption = 100 kg and new consumption = x kg,
So, 100 * 6 = x * 7.50 => x = 80kg. Reduction in consumption = 20%.

Q38. Answer: C

Explanation: The fruit content in both the fresh fruit and dry fruit is the same.
Given, fresh fruit has 68% water. So, remaining 32% is fruit content.
Weight of fresh fruits is 100kg.
Dry fruit has 20% water. So, remaining 80% is fruit content. Let weight if dry fruit be y kg.
Fruit % in fresh fruit = Fruit % in dry fruit. Therefore, (32/100) x 100 = (80/100)x y. We get, y = 40 kg.

Q39. Answer: A

Explanation: Rebate = 6% of Rs. 6650 = Rs. (6/100) x 6650 = Rs. 399.
Sales tax = 10% of Rs. (6650 - 399) = Rs. (10/100) x 6251 = Rs. 625.10
Final amount = Rs. (6251 + 625.10) = Rs. 6876.10

Q40. Answer: A

Explanation: Original cost = 30000
for 1st year 12,000 depreciates means 52500-10000 = 18000

and then after depreciates 3% every year so 11 * (3/100) * 30000 = 9900
after 8 years it amounts to 18000-9900 = 8100.

Q41. Answer: D
Explanation: Ratio of maximum marks = 1 : 2 : 2
Ratio of marks obtained = (0.5 x 1) : (0.6 x 2) : (0.65 x 2) = 0.5 : 1.2 : 1.3
Overall percentage=[(0.5+1.2+1.3)/(1+2+2)]*100=60%.

Q42. Answer: D
Explanation:

Sol. Required ratio $= 4V_A d_A : 7V_B d_B$

$$= \frac{4V_A d_A}{d_B} : 7V_B$$

Where d is density of the substance
Given $117d_A = 151d_B$

$$\therefore \frac{d_A}{d_B} = \frac{151}{117}$$

Now with $7V_B$ of substance B, $4V_A$ of substance A is used in place of $4V_A \times \frac{151}{117}$

$\Rightarrow$ % error $\frac{34}{117} \times \frac{117}{151} \times 100 \approx 22\%$

Q43. Answer: A
Explanation:

Sol. Suppose Tito's salary = x
Tom's salary = y and Tina's salary = z
$\therefore y = 125\%$ of $z = \frac{5z}{4}$
$x = 80\%$ of $z = \frac{4}{5}z \Rightarrow z = \frac{5}{4}x$

$$\therefore y = \frac{5z}{4} = \frac{5}{4} \times \frac{5}{4}x = \frac{25}{16}x$$

Also $x + y + z = 61000$

$$x + \frac{25}{16}x + \frac{5}{4}x = 61000$$

$X = 16000$

Q44. Answer: C
Explanation:

Sol. Number of pens removed
= 12% of 600 + 25% of 1200
= 72 + 300 = 372
$\therefore$ Percentage of total pens removed

$$= \frac{372}{1800} \times 100 = 20.67 = 22$$

Q45. Answer: A
Explanation:

Sol. Let his monthly salary be Rs. x

He spends Rs. 0.4x on educational expenses, Rs. 0.24x on purchasing books and Rs. 0.8x on purchasing stationary items.

Remaining amount = 0.4x - (0.24x + 0.08x)

= Rs. 0.08x

Also, $\frac{1}{4} \times 0.08x = 160$

$\therefore x = \frac{160 \times 4}{0.08}$ = Rs. 8000

CHAPTER 4 - PROFIT AND LOSS

Q1. Answer: D
Explanation: S. P. = 100 and C. P = 96
So, Profit = 4 Rs
% Profit= 4X100/96= 4.166 %

Q2. Answer: A
Explanation: Let the S.P. of pressure cooker = Rs. X .
So, C.P of pressure cooker = Rs. 9x/10.
Receipt=108% of Rs. X = Rs 27x/25
Gain=Rs (27x/25*9x/10) = Rs (108x-90x/100) = Rs18x/100
Gain %=(18x/100*10/9x*100) %=20%

Q3. Answer: C
Explanation:
Suppose, number of oranges bought = LCM of 6 and 4=12
CP=Rs. [(10/6)*12] =Rs.20
SP= Rs [(6/4)*12] =Rs.18
Loss %=[(2/20)*100] %=10%

Q4. Answer: B
Explanation: C.P. of 6 toffees = Re. 1

S.P. of 6 toffees = 120% of Re. 1 = Rs. $\frac{6}{5}$

For Rs. $\frac{6}{5}$, toffees sold = 6.

For Re. 1, toffees sold = $\left(6 \times \frac{5}{6}\right)$ = 5.

Q5. Answer: A
Explanation:

Solution: Given: cost price = Rs. 15, selling price = Rs. 40

Profit = selling price – cost price = Rs. 40 – 15 = Rs. 25

the profit as a percentage of the cost price:

$$\text{Profit \%} = \frac{\text{profit}}{\text{cost price}} \times 100\%$$

$$= \frac{25 \times 100}{15}\% = 166.7\%$$

Q6. Answer: B
Explanation: Apply the basic loss percentage formula.

Q7. Answer: C
Explanation: CP=SP+LOSS=100+10=110
LOSS %= (10/110) x 100=100/11.

Q8. Answer: D
Explanation: Let C.P. be Rs. x and S.P. be Rs. y.
Then, 3(y - x) = (2y - x) $\Rightarrow$ y = 2x.
Profit = Rs. (y - x) = Rs. (2x - x) = Rs. x.
$\therefore$ Profit % = $\left(\frac{x}{x} \text{ x } 100\right)\%$ = 100%

Q9. Answer: B
Explanation: Selling price = 125% of 319.60 = (125/100) * 319.60
= 399.50= 400 Rs

Q10. Answer: B
Explanation: C.P. of 56 kg rice = Rs. (26 x 20 + 30 x 36) = Rs. (520 + 1080) = Rs. 1600.
S.P. of 56 kg rice = Rs. (56 x 30) = Rs. 1680.
Gain =(80/1600*100) % = 5%

Q11. Answer: B
Explanation: Let S.P. of 45 lemons be Rs. X
Then, 80 : 40 = 120 : x
Thus x = 60
For Rs. 60, lemons sold = 45
For Rs. 24, lemons sold = $\frac{45}{60} \times 24 = 18$

Q12. Answer: A
Explanation: Let C.P of each article be Re. 1.
Then C.P of 18 articles = Rs. 18,
S.P of 18 articles = Rs. 21.
Gain % = (3/18 * 100) % = 50/3

Q13. Answer: A

Explanation: 320 SP=400CP => SP/CP=400/320=5/4
Profit %= 1/4 x 100=25%.

Q14. Answer: B
Explanation: 30CP=20SP
=> CP/SP=20/30=2/3
Profit %= ½ *100=50%

Q15. Answer: A
Explanation:

$$\text{Gain\%} = \left(\frac{\text{Error}}{\text{True value} - \text{Error}} \times 100\right)\%$$

Gain%= (100/900) x100 = 11.11%

Q16. Answer: A
Explanation: Here the cost price of the sugar is Rs 25/kg and the selling price is Rs 23/kg. So the loss is Rs 2/kg and the loss percentage = 2/25 x 100 = 8%
The profit due to wrong weight = 200/800 x 100 = 25%
Hence the overall profit and loss is given by {P + Q + (PQ/100)}
But as he is making loss of 8% in the first case so we put -8 in the above expression. If the final value is positive then he is making profit otherwise loss. So the net profit and loss =
{25 – 8 + {25 x (-8)}/100} = 25 – 8 – 2 = 15%
As the final value is positive so he is making a profit of 15%.

Q17. Answer: B
Explanation: Let us assume his CP/1000 gm = Rs 100
So, his SP/kg (800 gm) = Rs 126. His CP/800 gm = Rs 80 => profit = Rs 46
So, profit percentage = 46/80 x 100 = 57.5%

Q18. Answer:
Explanation: Using the formula,

$$\text{Gain \%} = \left[\frac{100 \times \text{excess}}{(\text{original value} - \text{excess})}\right]$$

$$\Rightarrow \frac{100}{8} = \left[\frac{100 \times \text{excess}}{(1 - \text{excess})}\right]$$

From here, Excess = 0.111.. Kg, which is 111.11 grams

Weight used by shopkeeper = 1000 – 111.11 = 888.89 grams

Q19. Answer: D
Explanation: In this case there will be always loss. The selling price is immaterial Hence, loss % = (common loss and gain %) 2 /10 = (162/10) % = (64/25) % = 2.56%

Q20. Answer: B
Explanation: TRY BY YOURSELF.SAME AS Q19.

Q21. Answer: A

Explanation: CP(100+P% OR L%)=MP(100-D%) => CP= [80 X (100-10)]/(100+20)=80x90/120=60.

Q22. Answer: A
Explanation: MP=100*SP/(100-D%). So, MP=100y/(100-x)

Q23. Answer: C
Explanation:

Solution: (c) Let C.P. = Rs. 100, then S.P. = Rs. 120

Also, Let marked price be Rs. x. Then, 90% of x = 120

$\Rightarrow x = \frac{120 \times 100}{90} = 133\frac{1}{3}$

∴ M.P. should be Rs. $133\frac{1}{3}$

or M.P. = $33\frac{1}{3}\%$ above C.P.

Q24. Answer: B
Explanation:

Solution: let the first discount be x%.
Then, 87.5% of(100-x)% of 300 =210.
87.5/100 * (100-x)/100 of 300 =210 ==> 100-x = 210*100*100/(300*87.5) = 80 ==> x = (100-80) = 20.
∴ First discount = 20%.

Q25. Answer: A
Explanation: SUCCESIVE DISCOUNT= D1 +D2- (D1*D2/100) = 40+20-(40*20/100) = 52%.

Q26. Answer: B
Explanation:

Solution: (2): Price of the article after first discount = 65 – 6.5 = Rs. 58.5

Therefore, the second discount

$= \frac{58.5 - 56.16}{58.5} \times 100 = 4\%$

Q27. Answer: A
Explanation: Cost Price = Rs. $\frac{100}{125}$ x 8750 = Rs. 7000.
Let the labeled price be Rs. X
Then, $\frac{70}{100}$ × X = 7000
X = Rs. 10,000

Q28. Answer: A
Explanation: Raj got 35% discount.
If there was no discount, Raj would pay Rs. 224.
This means giving 35% discount = Rs. 224 off.
Thus, 35% of marked price = Rs. 224
Marked Price = Rs. 640
Raj Paid = 640-224 = Rs. 416

Q29. Answer: B
Explanation:

Here there is no need to consider the amount.

Simply find maximum discount in % and we get the answer.

Tip:

Single equivalent of 2 discounts = **ADD** – $\frac{\textbf{MULTIPLY}}{100}$

Option 1 – 5% and 5%

Single Equivalent = $(5+5) - \frac{5x5}{100} = \mathbf{9.75\%}$

Option 2 – **10%** ⟶ **MAXIMUM DISCOUNT**

Option 3 – 8% and 2%

Single Equivalent = $(8+2) - \frac{8x2}{100} = \mathbf{9.84\%}$

Q30. Answer: B
Explanation:

30% discount on 200 = 30% of 2000 = **Rs. 600**

25% discount on 2000 = 25% of 2000 = **Rs. 500**

Remaining amount = 2000-500 = Rs. 1500

Second discount of 5% = 5% of 1500 = **Rs. 75**

Total discount = 500+75 = **Rs. 575**

So difference in discounts = Rs. 600 - Rs. 575 = **Rs. 25**

Q31. Answer: B
Explanation:

Let the initial price be Rs. 100

They increased price by 40%

So, **New price** = 100+40% = 140% of Rs. 100 = **Rs. 140**

Now to have no profit no loss situation, Chandrika must give Rs. 40 off.

How much percent is Rs. 40 of Rs. 140?

Chandrika must give $\frac{40}{140} \times 100 \cong$ **28.5% discount**

Q32. Answer: A
Explanation:

Let the original price be Rs. 100. Then, C.P. = Rs. 80

S.P. = 140% of Rs. 80 = Rs. $\left(\frac{140}{100} \times 80\right)$ = Rs. 112

∴ Required percentage = (112 - 100)% = 12%

Q33. Answer: C
Explanation: Let original Cost price is x
Its Selling price = (105/100) * x = 21x/20
New Cost price = (95/100) * x = 19x/20

New Selling price = (110/100)* (19x/20)= 209x/200
[(21x/20) - (209x/200)] = 1 => x = 200

Q34. Answer: C
Explanation: 103.33 CP- 0.95 CP = 65
CP = Rs. 780
profit (%) = (936 - 780)/780 x 100 = 20%

Q35. Answer: C
Explanation: Let the new S.P be x, then
(100 - loss%) : (1st S.P.) = (100 + gain%) : (2nd S.P.) ⇒(951140=105x)

$\Rightarrow \frac{95}{1140} = \frac{105}{x}$ => x = 1260

Q36. Answer: C
Explanation:

Initially	CP	profit	SP	MP
	100	x	(100+x)	133.33
After Change	100	2x	(100+x)	

Now, Since (100+x) - 100 = 2x

$\frac{7}{6}$ x= 20%

	CP	Profit	SP	MP
	100	20	120	133.33
So,	300	60	360	400
Again	300	120	420	

So the increased selling price = Rs. 420

Q37. Answer: A
Explanation: Total investment = Rs. (120 * 80 + 280 + (40/100) * 120 + 72).
= Rs. (9600 + 280+48 + 72) = Rs, 10000.
Sell price of 120 reams = 108% of Rs. 10000 = Rs. 10800.
Sell Price per ream = Rs. [10800/120] = Rs. 90.

Q38. Answer: B
Explanation: Let the cost of Production = Rs. P
Then, as per the question
$\left(\frac{125}{100} \times \frac{115}{100} \times \frac{110}{100} \times P\right)$ = 1265
Thus, P = 800

Q39. Answer: C

Explanation: The servant worked for 9 months instead of 12 months, he should receive 9/12 of his annual payment
Let the price of 1 shirt be Rs.S .i.e., $\frac{3}{4}$ (200 + S)
However, the question states that the servant receive Rs. 120 + S where S is the price of the shirt.
By equating the two equations we get $\frac{3}{4}$ (200 + S) = 120 + S.
Therefore Price of the shirt S = Rs. 120.

Q40. Answer: A
Explanation: Let C1 be the cost price of the first article and C2 be the cost price of the second article.
Let the first article be sold at a profit of 22%, while the second one be sold at a loss of 8%.
We know, C1 + C2 = 600.
The first article was sold at a profit of 22%. Therefore, the selling price of the first article = C1 + (22/100)C1 = 1.22C1
The second article was sold at a loss of 8%. Therefore, the selling price of the second article = C2 - (8/100)C2 = 0.92C2.
The total selling price of the first and second article = 1.22C1 + 0.92C2.
As the merchant did not make any profit or loss in the entire transaction, his combined selling price of article 1 and 2 is the same as the cost price of article 1 and 2.
Therefore, 1.22C1 + 0.92C2 = C1+C2 = 600
As C1 + C2 = 600, C2 = 600 - C1. Substituting this in 1.22C1 + 0.92C2 = 600, we get
1.22C1 + 0.92(600 - C1) = 600
or 1.22C1 - 0.92C1 = 600 - 0.92*600
or 0.3C1 = 0.08*600 = 48
or C1 = 48/(0.3) = 160.
If C1 = 160, then C2 = 600 - 160 = 440.
The item that is sold at loss is article 2. The selling price of article 2 = 0.92*C2 = 0.92*440 = 404.80.
Note: When you actually solve this problem in CAT, you should be using the following steps only
1.22C1 + 0.92C2 = C1+C2 = 600
1.22C1 + 0.92(600 - C1) = 600
C1 = 48/(0.3) = 160. And C2 = 600 - 160 = 440.
And the final step of the answer which is 0.92*440 which you should not actually compute. As two of the answer choices (2) and (3) are either 440 or more, they cannot be the answers. The last one is way too low to be 92% of 440, therefore, the answer should be choice (1)

Short Cut:- Use the rule of alligation

-8 22
0
22 8

The ratio of first to second = 22:8=11:4
SP of article at 8% loss = (11/15) * 600= Rs. 440

Q41. Answer: B
Explanation:
cost of 15 books is 100 rupee
so cost of 3 books is 20 rupee
and cost of 25 pencils is 100 rupee
so cost of 1 pencil is 4 rupee
traveling expenses = 15 % = 15 rupee
cost of 5 pencils = 5*4 = 20 rupee
remaining amount = 100 - 35 = 65 rupee
cost of 9 books is 20*3 = 60 rupee
so total 9 books can be purchased and 5 rupee will remained.

Q42. Answer: C
Explanation: Total discount for Mon-Fri=0.5x5=2.5
He paid=16-2.5=13.5

Q43. Answer: A
Explanation: Let the CP of each pen be Rs. 1.
CP of 99 pens = Rs. 99
Profit = Cost of 33 pens = Rs. 33 =>Profit% = 33/99 * 100 = 33 1/3%

Q44. Answer: C
Explanation: The gain percentage is 17.65 approx .Gain percentage is always calculated based on cost price . Hence, the cost Price is 100-15=Rs.85 .The gain percentage =(Gain/C.P)*100 i,e (15/85)*100=17.647=17 11/17.

Q45. Answer: A
Explanation: 110% of S.P. = Rs. 616
S.P. = (616 x 100)/110 = Rs. 560
C.P = (110 x 560)/112 = Rs. 500
Q46. Answer: B
Explanation:

Let the labelled price be Rs. x.

$$\text{Then, } 120\% \text{ of } x = 2880 \implies x = \left(\frac{2880 \times 100}{12}\right) = 2400$$

$$\therefore \text{C.P.} = 85\% \text{ of Rs. } 2400 = \text{Rs.}\left(\frac{85}{100} \times 2400\right) = \text{Rs. } 2040$$

Q47. Answer: C
Explanation: If the merchant offers a discount of 40% on the marked price, then the goods are sold at 60% of the marked price. The question further states that when the discount offered is 40%, the merchant sells at cost price. Therefore, selling @ 40% discount = 60% of marked price (M) = cost price (C)

ie., $\frac{60}{100}M = C$ or $M = \frac{100}{60}C$ or $M = 1.6666C$ i.e., a mark up 66.66%

Q48. Answer: A
Explanation: P = 10 - 7 = 3
SP = (102/3) = Rs. 34 per kg

Q49. Answer: A
Explanation:

S.P. of 1 article = Rs. 45.
Let marked price of each article be Rs. x.

$$\text{Then, } \frac{90}{100}x = 45 \implies x = \text{Rs.}\left(\frac{45 \times 100}{90}\right) = \text{Rs. } 50$$

$$\text{C.P.} = \text{Rs.}\left(\frac{100}{150} \times 45\right) = \text{Rs. } 30$$

Now, C.P. = Rs. 30, S.P. = Rs. 50

$$\therefore \text{ Required profit\%} = \left(\frac{20}{30} \times 100\right)\% = 66\frac{2}{3}\%$$

Q50. Answer: B

Explanation: 100% = 100/120 X25 = 5/6 X 25 = 125/6 = 20.83
Profit if sold for 22.50 is = 1.67 Rs
Profit % = 1.67 / 20.83 X 100 = 167 / 20.83 = 8.02 %

Q51. Answer: D
Explanation:
CP of 12 chocolate = Rs. 9
CP of 1 chocolate = $\frac{9}{12}$ = Rs. 0.75
Now SP = Re. 1, profit = Rs. 0.25
Profit % = $\frac{0.25}{0.75} \times 100 = 33\frac{1}{3}\%$

Q52. Answer: C
Explanation: Let C.P. of each article be Re. 1 C.P. of x articles = Rs. x.
S.P. of x articles = Rs. 20.
Profit = Rs. (20 - x).
$\therefore \left(\frac{20 - x}{X} \times 100 = 25 \right)$
$\Rightarrow$ 2000 - 100x = 25x => 125x = 2000 => x = 16.

Q53. Answer: B
Explanation: (C.P. of 17 balls) - (S.P. of 17 balls) = (C.P. of 5 balls)

$\Rightarrow$ C.P. of 12 balls = S.P. of 17 balls = Rs.720.

$\Rightarrow$ C.P. of 1 ball = Rs. $\left(\frac{720}{12} \right)$ = Rs. 60.

Q54. Answer: B
Explanation: 85 : 18700 = 115 : x
$\Rightarrow$ x = $\left(\frac{18700 \times 115}{85} \right)$ = 25300.

Hence, S.P. = Rs. 25,300.

Q55. Answer: B
Explanation: Let the original price be Rs. xx. Then;
95% of 88% of xx = 209 $\Rightarrow$ x=(209×100×10095×88)$\Rightarrow$ x=(209×100×10095×88) = 250

Q56. Answer: B
Explanation: Let the Cost price be k.
For a profit of 10%, Selling price = k + 10% of k = 11k /10
For a loss of 10%, (k - 10% of k) = (11k /10) – 40
=> 9k/10 = (11k/10) – 40 => k = 200

Q57. Answer: A
Explanation: Let the cost of Production = Rs. P
Then, as per question,
$\Rightarrow$ $(\frac{125}{100} \times \frac{115}{100} \times \frac{110}{100} \times P)$ = 1265 => P = 800

Q58. Answer: B

Explanation: Let C.P. = X and S.P. = Y
=> 7 % of Y = 8% of X and 9% of Y =10% of X + 1
=> 7Y = 8X and 9Y = 10X + 100
=> 9 x (8X / 7) = 10 X + 100 => X = Rs. 350

Q59. Answer: D
Explanation: SP of first at 20% profit=6000
SP of second at 20% loss=4000
Total SP=10000 and Total CP=10000
So, no profit no loss.

Q60. Answer: B
Explanation: (X+Y)/2 . [Take positive value of x or y for profit and negative for loss]
(30-10)/2=10% profit.

Q61. Answer: A
Explanation: When SP are same and also percentage of profit and loss same, we always have loss.
Loss%= -x2/100= (40x40)/100=16 % loss.

Q62. Answer: A
Explanation: CP of first at profit= 720 x (100/120)
CP of second at loss=720 x(100/90)
Total SP=1440
Total CP=720[100/120 + 100/90]=72000[1/120 + 1/90]=1400
Profit %=[(SP-CP)/CP]*100=(40/1400)*100=20/7%=2 6/7%

Q63. Answer: B
Explanation: The trader professes to sell his goods at a loss of 8%.
Therefore, Selling Price = (100 - 8)% of Cost Price or SP = 0.92CP
But, when he uses weights that measure only 900 grams while he claims to measure 1 kg.
Hence, CP of 900gms = 0.90 * Original CP
So, he is selling goods worth 0.90CP at 0.92CP
Therefore, he makes a profit of 0.02 CP on his cost of 0.9 CP

Profit % = $\frac{SP - CP}{CP} \times 100$

i.e., $\frac{0.92 - 0.90}{0.90} \times 100 = \frac{0.02}{0.90} \times 100 = 2\frac{2}{9}\%$ or 2.22%

CHAPTER 5 - AVERAGE

Q1. Answer: A
Explanation: Average= (216+463+154+605+446+336)/6 = 370.

Q2. Answer: B
Explanation: The average of A,B,C and D = Average of B and C
But B and C are consecutive even numbers. Their average will be equal to the odd number in between them (which is 55).
Therefore, B=55-1=54,C=55+1=56,A=B-2=52, A*C= 52*56= 2912

Q3. Answer: B
Explanation: A,B,C and D be the four consecutive odd numbers in ascending order. Their average =average of B and C=The even number between B and C=106
B=106-1=105 and C=106+1=107
Therefore, the third no. in ascending order =C =107

Q4. Answer: A
Explanation: 55.8*5=279,49*2=98,69.5*2=139
Therefore, Third Number=279-98-139=42

Q5. Answer: B
Explanation: The average age of 16 girls is 18 years=16*18=288
The average age of 4 boys is 17 years=14*17=238
Average age=(288+238)/30
Average Age=17.54

Q6. Answer: B
Explanation: Average salary of employee in a company=6000
When added 1 member salary=25+1=26=6500
So,(26*6500)-(25*6000)=169000-150000=19000

Q7. Answer: C
Explanation: Total wages earned during the 15 days=15*90=1350
Total wages earned during the first 7 days=7*87=Rs.609
Total wages earned during the last 7 days=7*92=644
Therefore, Total wages earned during the 15 days=Wages during first 7 days+ wage on the 8^{th} day +wages during the last 7 days
1350=609+1350=609+wage on the 8^{th} day+644
Wage on the 8^{th} day=1350-609-644=Rs.97

Q8. Answer: C
Explanation: Let us consider 100 employees to work in the factory.
40 - Workers 60 - Executives
Annual income of the worker = $390
Annual income of Executive = $420
Average annual income of all the employees in the factory ,
=> (40*390 + 60*420)/100 = [40*(300+90) + 60*(400+20)]/100
= (12000+3600+24000+1200)/100
= 40800/100 = 408
Therefore the answer is C.

Q9. Answer: B
Explanation: Average of Ramesh & Suresh=(R+S)/2=3800 =>Total income of R+S=3800*2=7600
Average of Suresh & Pratap=(S+P)/2=4800 => Total income of P+S=4800*2=9600
Average of Pratap & Ramesh=(R+P)/2=5800 => Total income of P+R=5800*2=11600
Therefore, total of three (2R+2P+2S)=7600+9600+11600=28800
=>R+P+S=14400 =>Average=14400/3=4800

Q10. Answer: A
Explanation: 112x=(112-32)*(x+6) =>32x=6*80 =>480/32=15

Q11. Answer: B
Explanation: Let the required mean score be a.
Then, 20 x 80 + 25 x 31 + 55 x a = 52 x 100
=> 1600 + 775 + 55a = 5200 => 55a = 2825 =>a = 51.4

Q12. Answer: B
Explanation: Average weight of 59 students be A.
Total weight of 59 students=59A
According to the question, when the weight of this student who left is added, the total weight of the class=59A+45.
When this student is also included, the average weights decrease by 0.2 kg.
=> (59A+45)/60=A-0.2 =>59A+45=60A-12 =>A=57

Q13. Answer: C
Explanation: Let original average expenditure=Rs. x
=>42(x-1)-35x=42 =>7x=84 => x=12
Now, Original Expenditure=(35*12)=Rs.420

Q14. Answer: A
Explanation: Average age of 40 students = 18
Average age of 60 students = 18.5
Average age of 20 new students = (18.5*60-18*40)/20 = 19.5 years = 19 years 6 months

Q15. Answer: B
Explanation: Let correct average= x. Then, correct total= 8x
Obtained total = 8*25.5 =204
=> 204-14 – (31-13) = 8x => x= 21.5

Q16. Answer: B
Explanation: Sum of marks were wrongly increased by = (192+33)*(92+83) = 50
Average was wrongly increased by = 50/100= 0.5
Correct mean = 89.05- 0.5 = 88.55

Q17. Answer: C
Explanation: Total decrease in marks = 60*(70-50) = 1200
Decrease in average = 58-55 = 3
Therefore, number of students = 1200/3 = 400

Q18. Answer: C
Explanation: Total of 10 innings = 21.5*10 = 215
Let number of runs which he requires for 11th innings = x
Then, average in 11th innings= (215+x) / 11=(215+x) /11 = 24 => x=49

Q19. Answer: B
Explanation: Decrease in average = 2 runs
Total decrease in 64 innings = 64*2 = 128 runs
New average = 0+128= 128 runs

Q20. Answer: C
Explanation: Total runs of 2 innings = 2*62 + 62(64-62) = 124+ 124 = 248
Highest score- Lowest score = 18 runs => Highest score = (240+180) /2 = 214 runs

Q21. Answer: A
Explanation: Total age of grandparents = 67*2= 134
Total age of parents = 35*2 = 70
Total age of grandchildren = 6*3= 18
Family's average age = (134+70+18) / 7 = 31.7

Q22. Answer: B
Explanation: Difference between temperature on 9th and 17th = 8* (31 – 30) = 8
Temperature for 8 days including 17th is more than that of 8 days including 9th
Therefore temperature on 17th is more than that of 9th
Therefore temperature on 17th = temperature on 9th + Difference = 35+8 = 43

Q23. Answer: B
Explanation: Let total number of students =x
Then, 500/x = 500/ (x-5) - 5
500 / (x+5) = 500 / (x-5)
By solving the above equation we get, X= -25
Since, we cannot get negative value of x. So, x=25.

Q24. Answer: A
Explanation: In 12 min, leak admits = 15/ 4 quintals
In one hour leak admits = 15/4 * 60/12 = 75/4 quintals
In 1 hour, pump throws = 12 quintals
Water left in the ship in 1 hour = 75/4 – 12 = 27/4 quintals
Therefore, 27/4 quintals water is left in = 1*60* (4/27) = 80/9. Now, in 80/9 hours, ship runs = 40 km
In 1 hour ship runs = 40* (9/80) = 4.5 km/hr

Q25. Answer: C
Explanation: We have : (2+7+6+x)/4 = 5 or 15+x =20 or x = 5
Also (18+1+6+x+y)/5 = 10, 25+5+y = 50, y =20.

Q26. Answer: A
Explanation: Let the total expenditure be x, Then the average = x/9,
8*12+ [x/9+8] =x or [x-x/9] =104.
8x/9 = 104, x =104*9/8 =117.

Q27. Answer: D
Explanation: Let the fourth number be x, Then , (First three + x)/4 = 4 =>First three +x = 16.
(x + last three) /4 = 4 =>x + last three = 16.
[(First three + x) + Last three]/7 = 3 =>First three +x + last three = 7*3 = 21.
Now, 16 + (16 -x) = 21 =>x = 32 – 21 = 11.

Q28. Answer: A
Explanation: The total weight of 29 students = 29* 28
The total weight of 30 students = 30* 27.8
Weight of the new student = (30*27.8 – 29*28)= 834 - 812 = 22

Q29. Answer: B
Explanation: Total age of the committee = 40*8 = 320,
Total age when a member is retired and a new one was joined = 320-55 +39 =304
Average age of present committee = 304/8 = 38.

Q30. Answer: C
Explanation: Let the actual number of points scored be x,
Then, [x + (92 –85)] /8 = 84 => (x + 7) /8 = 84 =>x = (84*8)- 7= 672 - 7 = 665.

Q31. Answer: D
Explanation: Total marks of 20 students = 64*20 = 1280
Total mark after the removal of 3 students = 1280 –(32 +28+34)= 1280 – 94 = 1186
Approximate average marks = 1186/ (20-3) = 1186/ 17 = 70.

Q32. Answer: B
Explanation: Let the number of students be 2x, 3x, 4x.
Let the average marks be 4y, 3y, y.
Average mark of class = (8xy+9xy+4xy)/ (2x+3x+4x) =21xy/9x=7y/3
Percentage difference = (3y - 7y/3)/7y/3 *100 = 28.57%

Q33. Answer: C
Explanation: Total age of 40 students = 40*8 = 320
Let the age of the teacher be x, Then (320+x)/41 = 8+1/2 =8 ½.
320+x =17/2*41 =697/2 = 348.5, x =348.5-320 = 28.5

Q34. Answer: D
Explanation: The total wages earned during the 15 days that the worker worked = 15 × 90 = Rs. 1350.
The total wages earned during the first 7 days = 7 × 87 = Rs. 609.
The total wages earned during the last 7 days = 7 × 92 = Rs. 644.
Total wages earned during the 15 days = wages during first 7 days + wage on 8th day + wages during the last 7 days.
=>1350 = 609 + wage on 8th day + 644
Wage on 8th day = 1350 - 609 - 644 = Rs. 97

Q35. Answer: D
Explanation: Total temperature on Wednesday, Thursday and Friday was 25 * 3 = 75^0 Total temperature on Thursday, Friday and Saturday was 24 * 3 = 72^0.
Hence, difference between the temperature on Wednesday and Saturday = 3^0.
If Saturday temperature = 27^0, then Wednesday's temperature = 27 + 3 = 30^0

Q36. Answer: A
Explanation: Total age of 12 students = 12 * 20 = 240 and the total age of 16 students = 21*16 = 336.
Let the average age of 4 new students be x. Therefore total age of the new students = 4x.
Hence the total age of 16 students = 240 + 4x
= 336 => x = 24.

Q37. Answer: A

Explanation: Let the average weight of the 59 students be A.
So, the total weight of the 59 of them will be 59*A.
The questions states that when the weight of this student who left is added.
The total weight of the class = 59A+ 45.
When this student is also included, the average weight decreases by 0.2 kgs.
=>(59A+45)/60=A−0.2 => 59A + 45 = 60A - 12
=> 45 + 12 = 60A - 59A => A = 57

Q38. Answer: C

Explanation: The average of 5 quantities is 10.
Therefore, the sum of all 5 quantities is 50.
The average of 3 of them is 9.
Therefore, the sum of the 3 quantities is 27.
Therefore, the sum of the remaining two quantities = 50 - 27 = 23.
Hence, the average of the 2 quantities = 23/2 = 11.5.

Q39. Answer: D

Explanation: At present the total age of the family = 5 * 20 = 100
The total age of the family at the time of the birth of the youngest member = [100-10-(10*4)] = 50
Therefore, average age of the family at the time of birth of the youngest member = 50/4 = 12.5.

Q40. Answer: A

Explanation: Suppose the bowler has taken x wickets before the last match. Given average=12.4.
Therefore, total run given =12.4x
Runs given including last match =12.4x+26
Now, average =12.Therefore,
=>(12.4x+26)/(x+5)=12 =>12.4x+26=12x+60
=>0.4x=34 =>x=85.

CHAPTER 6 – AGES & NUMBERS

Q1. Answer: A
Explanation: Let the present ages of Sameer and Anand be 5*x* years and 4*x* years respectively.
Then, $\frac{5x + 3}{4x + 3} = \frac{11}{9}$
$\Rightarrow 9(5x + 3) = 11(4x + 3)$
$\Rightarrow 45x + 27 = 44x + 33 \Rightarrow 45x - 44x = 33 - 27 \Rightarrow x = 6.$
$\therefore$ Anand's present age = 4*x* = 24 years.

Q2. Answer: A
Explanation: Ages of Promila and Sakshi 1yr ago be 4x and x respectively.
then [(4x+1)+6]-[(x+1)+6]=9
=> 3x=9 => x=3
The ratio = (4x+1):(x+1) =>13:4

Q3. Answer: A
Explanation: Let the son's present age be *x* years. Then, (38 - *x*) = *x*
$\Rightarrow 2x = 38. \Rightarrow x = 19.$
Son's age 5 years back (19 - 5) = 14 years.

Q4. Answer: C
Explanation: Mother's age when Ayesha's brother was born = 36 years.
Father's age when Ayesha's brother was born = (38 + 4) years = 42 years.
Required difference = (42 - 36) years = 6 years.

Q5. Answer: B
Explanation: Let Ronit's present age be *x* years. Then, father's present age =(*x* + 3*x*) years = 4*x* years.
$\therefore (4x + 8) = \frac{5}{2}(x + 8)$
$\Rightarrow 8x + 16 = 5x + 40 \Rightarrow 3x = 24 \Rightarrow x = 8.$
Hence, required ratio = $\frac{(4x + 16)}{(x + 16)} = \frac{48}{24} = 2.$

Q6. Answer: A
Explanation: (A+B) - (B+C) = 12 =>A - C = 12.
=>C is younger than A by 12 years.

Q7. Answer: B
Explanation: Let the mother's present age be x years.

Then, the person's present age =(2/5) x years
=>(2/5)x+8=1/2(x+8)

$\Rightarrow 2(2x + 40) = 5(x + 8) \Rightarrow x = 40.$

Q8. Answer: C

Explanation: Let B's present age = x years. Then, A's present age = (x + 9) years.
(x + 9) + 10 = 2(x - 10)
=> x + 19 = 2x – 20 => x =39.

Q9. Answer: A
Explanation: If Rahul age is x, then Sachin age is x-7,
So, (x-7)/x = 7/9
=> 9x-63 = 7x => 2x = 63 => x = 31.5
=> Sachin age is 31.5 - 7 = 24.5

Q10. Answer: D
Explanation: Let the present ages of son and father be *x* and (60 -*x*) years respectively.
Then, (60 - *x*) - 6 = 5(*x* - 6)
$\Rightarrow$ 54 - *x* = 5*x* – 30 $\Rightarrow$ 6*x* = 84 $\Rightarrow$ *x* = 14.
Son's age after 6 years = (*x*+ 6) = 20 years..

Q11. Answer: A
Explanation: Let, Maala's age = 4A and Kala's age = 3A
Then 4A + 3A = 28 =>A = 4
Maala's age = 16 years
and Kala's age = 12 years
Proportion of their ages after 8 is = (16 + 8) : (12 + 8)= 24 : 20= 6 : 5

Q12. Answer: C
Explanation: Krish's age = 3A and Vaibhav's age = 5A
(3A+9)/(5A+9) = 3/4
=> 4 (3A + 9) = 3 (5A + 9) => A = 3
Therefore, Vaibhav's age = 15 years.

Q13.Answer: C
Explanation: Let, Total of current ages of the 2 daughters is A years.
Then, father's current age = 3A years.
(3A + 5) = 2 (A +10) =>3A + 5 = 2A + 20 =>A = 15
Therefore, father's current age = 45 years.

Q14. Answer: D
Explanation: Let Meena's age = A.
Then Sivagami's age = A + 2
After 6 years the total of their ages will be 7 times of what?
Not clear. So, the given data are inadequate.

Q15. Answer: C
Explanation: Let the son's present age be *x* years. Then, man's present age = (*x* + 24) years.
$\therefore$ (*x* + 24) + 2 = 2(*x* + 2) $\Rightarrow$ *x* + 26 = 2*x* + 4 $\Rightarrow$ *x* = 22.

Q16. Answer: A
Explanation: 1/3 OF ¼ OF N= 15 =>N=180. So, 3/10 N=54.

Q17. Answer: A

Explanation: Since the number is greater than the number obtained on reversing the digits, so the ten's digit is greater than the unit's digit.
Let ten's and unit's digits be $2x$ and x respectively.
Then, $(10 \times 2x + x) - (10x + 2x) = 36$
$\Rightarrow 9x = 36 \quad \Rightarrow x = 4.$
$\therefore$ Required difference = $(2x + x) - (2x - x) = 2x = 8.$

Q18. Answer: A
Explanation: Let the three integers be x, x + 2 and x + 4. Then, 3x = 2 (x + 4) + 3 <=> x = 11.
Third integer = x + 4 = 15.

Q19. Answer: C

Explanation: Let the ten's and unit digit be x and $\frac{8}{x}$ respectively.

Then, $\left(10x + \frac{8}{x}\right) + 18 = 10 \times \frac{8}{x} + x$
$\Rightarrow 10x^2 + 8 + 18x = 80 + x^2$
$\Rightarrow 9x^2 + 18x - 72 = 0$
$\Rightarrow x^2 + 2x - 8 = 0 \quad \Rightarrow (x + 4)(x - 2) = 0 \quad \Rightarrow x = 2.$

Q20. Answer: A
Explanation: Let the ten's digit be x.
Then, unit's digit = $x + 2$.
Number = $10x + (x + 2) = 11x + 2$.
Sum of digits = $x + (x + 2) = 2x + 2$.
$\therefore (11x + 2)(2x + 2) = 144$
$\Rightarrow 22x^2 + 26x - 140 = 0$
$\Rightarrow 11x^2 + 13x - 70 = 0 \quad \Rightarrow (x - 2)(11x + 35) = 0$
$\Rightarrow x = 2.$
Hence, required number = $11x + 2 = 24$.

CHAPTER 7 – INTEREST

Q1. Answer: C

Explanation: S.I. for 2 year = Rs. (945 - 815) = Rs. 130.
S.I. for 1 year=Rs. 65
S.I. for 3 years = Rs.(65 x 3) = Rs. 195.
∴ Principal = Rs. (815 - 195) = Rs. 620

Q2. Answer: B

Explanation: Time = $\left(\frac{100 \times 81}{450 \times 4.5}\right)$ = 4 years.

Q3. Answer: D

Explanation: S.I. = Rs. (15500 - 12500) = Rs. 3000.

Rate = $\left(\frac{100 \times 3000}{12500 \times 4}\right)$ = 6%

Q4. Answer: C

Explanation: Let the principal be P and rate of interest be R%.

∴ Required ratio = $\frac{\left(\frac{P \times R \times 6}{100}\right)}{\left(\frac{P \times R \times 9}{100}\right)} = \frac{6PR}{9PR} = \frac{6}{9}$ =2 : 3

Q5. Answer: A

Explanation: Gain in 2 years =

$$\left[\left(5000 \times \frac{25}{4} \times \frac{2}{100}\right) - \left(\frac{5000 \times 4 \times 2}{100}\right)\right]$$

Gain in 1 year = Rs. (225/2) = 112.50

Q6. Answer: B

Explanation: Let Rs. x be the amount that the elder daughter got at the time of the will. Therefore, the younger daughter got (3,500,000 - x).
The elder daughter's money earns interest for (21 - 16) = 5 years @ 10% p.a. simple interest.
The younger daughter's money earns interest for (21 - 8.5) = 12.5 years @ 10% p.a. simple interest.
As the sum of money that each of the daughters get when they are 21 is the same,
=> x+[(5*10*x)/100]=(3,500,000−x)+[12.5*10*(3,500,000−x)/100]
=>x+(50/x)=3,500,000−x+(125/100)*3,500,000−(125x/100)
=>(200x+50x+125x)/100=(9/4)*(3,500,000)
=>x=2,100,000=21 lakhs

Q7. Answer: A

Explanation: Let principal = P, Then, S.I.=P and Time=8 years

Rate = [(100 x P)/ (P x 8)]% = 12.5% per annum.

Q8. Answer: A

Explanation: Let the original rate be R%. Then, new rate = (2R)%.

Note: Here, original rate is for 1 year(s); the new rate is for only 4 months i.e.1/3 year(s).

(725*R*1/100)+[(362.50*2R*1)/(100*3)]= 33.50

=> (2175 + 725) R = 33.50 x 100 x 3

=> (2175 + 725) R = 10050 => (2900)R = 10050

=> R=10050/2900=3.46

Original rate = 3.46%

Q9. Answer: A

Explanation: Amount = Rs. (30000 + 4347) = Rs. 34347.

Let the time be *n* years.

Then, $30000\left(1+\frac{7}{100}\right)^{n} = 34347$

Hence, by solving the above equation n=2 years

Q10. Answer: A

Explanation: Time, T = 2 years 73 days = 11/5 year

Rate, $R=6\frac{1}{4}\%=25/4\%$

Amount after 2 years 73 days

$=20480\left(1+\frac{\frac{25}{4}}{100}\right)^{2}+\left(1+\frac{1/5(\frac{25}{4})}{100}\right) = 23409$

Compound Interest = 23409 - 20480 = Rs.2929

Q11. Answer: A

Explanation: 5% is the rate of interest. 20% of the interest amount is paid as tax.

i.e. 80% of the interest amount stays back.

$\therefore$ if we compute the rate of interest as 80% of 5% = 4% p.a., we will get the same value.

The interest accrued for 3 years in compound interest = 3 x simple interest on principal + 3 x interest on simple interest + 1 x interest on interest on interest.

= 3 x (200) + 3 x (8) + 1 x 0.32 =600 + 24 + 0.32 = 624.32

The amount at the end of 3 years = 5000 + 624.32 = 5624.32

Q12. Answer: B

Explanation: The population grew from 3600 to 4800 in 3 years. That is a growth of 1200 on 3600 during three year span.

Therefore, the rate of growth for three years has been constant.

The rate of growth during the next three years will also be the same.

Therefore, the population will grow from 4800 by 4800*(1/3)= 1600

Hence, the population three years from now will be 4800 + 1600 = 6400

Q13. Answer: B

Explanation: Same as 12 (use + sign as the height is increasing)
Rate of increase = 1/5 × 100 = 20%
Height after 2 years = P(1+R/100)T= 50(1 + 20/100)2= 72 cm

Q14. Answer: B
Explanation: Amount = Rs. (30000 + 4347) = Rs. 34347
Let the time be n years
$30000 \left(1 + \frac{7}{10}\right)^n = 34347$
n= 2 years

Q15. Answer: A
Explanation: Let the sum be P
Amount After 2 years =$P(1+R/100)^T$
Given, amount after 2 years = 882
$P(21/20)^2 = 882$
By solving the above equation, we get P= Rs. 800

Q16. Answer: C
Explanation: Present worth of Rs. x due in T years hence is given by

Present Worth (PW) = $\frac{x}{\left(1+\frac{R}{100}\right)}T$
Let x be the annual payment
Then, present worth of x due 1 year hence + present worth of x due 2 year hence = 1025

=> x= (1025×441) / 820 = Rs.551.25

Q17. Answer: D
Explanation: Present worth of Rs. x due T years hence is given by
Present Worth (PW) = $x/(1+R/100)^T$

Present Worth (PW)=$242/(11/10)^2$=Rs. 200

Q18. Answer: B
Explanation: Let the rate of interest be R% per annum.
Assume that Rs. 10000 amount to Rs. 160000 in T years
$160000 = 10000\left(1 - \frac{R}{100}\right)^T$

$\frac{160000}{10000} = \left(1 - \frac{R}{100}\right)^T$

$\left(1 - \frac{R}{100}\right)^{T/2} = \sqrt{16} = 4$

In T/2 years, Rs.10000 amounts to $10000(1+R/100)^{T/2}$

=10000*4= 40000 (From equation (1))

Q19. Answer: B
Explanation: Amount = Rs. (30000 + 4347) = Rs. 34347.

Let the time be n years.

$34347 = 30000\left(1 - \frac{7}{100}\right)^n$

Solving this equation, we get n = 2 years.

Q20. Answer: C

Explanation: Let each installment be Rs.x. Then,

(P.W. of Rs.x due 1 year hence) + (P.W of Rs.x due 2 years hence) + (P.W of Rs. X due 3 years hence) = 7620.

$$\frac{x}{(1+\frac{50}{3*100})^1} + \frac{x}{(1+\frac{50}{3*100})^2} + \frac{x}{(1+\frac{50}{3*100})^3} = 7620$$

=> (6x/7)+(36x/49)+(216x/343)=7620

=> 294x + 252x + 216x = 7620 * 343

=> x = 3430

Amount of each installment = Rs.3430

Q21. Answer: C

Explanation: Let P = Rs. 100. Then, S.I. Rs. 60 and T = 6 years.

$\therefore$ R = $\left(\frac{100 \times 60}{100 \times 6}\right)$ = 10% p.a.

Now, P = Rs. 12000. T = 3 years and R = 10% p.a.

$\therefore$ C.I. = Rs. $\left[12000 \times \left\{\left(1 + \frac{10}{100}\right)^3 - 1\right\}\right]$

=12000*(331/1000)

=Rs. 3972

Q22. Answer: B

Explanation: S.I = $\frac{1200*10*1}{100}$ = 120

C.I = $1200\left(1 + \frac{5}{100}\right)^2 - 1200$

=Rs.123

Difference = Rs. (123 - 120) =Rs.3

Q23. Answer: A

Explanation: For 1st year S.I =C.I.

Thus, Rs.16 is the S.I. on S.I. for 1 year, which at 8% is thus Rs.200

i.e S.I on the principal for 1 year is Rs.200

Principle = Rs.(100*200)/(8*1) = Rs.2500

Amount for 2 years, compounded half-yearly

Rs. $2500*[(1+(4/100)^4]$=Rs.2924.4

C.I = Rs.424.64

Also, S.I=Rs.(2500*8*2/100)=Rs.400

Hence, [(C.I) - (S.I)] = Rs. (424.64 - 400)

=Rs.24.64

Q24. Answer: A

Explanation: The difference between compound interest and simple interest on Rs. P for 2 years at R% per annum $=P*(R/100)^2$
Simple Interest for 2 years = Rs.200
Sum, $P= (100\times SI)/RT=(100\times200)/(7\times2)=(100\times100)/7$
Required Difference = $P(R/100)^2=[(100\times100)/7]*(7/100)^2$=Rs. 7

Q25. Answer: C

Explanation: The difference between compound interest and simple interest on Rs. P for 2 years at R% per annum = $P(R/100)^2$
Put P= 15000 and solve the equation to get R=8%

Q26. Answer: A

Explanation: In 3 y interest = 1200-1125=75
SI for 1y =25 and SI for 5 y=125.
Principal=1125-125=1000
Rate= (75*100)/(1000*3)=2.5%.

Q27. Answer: D

Explanation: S.I=pnr/100 : p=5000;n=5;r=12 sub and
get S.I=3000 amount aft 5 yrs= principle + S.I =8000

Q28. Answer: C

Explanation: By the problem (p * r * t)/100=1500 or,
(5000 * 2.5 * t)/100=1500 which gives t=12 years.

Q29. Answer: C

Explanation: As the rate of interest for both the cases are same (A1-P)/T1 = (A2-P)/T2 (2500-p)/5=(3000-p)/7 17500 - 7p = 15000 - 5p =>p=1250

Q30. Answer: A

Explanation: Let the sum be P.
R = 10 % , n = 2 years
SI = P x R x n / 100 = P x 10 x 2 / 100 = 0.20 P
CI = A – P = P [1 + (R / 100)]n – P = 0.21 P
Now, it is given that CI – SI = 549
=> 0.21 P – 0.20 P = 549 => 0.01 P = 549 => P = 54900
Therefore, the required sum of money is Rs. 54,900

Q31. Answer: D

Explanation:

Let the sum = x

A/q, $\frac{x\times t\times(R+2)}{100}-\frac{x\times t\times R}{100}=108$

& $\frac{x\times R\times(t+2)}{100}-\frac{x\times R\times t}{100}=180$

We can't conclude value of x from the above equations.

Q32. Answer: B

Explanation:

We know that,

$\text{Diff} = \text{p}\frac{R^2}{100^2} \times \frac{300+R}{100}$

$620 = \text{p} \times \frac{100}{100^2} \times \frac{310}{100}$

$\Rightarrow \text{p} = \text{Rs. } 20000$

Q33. Answer: D

Explanation:

Let the each sum = x

A/q, $\frac{x\times7\times4.5}{100} - \frac{x\times7\times4}{100} = 31.50$

$\Rightarrow \frac{7x\times0.5}{100} = 31.50$

$\Rightarrow x = \frac{3150\times2}{7} = Rs.900$

Q34. Answer: D

Explanation:

Difference between C.I. & S.I. = 450

So, $450 = \frac{p\times15\times15}{100\times100}$

$\Rightarrow p = 20000$

So, amount invested = Rs. 20,000

Q35. Answer: C

Explanation:

Cash down payment = 1500

Let 'x' becomes 1020 at the end of Ist year

Then, $1020 = x\left(1 + \frac{10}{100}\right)$

$\Rightarrow x = \frac{1020\times10}{11} = 927.27$

Similarly, $1003 = y\left(1 + \frac{10}{100}\right)^2$

$\Rightarrow y = \frac{1003\times20\times20}{22\times22} = 828.92$

& $z = \frac{990\times10\times10\times10}{11\times11\times11} = 743.80$

Hence, cost price = 1500 + 927.27 + 828.92 + 743.80

= 3999.99 or Rs. 4000

Q36. Answer: D

Explanation:

According to question

$x\times\frac{4}{100} = y\times\frac{6}{100} = z\times\frac{8}{100}$

$\Rightarrow x : y : z = 6 : 4 : 3$

So, money invested at 4%

$x = \frac{6}{13}\times2600 = Rs.1200$

Q37. Answer: D

Explanation:

When invested for 4 years,

$S.I. = \frac{P \times R \times 4}{100} = \frac{PR}{25}$

When invested for 6 years.

$S.I. = \frac{P \times R \times 6}{100} = \frac{3PR}{50}$

Now A/q

$\frac{PR \times 150}{25 \times 100} = \frac{3PR}{50}$

From the above equation, we can't conclude rate of interest.

Q38. Answer: B

Explanation:

Let amount invested by Amar = x

Amount invested by Akbar = $x + 5000$

Amount invested by Anthony = $x + 7000$

Now, $[x + (x + 5000) + (x + 7000)] \times \frac{12}{100} = 3240$

$\Rightarrow 3x + 12000 = \frac{3240 \times 100}{12}$

$\Rightarrow 3x = 27000 - 12000$

$\Rightarrow x = \frac{15000}{3} = \text{Rs. } 5000$

Hence, amount invested by Akbar = 5000 + 5000

= Rs. 10,000

Q39. Answer: A

Explanation: it is given that the investment doubles itself in 15 years.

Let the initial investment be Rs. P => At the end of 15 years, A = 2 P

Now, this 2 P will be invested. => Amount after 15 more years = 2 x 2 P = 4 P

Now, this 4 P will be invested. => Amount after 15 more years = 2 x 4 P = 8 P

Thus, the investment (P) will become 8 times (8 P) in 15 + 15 + 15 = 45 years

Q40. Answer: A

Explanation: Let the borrowed sum be P.

=> SI for first 2 years + SI for next 3 years + SI for next 4 years = 22800

=> (P x 6 x 2 / 100) + (P x 9 x 3 / 100) + (P x 14 x 4 / 100) = 22800

=> 95 P / 100 = 22800=> P = 24000.Therefore, Borrowed sum = Rs. 24,000

CHAPTER 8 – ALLIGATIONS AND MIXTURES

Q1. Answer: B
Explanation: Rice 1: Rice 2 = (56-51) : (51-43) = 5:8

Q2. Answer: A
Explanation: SP of mixture = Rs. 18/kg; Profit = 20% => CP of mixture = Rs. 15/kg
CP of Rice 1=Rs. 20/kg; CP of Rice 2 = Rs. 12/kg
Rice 1: Rice 2 = (15-12) : (10-15) = 3:5

Q3. Answer: C
Explanation: Same as question 2. Do it yourself.

Q4. Answer: A
Explanation: Rice 1: Rice 2 = (18-14) : (14-8) = 4:6 = 2:3
Quantity of rice 1 = $2/5^{th}$ of 50 kg = 20 kg

Q5. Answer: A
Explanation: Apply the alligation formula.
Ratio of rice sold at 5% loss : Ratio of rice sold at 10% profit = 1 : 4
Thus, the quantity of rice sold at 10 % profit = 20 kgs.

Q6. Answer: B
Explanation: Apply the alligation formula.
Ratio of sugar sold at 6% loss : Ratio of sugar sold at 14% profit = 9 : 1
Thus, the quantity of sugar sold at 6% loss = 900 gms.

Q7. Answer: B
Explanation: CP(Water) = 0; CP(pure Milk) = Rs. 108/ltr; CP(Mixture) = 90
Hence, Water : Pure Milk = (108-90) : (90-0) = 18:90 = 1:5
Therefore, for 16 lits of water, milk required = 80 litres

Q8. Answer: C

Explanation: Quantity of Milk for Rs. 2 = $\frac{1}{6}$ litres

Thus 5/6 of the mixture is water which is 25litres.

Thus, 5/6 x (total mixture) = 25 litres

Total mixture = 30 litres

Quantity of pure milk = 5 litres

Q9. Answer: A

Explanation: Similar to question 8

Q10. Answer: C

Explanation: Final Amount = 100 (90/100)(90/100)(90/100) = 72.9

Q11. Answer: C

Explanation: Final amount of pure milk left = $100\times\frac{90}{100}\times\frac{91}{100}\times\frac{92}{100}$ = 75.34litres

Q12. Answer: C

Explanation: 55% of 80 = 44litres

Now try by options. Only option C satisfies the given conditions.

Q13. Answer: C

Explanation: X/Y=7/5 - RATIO OF A to B

5X-7Y=0.....(1)

9 litres would have : 7/12*9=5.25 of A and 9-5.25=3.75 of B

New ratio: (X-5.25)/(Y-3.75+9)=7/9

9X-7Y=16*5.25 ..... (2)

Solve eq 1 and 2 : answer is 21 for x

Q14. Answer: D

Explanation: Let quantity of A & B be 4x and x.

According to the question,

$$\frac{4x-10\times\frac{4}{5}}{x-10\times\frac{1}{5}+10}=\frac{2}{3}$$

$$\Rightarrow\frac{4x-8}{x+8}=\frac{2}{3}$$

$\Rightarrow 12x - 24 = 2x + 16$

$\Rightarrow 10x = 40$

$x = 4$

$\therefore$ Required answer = $4x = 4 \times 4 = 16$ litres

Q15. Answer: B

Explanation: Quantity of milk in glass 1 = $3/5^{th}$

Quantity of milk in glass 2 = $4/5^{th}$

Q16. Answer: A

Explanation: Milk : Water = (9x + 7x + 6x) : (2x + 4x + 5x) = 2:1

Q17. Answer: A

Explanation: Similar to question 16. Do it yourself.

Q18. Answer: A

Explanation: Quantity of milk in vessel 1 = $4/7^{th}$

Quantity of milk in vessel 2 = $2/5^{th}$

Quantity of milk in final mixture = 50% = 1/2

Vessel 1 : Vessel 2 = (1/2 – 2/5) : (4/7 – 1/2)

= 7:5

Please note that may use of quantity of water in place of milk & proceed the same way.

Q19. Answer: B

Explanation: Apply the alligation formula. Start by either considering the zinc or copper.

Q20. Answer: A

Explanation: (3x – 12)/ (2x – 8+ 12) = ¼

X= 6 therefore , 18 and 12.

Q21. Answer: A

Explanation: Let total capacity of container = 10

So, Milk from first liquid = $6 \times \frac{25}{100} = 1.5$

So, Milk from second liquid = $4 \times \frac{30}{100} = 1.2$

Total Milk = 1.5 + 1.2 = 2.7

Required Answer = $\frac{2.7}{10}$ x 100 = 27%

Q22. Answer:

Explanation: Alcohol in 1 litre of first = $1\times \frac{2}{10} = \frac{1}{5}$

Alcohol in 2 litres of second = 2 x 0 = 0

Required answer = $\frac{1}{5\ x\ 3} = \frac{1}{15}$

Q23. Answer: D

Explanation: CP of milk = SP of mixture (milk + water)

Let CP of milk = Rs. 100 => SP of mixture = Rs. 100; Gain% = 20%

Therefore, CP of mixture = Rs. 83.33

CP of water = 0

Milk : Water = (83.33 – 0):(100-83.33) = 5:1

Q24. Answer: A

Explanation: When the profit is 25%, it means 25% of the milk is water. Thus the ratio of milk and water is 4:1.

Q25. Answer: A

Explanation: Similar to question 24. Do it yourself.

Q26. Answer: C
Explanation: Similar to question 24. Do it yourself.

Q27. Answer: B
Explanation: Total Cost price of 12 pens = 150 x12 = Rs. 1800
Overall Profit = 15% => Overall Selling Price = 1800 x 1.15 = Rs. 1725
First Half: 50 pens; 10% profit
Total CP = Rs. 50 x 12 = Rs. 600
Total SP = 1.1 x 600 = Rs. 660
Second Half: 100 pens
SP = 2070 – 660 = Rs. 1415
CP = 100 x 12 = Rs. 1200
Profit = 1415-1200 = 215
Profit % = (215/1200) x 100 = 17.5%

Q28. Answer: C
Explanation: Similar to question 27. Attempt it yourself.

Q29. Answer: A
Explanation: Boys Money + Girls Money = Rs. 39
Let # Boys = A and # Girls = 65 - A
⇨ 0.8 x A + 0.3 x (65-A) = 39
⇨ A = 39
⇨ # Girls = 26

Q30. Answer: D
Explanation: Attempt it with the help of the options.

Q31. Answer: A
Explanation: let gold quantity be a and copper be b
Then $S= (aS_g + bS_c)/(a+b)$
15=19a+9b/a+b
Divide numerator and denominator by b and take a/b=x
15=(19x+9)/(x+1)
19x+9=15x+15
4x=6 => x=3/2
Therefore, Gold/Copper = 3/2

Q32. Answer: A
Explanation: Apply the Alligation formula. Answer A = 6000.

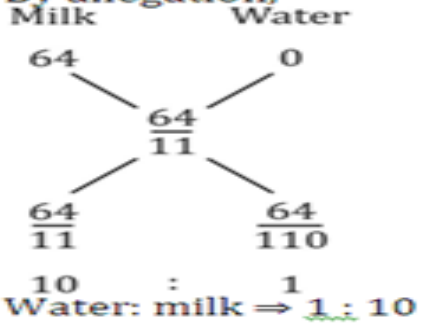
Q33. Answer: B
Explanation:

Sol. S.P. = 8

Profit = 37.5%

$\therefore$ C.P. $= \frac{8 \times 100}{137.5} = \frac{64}{11}$

By allegation,

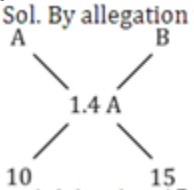


Water: milk $\Rightarrow$ 1 : 10

Q34. Answer: B

Explanation:

Sol. By allegation rule,



$\Rightarrow \frac{1.4A - A}{B - 1.4A} = \frac{15}{10} = \frac{3}{2}$

$\Rightarrow 2.8A - 2A = 3B - 4.2A$

$\Rightarrow 4.2A + 0.8A = 3B$

$\Rightarrow \frac{A}{B} = \frac{3}{5}$

$\Rightarrow$ A : B = 3 : 5

Q35. Answer: D

Explanation:

Sol. Let quantity of A & B be 4x & x.

According to the question,

$$\frac{4x - 10 \times \frac{4}{5}}{x - 10 \times \frac{1}{5} + 10} = \frac{2}{3}$$

$$\Rightarrow \frac{4x - 8}{x + 8} = \frac{2}{3}$$

$\Rightarrow 12x - 24 = 2x + 16$

$\Rightarrow 10x = 40$

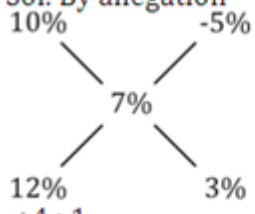
$x = 4$

$\therefore$ Required answer = $4x = 4 \times 4 = 16$ litres

Q36. Answer: D

Explanation:

Sol. By allegation



$\Rightarrow$ 4 : 1

Required answer = 40 kg, 10 kg

Q37. Answer: D
Explanation:

Sol. Total wheat = 150 kg
High quality = 135 kg
Low quality = 15 kg
Now,

$$\frac{135 + x}{15} = \frac{19}{1}$$

$\Rightarrow x = 150$ kg

Q38. Answer: A
Explanation:

Sol. Let total capacity of container = 10
So, milk from first liquid = $6 \times \frac{25}{100} = 1.5$
So, milk from 2nd liquid = $4 \times \frac{30}{100} = 1.2$
Total milk = 1.5 + 1.2 = 2.7
Required answer = $\frac{2.7}{10} \times 100 = 27\%$

Q39. Answer: A
Explanation:

Sol. Alcohol in 1 litre of first = $1 \times \frac{2}{10} = \frac{1}{5}$
Alcohol in 2 litre of second = $2 \times 0 = 0$
Required answer = $\frac{1}{5 \times 3} = \frac{1}{15}$

Q40. Answer: C
Explanation:

Sol. Remaining dettol = $1\left(1 - \frac{1}{3}\right)^4 = \frac{16}{81}$ part
So, required answer = 16 : 65

Q41. Answer: A
Explanation:

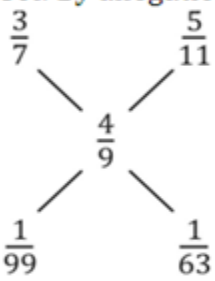
Sol. Gold in alloy = 50 × 80% = 40 gm
Silver in alloy = 50 × 20% = 10 gm
Now,

$$\frac{40 + x}{10} = \frac{90}{10}$$

$\Rightarrow x = 50$ gm

Q42. Answer: B
Explanation:

Sol. By allegation rule,



$\Rightarrow 7 : 11$

Required answer = $18 \times \frac{7}{18} = 7$ litres

Q43. Answer: A

Explanation:

Sol. 1st alloy zinc = $\frac{2}{5} \times 15 = 6$

Copper = $\frac{3}{5} \times 15 = 9$

Let copper to be removed = x

Then,

$$\frac{6+10}{9-x} = \frac{4}{1}$$

$\Rightarrow 16 = 36 - 4x$

$\Rightarrow x = 5$ gm

Q44. Answer: C

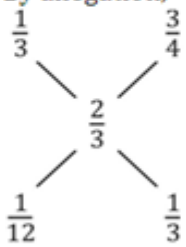
Explanation:

Sol. Copper in 1st alloy = $\frac{1}{3}$

Copper in 2nd alloy = $\frac{3}{4}$

Copper in required alloy = $\frac{2}{3}$

By allegation,



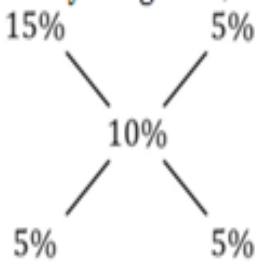
$\Rightarrow 1 : 4$

$\therefore$ Required answer = 4 times.

Q45. Answer: D

Explanation:

Sol.By allegation,



⇒1 : 1

So, required answer = 20 litres.