Answer & Solutions

Level-I

1. **(d)** Let X be the number of new science books. Then, Total Science books / Total books = 45%.

$$\Rightarrow \frac{\left(X+110000\times\frac{40}{100}\right)}{(20000+10000)}=\frac{45}{100}\Rightarrow X=14500.$$

2. **(b)** Number of runs made by running = 110 – (3 × 4 + 8 × 6) = 50.

$$\therefore \quad \text{Required percentage} = \left(\frac{50}{110}\times 100\right)\%$$

$$= 45\frac{5}{11}\%$$

3. **(a)** Total marks secured = (90% of 100 + 60% of 150 + 54% of 200)

$$= \left(\frac{90}{100}\times 100+\frac{60}{100}\times 150+\frac{54}{100}\times 200\right)$$

= (90 + 90 + 108) = 288.

Total maximum marks = (100 + 150 + 200) = 450.

$$\therefore \quad \text{Aggregate Percentage} = \left(\frac{288}{450}\times 100\right)\% = 64\%$$

4. **(d)** Let the third number be 100. Then, the first and second numbers will be 20 and 50, respectively.

$$\text{Required \%} = \frac{20}{50}\times 100 = 40\%$$

5. **(a)** Let the total number of applicants be x. Number of eligible candidates = 95% of x. Eligible candidates of other categories = 15% of (95% of x)

$$= \left(\frac{15}{100}\times\frac{95}{100}\right)\times x = \frac{57}{400}x$$

$$\therefore \quad \frac{57}{400}x = 4275 \Leftrightarrow x = \left(\frac{4275\times 400}{57}\right) = 30000$$

6. **(c)** Let the salary of Deepa be ₹ x.
Then, 80% of 8% of x = 2240

$$\Rightarrow \quad \frac{80}{100}\times\frac{8}{100}\times x = 2240$$

$$\Rightarrow \quad x = \frac{2240\times 100\times 100}{80\times 8} = 35000$$

Hence, the salary of Deepa = ₹ 35000

7. **(a)** Let the original price be x and sale be of y units.
Then, the revenue collected initially = $x \times y$

Now, new price = 0.8 x, new sale = 1.8 y
Then, new revenue collected = 1.44 xy

$$\text{\% increase in revenue} = \frac{0.44xy}{xy}\times 100$$

$$= 44\% \text{ increase}$$

8. **(a)** % reduction in consumption

$$= \frac{\text{\% change in price}}{100 + \text{\% change in price}}\times 100$$

$$= \frac{7}{100+7}\% = \frac{7}{107}\%$$

9. **(c)** Let his sales be worth ₹ x. Then,
$1000 + 2.5\%$ of $(x-4000) = 5\%$ of $x + 600$

$$\Rightarrow \frac{5x}{100}-\frac{2.5(x-4000)}{100} = 1000-600$$

$$\Rightarrow 2.5x + 10000 = 40{,}000$$

$$\Rightarrow x = \frac{30{,}000}{2.5} = 12{,}000$$

10. **(c)** Let the inspector examined x metres, then 0.08% of $x = 2$

$$\Rightarrow \frac{x\times 0.08}{100} = 2$$

$$\text{or} \quad x = \frac{200}{0.08} = 2500 \text{ metres}$$

11. **(a)** Let the investment of C = ₹ 100
Then B's investment = ₹ 90 and A's investment = ₹ 99
Sum of investment = ₹ (100 + 90 + 99) = ₹ 289

$$\text{Hence, } C\text{'s actual investment} = ₹\left(\frac{14450\times 100}{289}\right)$$

= ₹ 5000

12. **(a)** Let B get ₹ x. Then C gets = 75% of $x = \frac{3x}{4}$

and A gets = 120% of $\frac{3x}{4} = \frac{120}{100}\times\frac{3x}{4} = \frac{9x}{10}$

$$\text{Now, } \frac{9x}{10}+\frac{3x}{4}+x = 4558$$

$$\Rightarrow \frac{53x}{20} = 4558 \Rightarrow x = \frac{4558\times 20}{53} = 1720$$

$$\text{Hence, A's share} = \frac{9x}{10} = ₹\ \frac{9\times 1720}{10} = ₹\ 1548$$

13. (b) Let the total number of votes enrolled be x. Then, Number of votes cast = 75% of x. Valid votes = 98% of (75% of x).

$\therefore$ 75% of [98% of (75% of x)] = 9261

$$\Rightarrow \left(\frac{75}{100}\times\frac{98}{100}\times\frac{75}{100}\times x\right)=9261$$

$$\Rightarrow x=\left(\frac{9261\times100\times100\times100}{75\times98\times75}\right)=16800.$$

14. (d) Height climbed in second hour

$$=12\frac{1}{2}\% \text{ of } \left(100-62\frac{1}{2}\right)\% \text{ of } 192 \text{ m}$$

$$=\left(\frac{25}{2}\times\frac{1}{100}\times\frac{75}{2}\times\frac{1}{100}\times192\right) m = 9 \text{ m}.$$

15. (b) Let the original number be 100.
Then, the new number = 100 × 1.1 × 0.9 = 99
i.e. the number decreases by 1%.

16. (c) Work with option, $\left(\frac{5}{4}\right)x-\left(\frac{7}{10}\right)x=22$

Only $x = 40$ fulfil the above equation.

17. (c) Let the total sales be ₹ x. Then, $5\frac{1}{2}\%$ of $x+\frac{1}{2}\%$ of $(x-10000) = 1990$

$$\Leftrightarrow \frac{11}{2}\times\frac{1}{100}\times x+\frac{1}{2}\times\frac{1}{100}\times(x-10000)=1990$$

$\Leftrightarrow 12x-10000=398000 \Leftrightarrow 12x=408000$

$\Leftrightarrow x = 34000$

18. (a) Let the number be x,

Then, $\frac{12}{100}\times\frac{75}{100}\times x-\frac{5}{100}\times x=75$

$$\Rightarrow \frac{9x}{100}-\frac{5x}{100}=75 \Rightarrow \frac{4x}{100}=75$$

$$\Rightarrow x=\frac{75\times100}{4}=1875$$

19. (a) $\because$ Amount, he have spent in 1 month on clothes transport = Amount spent on saving per month

$\therefore$ Amount, spent on clothes and transport

$$=\frac{48456}{12}=₹4038$$

20. (a) Let the population of males = x; then the population of females = $9000-x$

Now, 5% of x + 8% of $(9000-x)$

$=(9600-9000)=600$

or $0.05x+720-0.08x=600$

or $720-600=0.08x-0.05x$

or, $120=0.03x$

$\therefore x=4000$

$\therefore$ Reqd. ratio of population of males and females

$$=\frac{4000}{9000-4000}=\frac{4000}{5000}=4:5$$

21. (d) Let salary of Saroj be ₹ x.

$\therefore$ Salary of Raju $=\frac{80}{100}x$

Salary of Ram $=\frac{70}{100}x$

$$\text{Required percentage}=\left(\frac{\frac{80x}{100}-\frac{70x}{100}}{\frac{70x}{100}}\right)\times100$$

$$=\frac{10x}{76x}\times100=\frac{100}{7}=14.28\%$$

22. (d) Let the family consumes 1 kg wheat
To keep expenditure at Rs. 24, its new consumption should be $\frac{24}{27}=\frac{8}{9}$ kg

$\therefore$ Percentage decrease in consumption

$$=\frac{\left(1-\frac{8}{9}\right)}{1}\times100=11.1\%$$

Alternative method :

$$\text{Required \%}=\frac{27-24}{27}\times100=11.1\%$$

23. (d) Let the first man's output be x.

Then, $33\frac{1}{3}\%$ of x = 50% of 1500 $\Leftrightarrow \left(\frac{100}{3}\times\frac{1}{100}\times x\right)$ = 750 $\Leftrightarrow x = 750 \times 3 = 2250$.

24. (b) Solve using options. 2/25 fits the requirement.

25. (c) 10 × 100 = 1000, 100 = no. of visitors
Now, 7.5 × No. of visitors = 1200
No. of visitors = 160

$$\text{Increase \%}=\frac{160-100}{100}\times100=60\%$$

26. (c) Let the inspector examined x metres, then 0.08% of $x = 2$

$$\Rightarrow \frac{x\times0.08}{100}=2$$

$$\text{or } x=\frac{200}{0.08}=2500 \text{ metres}$$

27. (d) Let the original fraction be $\frac{x}{y}$

Then, $\frac{115\% \text{ of } x}{92\% \text{ of } y} = \frac{15}{16} \Rightarrow \frac{115x}{92y} = \frac{15}{16}$

$\Rightarrow \frac{x}{y} = \left(\frac{15}{16} \times \frac{92}{115}\right) = \frac{3}{4}$

28. (d) Let the class has 100 students.
$\Rightarrow$ Number of girls = 35 and number of boys = 65.
Since total number of present students = 70 and number of girls present = 80% of 35 = 28, so number of boys present = 70 – 28 = 42.
$\Rightarrow$ Required fraction = 42/65.

29. (b) Let 100 units be B's income and X units be B's expenditure
$\Rightarrow$ A's income = 60 units.
A's expenditure = 70X/100 units.
But 60 = 75/100 x X $\Rightarrow$ X = 80.
i.e., B's saving = (100 – 80) units = 20 units.

Hence A's saving = $60 - \frac{70}{100} \times 80 = 4$ units.

i.e., A's saving : B's saving = 4 : 20 = 1 : 5.

30. (a) Decrease in production is only due to decrease in manpower. Hence, manpower is decreased by 25%
Now, suppose that to restore the same production, working hours are increased by x%
Production = Manpower × Working hours
= M × W (say)
Now, M × W = (M –25% of M) × (W + x% of W)

or, $M \times W = \frac{75}{100} M \times \frac{100+x}{100} W$

or, 100 × 100 = 75 (100 + x)

or, $\frac{400}{3} = 100 + x$ $\therefore$ $x = \frac{100}{3} = 33\frac{1}{3}\%$

31. (b) Let original number = 100
New number = 120% of 120% of 100

$= \left(\frac{120}{100} \times \frac{120}{100} \times 100\right) = 144.$

Decrease on 144 = 44. Decrease on 100

$= \left(\frac{44}{144} \times 100\right)\% = 30\frac{5}{9}\%$

32. (d) Number of ticketless travellers in April

$= 4000 \times \left(1 + \frac{5}{100}\right)\left(1 - \frac{5}{100}\right)\left(1 - \frac{10}{100}\right)$

$= \left(4000 \times \frac{21}{20} \times \frac{19}{20} \times \frac{9}{10}\right) = 3591.$

33. (d) Weight of water in the mixture of 60 g water

$= 60 \times \frac{75}{100} = 45\text{g}$

weight of water in the mixture of 45 g water
= 45 + 15 = 60 g

$\therefore$ Percentage of water = $\frac{60 \times 100}{75} = 80\%$

34. (a) Servant's commission amount
= 6000 – 1500 = ₹ 4500
i.e., 15% = 4500

or, $100\% = \frac{4500}{15} \times 100 =$ ₹ 30000

35. (d) Let the total number of children = x

Then, $\frac{720}{x} = 20\%$ of $x = \frac{20}{100} \times x = \frac{x}{5}$

$\Rightarrow$ $x^2 = 720 \times 5 = 3600$
$\Rightarrow$ $x = 60$

$\therefore$ Each child receive = $\frac{720}{60} = 12$ sweets

36. (a) Suppose price of the printer = P
$\therefore$ Price of a computer = 3 P
Total cost of 60 computers = 180 P
Total cost of 20 printers = 20 P
$\therefore$ Total cost of the purchase = 200 P
Thus total cost of the printers is 10% of the total cost.

37. (d) Population after 2000 = 3244800
Population after 2001 = 2985216
Population at the end of 2003 = 3228810

38. (c) Non-defective products

$\frac{25 \times 0.98 + 35 \times 0.96 + 40 \times 0.95}{100} \times 100 = 96.1\%$

39. (a) On ₹ 100 he saves ₹ 6. On 115 he still saves ₹ 6. percentage increase of 15 on 94 = 15.95%

40. (c) **Half yearly exam**

Annual exam

$\underbrace{70 \times 0.6}_{42} + \underbrace{30 \times 0.8}_{24}$
+

$\therefore$ Total pass in annual exam = 42 + 24 = 66

41. (a) Solution = 100 ml and Alcohol = 40 ml
For first vessel

$\frac{40+x}{100+x} = \frac{1}{2}$,

so, x = 20ml

For second vessel

$$\frac{40+\frac{3}{5}y}{100+\frac{2}{5}y}=\frac{1}{2},$$

so, $y = 25$ml

Required percentage $= \frac{5}{25}\times 100 = 20\%$

42. (d) Total land of Sukhiya $= \frac{480x}{0.6} = 800\ x$

$\therefore$ Cultivated land of village $= 384000\,x$

$\therefore$ Required percentage $= \frac{800x}{384000}\times 100 = 0.20833.$

43. (b) Total votes = 6000. Valid votes = 75% of 6000 = 4500. Bhiku gets 65% of 4500 votes and Mhatre gets 35% of 4500. Hence, Mhatre gets: 0.35 × 4500 = 1575 votes.

44. (b) Solve using options. Checking for option (b), gives us:

$200000 \to 180000 \to 171000 \to 153900 \to 146205$

(by consecutively decreasing 200000 by 10% and 5% alternately)

45. (a) Solve through trial and error using the options. 12% (option (a)) is the only value that fits the situation.

46. (d) Salary of Dheeraj = ₹ 100

Salary of Anil = ₹ 80

Salary of Vinit = ₹ 70

Required percent $= \frac{10}{70}\times 100 = 14.28\%$

47. (d) Let population = 100

At least 50 people read a newspaper

At most 12.5 people read more than a newspaper

Hence, at least 37.5 people read only one newspaper.

48. (a) Let monthly income be y

Let money spent on grocery, clothes and education be $4x, 2x, 5x$

Money spent of clothes = ₹ 5540 = $2x$

$x = 2770$

Now $4x + 2x + 5x = 11x = 11 \times 2770$

$= 30470 = 55\%$ of y

$y = \frac{30470\times 100}{55}$

$y =$ ₹ 55,400

49. (e) Let the two number be x and y.

$35\%\,x = 2 \times 75\%\,y$

$35\%\,x = 150\%\,y$

$\frac{35}{100}\times x = \frac{150}{100}\times y$

$35x = 150y$

$\frac{x}{y} = \frac{\cancel{150}^{30}}{\cancel{35}^{7}}$, $x : y = 30 : 7$

50. (a) No. of boys, last year = 610

20% of 610 = 122

No. of boys, current year = 610 – 122 = 488

No. of girls = 175% of 488

$= \frac{175\times 488}{100} = 854$ girls

51. (c) Let maximum marks of test = x

Vidya marks = 350 + 296 = 646 = 76% of x

$x = \frac{646\times 100}{76} = 850$

52. (e) Let initial marks of student = x

After Re-evaluation marks reduced by 40% of x

New score = 60% of x = 96

$= \frac{60}{100}\times x = 96$

$x = \frac{96\times 100}{60}$

$x = 160$

Marks lose = 160 – 96 = 64.

53. (e) No. of candidates selected for job = 20% of 855

$= \frac{20\times 855}{100} = 171$

54. (d) Total cost price = 200 × 10 = ₹ 2000

Total selling price = 12 × 195 = ₹ 2340

$\therefore$ Profit per cent $= \frac{2340-2000}{2000}\times 100 = 17\%$

55. (a) Saving percentage = (100 – 55) % = 45%

If the income of Ajay be ₹ x, then,

$\frac{45\times x}{100} = 27000$

$\Rightarrow x = \frac{27000\times 100}{45} =$ ₹ 60000

56. (c) Salary in May 2000 = ₹ 15000

Salary in July 2000 $\Rightarrow$ 15000 + 10% of 15000 = ₹16500

Salary in October 2001 = 16500 + 10% of 16500 = ₹18150

57. (c) Let the total number of students in the class be x.

$\because \frac{72x}{100} - 40 + 40 + \frac{44x}{100} - 40 = x$

$\Rightarrow \frac{72x}{100}x + \frac{44x}{100} - x = 40$

$\Rightarrow \frac{16x}{100} = 40 \Rightarrow x = \frac{40 \times 100}{16}$

$\Rightarrow x = 250$

58. (c) If the number of trees in the garden be x, then

$x \times \frac{60}{100} \times \frac{25}{100} \times \frac{20}{100} = 1500$

$\Rightarrow x \times \frac{3}{5} \times \frac{1}{4} \times \frac{1}{5} = 1500$

$\Rightarrow x = \frac{1500 \times 5 \times 4 \times 5}{3} = 50000$

59. (b) $\frac{P-Q}{2} = (P+Q) \times \frac{30}{100}$

$\Rightarrow 5(P-Q) = (P+Q) \times 3$

$\Rightarrow 5P - 3P = 5Q + 3Q$

$\Rightarrow 2P = 8Q \Rightarrow P = 4Q$

$Q = \frac{x}{100} \times P$

$Q = \frac{x}{100} \times 4Q$

$\Rightarrow \frac{4x}{100} \Rightarrow x = 25$

60. (d) Let the total number of students be x.

Let A and B represent the sets of students who passed in English and Mathematics respectively.

Then, number of students passed in one or both the subjects

$= n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$= 75\% \text{ of } x + 60\% \text{ of } x - (x - 25\% \text{ of } x)$

$= \frac{3}{4}x + \frac{3}{5}x - \frac{3}{4}x = \frac{3}{5}x$

So, $\frac{3}{5}x = 240$

$x = \frac{240 \times 5}{3} = 400$

61. (b) $\frac{40}{100} \times \frac{4}{5} \times \frac{3}{4} \times x = 48$

$\frac{6}{25}x = 48$

$x = \frac{48 \times 25}{6} = 200$

1% of 200 is 2.

62. (d) % of votes secured by second candidate

$= (100 - 57) = 43\%$

Let total votes polled be x.

According to question,

$(57 - 43)\%$ of $x = 42000$

14% of $x = 42000 \Rightarrow x = 3,00,000$

63. (c) Let the number is x.

According to question

$x - 10\%$ of $x = 30$

$x - \frac{10}{100}x = 30$

$\left(\frac{100-10}{100}\right)x = 30$

$x = \frac{30 \times 100}{90} = 33\frac{1}{3}$

Hence, the number is $33\frac{1}{3}$

64. (c) Required percentage $= \frac{24}{40} \times 100 = 60\%$

65. (a) $\frac{125}{100} \times x = 100$

$\Rightarrow x = \frac{100 \times 100}{125} = 80$

66. (b) Marks of Supriyo = x marks

Accoding to question

Mahuya marks = Supriyo marks – 10% of Supriyo marks

$81 = \mathbf{x} - 10\% \text{ of } x \Rightarrow x\left(1 - \frac{10}{100}\right)$

$81 = \frac{9}{10}x \Rightarrow \frac{810}{9} = x$

$\therefore x = 90$ marks

67. (a) $R = S + 0.2S = 1.2S$

$\left(\frac{R-S}{R}\right) \times 100 = \left(1 - \frac{S}{R}\right) \times 100$

$= \left(1 - \frac{1}{1.2}\right) \times 100$

$= \frac{100}{6} = \frac{50}{3} = 16\frac{2}{3}$

68. (a) $\frac{1}{100} \times \frac{1}{100} \times \frac{25}{100} \times 1000 = 0.025$