

Hints and Solutions

1. Due to absence of letter 'T', the word MAIL cannot be formed.
2. Only 'Ban' can be formed from the given word.
3. Learning martial arts is necessary for girls for self-defence. So, argument I holds. However, argument II is vague since a training in these arts has nothing to do with their feminine grace.
4. Clearly, vowels A, E, I, O, U are coded as 1, 2, 3, 4, 5 respectively. Each of the consonants in the word is moved one step forward to give the corresponding letter of the code. So, the code for ACID becomes IDSE.

5. We have A = 2, B = 3, ..., Z = 27. Then,

$$\text{FOR} = F + O + R = 7 + 16 + 19 = 42.$$

$$\text{FRONT} = F + R + O + N + T = 7 + 19 + 16 + 15 + 21 = 78.$$

6. Each letter of the first group is moved three steps backward to obtain the corresponding letter of the second group.
7. The 1st, 2nd, 3rd, 4th, 5th letters of the first group are moved one, two, three, four, five steps forward respectively to obtain the corresponding letters of the second group.

8. The relationship is $x : \left(\frac{x}{2} + 1\right)$ or 20 : $\left(\frac{20}{2} + 1\right)$ or, 20 : 11
in the same way, 102 : $\left(\frac{102}{2} + 1\right)$ or 102 : (51 + 1) or, 102 : 52

9. The relationship is $x : x^2(x-1)$
or, 11 : $11^2(11-1)$ or, 11 : 121(10) or, 11 : 1210.
In the same way 8 : $8^2(8-1)$ or, 8 : 64(7) or, 8 : 448

10. Botany is the branch of science which deals with the study of plants. Similarly, Entomology is the branch of science which deals with the study of insects.

11. Sumit is 17th from the last and Ravi is 7 ranks ahead of Sumit. So, Ravi is 24th from the last.

Number of students ahead of Ravi in rank = (39 - 24) = 15.
So, Ravi is 16th from the start.

12. Clearly, the last bell rang 45 min before 7.45 am i.e., at 7.00 am. But it happened five minutes before the priest gave the information to the devotee. So, the information was given at 7.05 am.

13. If day before yesterday was Saturday, then today is Monday. Thus, tomorrow will be Tuesday and day after tomorrow will be Wednesday.

14. Let the number of boys and girls participating in sports be $3x$ and $2x$ respectively.

$$\text{Then, } 3x = 15 \text{ or } x = 5.$$

So, number of girls participating in sports = $2x = 10$.

Number of students not participating in sports
= $60 - (15 + 10) = 35$.

Let number of boys not participating in sports be y .

Then, number of girls not participating in sports = $(35 - y)$.

$$\therefore (35 - y) = y + 5 \Leftrightarrow 2y = 30 \Leftrightarrow y = 15$$

So, number of girls not participating in sports
= $(35 - 15) = 20$.

Hence, total number of girls in the class = $(10 + 20) = 30$.

15. Let the father's age be x and the son's age be y . Then,

$$x - y = y \text{ or } x = 2y$$

Now, $x = 36$. So, $2y = 36$ or $y = 18$.

\therefore Son's present age = 18 yr. So, son's age 5 yr ago
= 13 yr.

17. The only daughter of woman's father is she herself. So, the person is woman's son, i.e., the woman is the person's mother.

18. All except Kangaroo have thick hair or fur on their skin.

19. All except simmer are connected with light, while simmer is a way of cooking.

20. Each of the members except 48, is one more than the square of a certain number.

21. In all other pairs, $\frac{1st\ number - 1}{7} = 2nd\ number$.

22. All other groups contain alternate letters of the alphabet.

23. In all other numbers, the sum of the digits is 17.

24. The first number is twice the second and the second number is twice the third. A similar relationship exists between the number in the group (40, 20, 10).

27. We have $(16 - 6)^2 + (5 - 2)^2 = 10^2 + 3^2 = 109$,
 $(22 - 15)^2 + (21 - 19)^2 = 7^2 + 2^2 = 53$

So, missing number

$$= (17 - 13)^2 + (51 - 48)^2 = 4^2 + 3^2 = 25$$

28. Sprawl, Spruce, Spruce, Spume, Skort.

29. Crude, Cruise, Crumb, Crupper, Crusade.

30. The series is aax|aaax|aaaaa|aaaaagb.

Thus, the number of a's is increasing by one in the successive sequence.

31. In this series, 5 is added to the previous number and the number 70 is inserted at every third number.

32. R $\xrightarrow{-1}$ U $\xrightarrow{-2}$ X $\xrightarrow{-3}$ A $\xrightarrow{-4}$ D $\xrightarrow{-5}$ (3)

33. The pattern is $+2 + 1, +2 + 2 + 3, \dots$

So, missing number is $59 + 2 + 4 = 122$

34. 1st letter N $\xrightarrow{-2}$ X $\xrightarrow{-3}$ (I) $\xrightarrow{-4}$ E $\xrightarrow{-5}$ B

2nd letter 5 $\xrightarrow{-2}$ 7 $\xrightarrow{-3}$ (9) $\xrightarrow{-4}$ 14 $\xrightarrow{-5}$ 19

3rd letter V $\xrightarrow{-2}$ T $\xrightarrow{-3}$ (Q) $\xrightarrow{-4}$ P $\xrightarrow{-5}$ N

35. The correct pattern is $\times 2 + 1, \times 3 + 1, \times 2 + 1, \times 3 + 1, \dots$

So, 356 is wrong and must be replaced by $(129 \times 3 + 1)$ i.e., 388.



So, Dolly's brother is Bhavna's Maternal Uncle.



38. There are 11 intervals when the clock strikes 12.

Time taken for 11 intervals = 48 s.

$$\therefore \text{Time taken for 1 interval} = \left(\frac{48}{11}\right) s$$

In order to strike 3, there are 2 intervals, for which the

$$\text{time taken} = \left(\frac{48}{11} \times 2\right) s = 8 \frac{8}{11} s$$

40. 15th July, 1996 = (1995 yr + Period from 1.1.1996 to 15.7.1996)

$$1600 \text{ yr} = 0 \text{ odd days}$$

$$300 \text{ yr} = 1 \text{ odd day}$$

$$95 \text{ yr} = (23 \text{ leap yr} + 72 \text{ ordinary yr})$$

$$= (23 \times 2 + 72) \text{ odd days} = 118 \text{ odd days}$$

118 odd days = (16 weeks + 6 days - 6 odd days)

Jan Feb March April May June July

$$(31 + 29 + 31 + 30 + 31 + 30 + 15)$$

$$= 197 \text{ days} = (28 \text{ weeks} + 1 \text{ day}) = 1 \text{ odd day.}$$

Total odd days = $(0 + 1 + 6 + 1) = 1 \text{ odd day.}$

So, it was a Monday.

41. As shown in figure the man initially faces in the direction OA. On moving 135° anti-clockwise, he faces in the direction OB. On further moving 180° clockwise, he faces in the direction OC, which is South-west.



42. Clearly, we have to find a number which lies inside the triangle, the rectangle and the circle, which is 4.

43. The movements of Radha are as shown in figure. Clearly, Radha's distance from the starting point



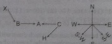
$$O = OD = (OC - CD)$$

$$= (AB - CD)$$

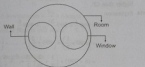
$$= (14 - 4) \text{ m}$$

$$= 10 \text{ m.}$$

44. Clearly, X is the farthest West.



45. Both wall and window are parts of a room. But, wall and window are entirely different.



46. On interchanging + and - and 4 and 8 in (b), we get the equation as
 $8 + 4 - 12 = 0$ or $12 - 12 = 0$ or $0 = 0$, which is true.
47. Seventh letter from the left is A and the third letter to its right is K.
48. The word formed by the letters given in the box is thermometer; ∴ The missing letters are m, e.
49. The word is 'EXCHANGE'. Therefore, missing letters are E and N.
50. Let the number of guests be x . Then,

$$\text{number of bowls of rice} = \frac{x}{2}, \text{ number of bowls of dal} = \frac{x}{3},$$

$$\text{number of bowls of meat} = \frac{x}{4}$$

$$\therefore \frac{x}{2} + \frac{x}{3} + \frac{x}{4} = 65 \Rightarrow \frac{6x + 4x + 3x}{12} = 65 \Rightarrow 13x = 65 \times 12$$

$$\Rightarrow x = \left(\frac{65 \times 12}{13} \right) = 60.$$

101. Let a be the side of square

$$\therefore a^2 = 484$$

$$\Rightarrow a = 22$$

$$\therefore \text{Length of wire} = 4 \times 22$$

$$= 88 \text{ cm}$$

$$\therefore \text{Circumference of circle} = 88$$

$$\Rightarrow r = \frac{88 \times 7}{2 \times 22} = 14 \text{ cm}$$

$$\therefore \text{Area of circle} = \pi r^2$$

$$= \frac{22}{7} \times 14 \times 14$$

$$= 616 \text{ cm}^2$$

102. Let a be the side of square.

$$a^2 = 81$$

$$\Rightarrow a = 9 \text{ cm}$$

$$\therefore \text{Perimeter of square} = 4 \times 9 = 36 \text{ cm}$$

$$\therefore \text{Length of wire} = 36$$

$$\Rightarrow \pi r + 2r = 36$$

$$r = \frac{36 \times 7}{36} = 7 \text{ cm}$$

$$\therefore \text{Area of circle} = \pi r^2$$

$$= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$

103. CP of one pencil = ₹ $\frac{1}{5}$

and SP of one pencil = ₹ $\frac{1}{3}$

$$\therefore \text{Gain} = \frac{1}{3} - \frac{1}{5} = \frac{5-3}{15} = ₹ \frac{2}{15}$$

$$\therefore \% \text{ Gain} = \frac{2 \times 100}{15} = \frac{200}{3} = 66 \frac{2}{3} \%$$

104. Let ₹ P be the given sum of money, we have

$$2^3 = P \left(1 + \frac{R}{100} \right)^4$$

Or $2 = \left(1 + \frac{R}{100} \right)^4$

Or $2^{\frac{1}{4}} = \left(1 + \frac{R}{100} \right)$... (i)

Let the sum become 8 times in T years, then

$$8P = P \left(1 + \frac{R}{100} \right)^T$$

Or $8 = \left(1 + \frac{R}{100} \right)^T$

$$8 = \left(2^{\frac{1}{4}} \right)^T$$

Or $8 = 2^{\frac{T}{4}}$

Or $2^3 = 2^{\frac{T}{4}}$

Or $T = 4 \times 3 = 12 \text{ yr.}$

105. LCM of 7, 9 and 12 = 84 in the given options only 253 is a least number which when divided by 7, 9 and 12 leaves the same remainder 1 in each case since 253 leaves the remainder 1, when 253 is divided by 84.

106. Let the average of 5 innings = x

Score in sixth innings = 80

∴ total of 5 innings = $5x$

According to question,

$$\frac{5x + 80}{6} = x + 5$$

Or $5x + 80 = 6x + 30$

Or $x = 80 - 30 = 50$

∴ His average after sixth innings = $50 + 5 = 55$

107. Change in SI

$$= \frac{25}{2} - 10 = \frac{5}{2} \%$$

∴ $\frac{5}{2} \%$ of principal = ₹ 1250

$$\begin{aligned} \text{Principal} &= ₹ \frac{1250 \times 2 \times 100}{5} \\ &= ₹ 50000 \end{aligned}$$

$$108. \sqrt{\frac{48.4}{0.289}} = \sqrt{\frac{484}{2.89}}$$

$$= \frac{22}{17} = \frac{220}{17} = 12\frac{16}{17}$$

109. Expression

$$\begin{aligned} &= 0.\overline{63} - 0.\overline{37} + 0.\overline{80} \\ &= \frac{63}{99} - \frac{37}{99} + \frac{80}{99} \\ &= \frac{63 + 37 + 80}{99} = \frac{180}{99} \\ &= 1\frac{81}{99} = 1.\overline{81} \end{aligned}$$

110. Expression

$$\begin{aligned} &= \sqrt{284 + \sqrt{52 + \sqrt{144}}} \\ &= \sqrt{248 + \sqrt{52 + 12}} \\ &= \sqrt{248 + \sqrt{64}} \\ &= \sqrt{248 + 8} = \sqrt{256} = 16 \end{aligned}$$

111. Let the amount to be distributed be ₹ x .

$$P : Q : R = 2 : 7 : 9$$

$$\text{Sum of the ratios} = 2 + 7 + 9 = 18$$

$$P = \frac{2}{18} \times x = \frac{x}{9}$$

$$Q = \frac{7}{18} \times x$$

$$R = \frac{9}{18} \times x = \frac{x}{2}$$

As given,

$$\frac{x}{9} + \frac{7x}{18} = \frac{x}{2}$$

Thus, we get to conclusion. Amount should necessarily be known.

112. Let the CP be ₹ 100. Then, SP = ₹ 120

Let the marked price be ₹ x .

Then, 90% of $x = ₹ 120$

$$\begin{aligned} \Rightarrow x &= \frac{120 \times 100}{90} = \frac{400}{3} \\ &= 133\frac{1}{3} \end{aligned}$$

It is $33\frac{1}{3}\%$ higher than the CP.

113. Let the CP be ₹ 100. Then, SP = ₹ 120.

Let the marked price be ₹ x .

Then, 90% of $x = 120$

$$\Rightarrow x = \frac{120 \times 100}{90} = \frac{400}{3} = 133\frac{1}{3}$$

It means he should mark $33\frac{1}{3}\%$

higher than CP.

114. Expression

$$\begin{aligned} &= 999\frac{1}{7} + 999\frac{2}{7} + \dots + 999\frac{6}{7} \\ &= \left(999 + \frac{1}{7}\right) + \left(999 + \frac{2}{7}\right) + \dots + \left(999 + \frac{6}{7}\right) \\ &= (6 \times 999) + \left(\frac{1}{7} + \frac{2}{7} + \frac{3}{7} + \dots + \frac{6}{7}\right) \\ &= 5994 + \left(\frac{1+2+3+4+5+6}{7}\right) \\ &= 5994 + \frac{21}{7} = 5994 + 3 \\ &= 5997 \end{aligned}$$

115. Distance covered in 1 revolution

= Circumference of wheel

$$= 2\pi r = 1 \times \frac{22}{7} \times 20 \text{ cm}$$

Total distance = 176 m

$$= 17600 \text{ cm}$$

∴ Number of revolutions

$$\begin{aligned} &= \frac{17600}{2 \times \frac{22}{7} \times 20} \\ &= \frac{17600 \times 7}{2 \times 22 \times 20} = 140 \end{aligned}$$

116. Volume of the box = $(56 \times 35 \times 28) \text{ cm}^3$

Volume of a soap cake

$$\begin{aligned} &= (8 \times 5 \times 4) \text{ cm}^3 \\ &= \frac{56 \times 35 \times 28}{8 \times 5 \times 4} = 343 \end{aligned}$$

117. If ₹ x and ₹ y be the cost price of two goats, then,

80% of $x = 144\%$ of y

$$\Rightarrow \frac{x}{y} = \frac{144}{80} = \frac{9}{5}$$

i.e., $x : y = 9 : 5$

Sum of the ratios = $9 + 5 = 14$

∴ Cost of first goat = ₹ $\left(\frac{9}{14} \times 1008\right) = ₹ 648$

118. Let required distance be x km. Then,

$$\frac{x}{3} + \frac{x}{2} = 5$$

$$\Rightarrow \frac{2x + 3x}{6} = 5$$

$$\Rightarrow 5x = 6 \times 5$$

$$\therefore x = \frac{6 \times 5}{5} = 6 \text{ km}$$

118. Speed upstream

$$= \frac{40}{8} = 5 \text{ km/h}$$

$$\text{Speed downstream} = \frac{36}{6} = 6 \text{ km/h}$$

∴ Speed of boat in still water

$$= \frac{1}{2}(5 + 6) = 5.5 \text{ km/h}$$

120. Total length of trains

$$= 140 + 160 = 300 \text{ m}$$

Relative speed = 60 + 40

$$= 100 \text{ km/h}$$

$$= 100 \times \frac{5}{18} \text{ m/s}$$

$$= \frac{250}{9} \text{ m/s}$$

∴ Time taken to cross each other

$$= \frac{300}{\frac{250}{9}} = \frac{300 \times 9}{250} = 10.8 \text{ s}$$

121. Total weight increased

$$= \frac{1}{2} \times 50 = 25 \text{ kg}$$

∴ Weight of the new man

$$= 50 + 25 = 75 \text{ kg}$$

122. Remaining monthly income

$$= (100 - (12 + 18))\% \text{ of } ₹ 33650$$

$$= ₹ \frac{70 \times 33650}{100} = ₹ 23555$$

123. Amount spent on food and entertainment together

$$= 34\% \text{ of } ₹ 33650$$

$$= ₹ \frac{34 \times 33650}{100}$$

$$= ₹ 11441$$

124. Expenditure on children = 23%

Provident fund savings = 12%

For no children, total savings = 35%

∴ Required savings = 35% of ₹ 33650

$$= ₹ \frac{35 \times 33650}{100}$$

$$= ₹ 11777.50$$

125. Let original rate = ₹ x per egg.

$$\text{New rate} = 80\% \text{ of } x = ₹ \frac{4x}{5}$$

$$\text{Original quantity for } ₹ 40 = \frac{40}{x}$$

$$\text{New quantity} = 40 \times \frac{5}{4x} = \frac{50}{x}$$

$$\therefore \frac{50}{x} - \frac{40}{x} = 20$$

$$\Rightarrow \frac{10}{x} = 20$$

$$\Rightarrow x = \frac{10}{20} = \frac{1}{2}$$

∴ Reduced price

$$= 80\% \text{ of } ₹ \frac{1}{2}$$

$$= \frac{4}{5} \times \frac{1}{2} = ₹ \frac{2}{5}$$

$$= \frac{2}{5} \times 100 = 40 \text{ paise}$$

$$126. (a + b + c)^2 = a^2 + b^2 + c^2 + 2$$

$$(ab + bc + ca)$$

$$= (a + b + c)^2$$

$$= 250 + 2 \times 3 = 256$$

$$\therefore a + b + c = \sqrt{256} = \pm 16$$

$$127. A's 1 \text{ day's work} = \frac{1}{5}$$

$$B's 1 \text{ day's work} = \frac{1}{10}$$

$$\text{Ratio} = \frac{1}{15} : \frac{1}{10} = 2 : 3$$

Sum of the ratios = 2 + 3 = 5

$$\therefore A's \text{ share} = ₹ \frac{2}{5} \times 30000 = ₹ 12000$$

$$128. \text{ If } a + b + c = 0,$$

$$a^3 + b^3 + c^3 = 3abc$$

Here, $0.111 + 0.222 + (-0.333)$

$$= 0$$

$$\therefore (0.111)^3 + (0.222)^3 + (-0.333)^3$$

$$= -3 \times 0.111 \times 0.222 \times 0.333$$

$$= -(0.333)^2 \times 0.222$$

∴ Expression

$$= [-(0.333)^2 \times 0.222 + (0.333)^2 \times 0.222]^3 = 0$$

129. Original savings

$$= ₹ (13500 - 9000) = ₹ 4500$$

New income = 114% of ₹ 13500

$$= ₹ (114 \times 135) = ₹ 15390$$

New expenditure = 107% of ₹ 9000

$$= ₹ (107 \times 90)$$

$$= ₹ 9630$$

New savings = ₹ (11390 - 9630)

$$= ₹ 5760$$

∴ Percentage increase in savings

$$= \frac{5760 - 4500}{4500} \times 100$$

$$= \frac{1260}{45} = 28\%$$