

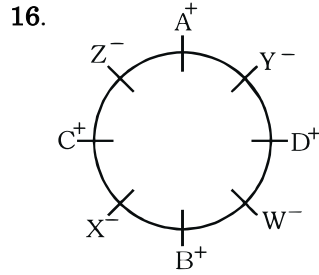
ANSWER SET - 09

01. (4) 02. (1) 03. (1) 04. (1) 05. (3)
 06. (2) 07. (2) 08. (3) 09. (1) 10. (2)
 11. (1) 12. (2) 13. (2) 14. (2) 15. (4)
 16. (3) 17. (4) 18. (2) 19. (4) 20. (1)
 21. (4) 22. (3) 23. (1) 24. (4) 25. (3)
 26. (2) 27. (3) 28. (1) 29. (2) 30. (1)
 31. (1) 32. (4) 33. (2) 34. (4) 35. (1)
 36. (3) 37. (1) 38. (2) 39. (2) 40. (3)
 41. (3) 42. (3) 43. (2) 44. (4) 45. (1)
 46. (3) 47. (4) 48. (2) 49. (1) 50. (3)
 51. (3) 52. (1) 53. (4) 54. (3) 55. (2)
 56. (2) 57. (3) 58. (3) 59. (1) 60. (3)
 61. (3) 62. (1) 63. (3) 64. (2) 65. (3)
 66. (4) 67. (3) 68. (4) 69. (3) 70. (4)
 71. (2) 72. (3) 73. (4) 74. (3) 75. (3)
 76. (4) 77. (3) 78. (3) 79. (4) 80. (2)
 81. (4) 82. (3) 83. (4) 84. (4) 85. (4)
 86. (2) 87. (3) 88. (3) 89. (4) 90. (1)
 91. (4) 92. (3) 93. (4) 94. (2) 95. (4)
 96. (2) 97. (3) 98. (3) 99. (4) 100. (2)

EXPLANATION - 09

01. $3265 = 3265 + 1111 = 4376$
 $4673 = 4673 + 1111 = 5784$
 02. Here the first word is the synonym of the second word.
 03. $\begin{matrix} Q & Y & G & O & S & A & I & Q \\ & & & +2 & & & & \\ & & & & +2 & & & \\ & & & & & +2 & & \\ & & & & & & +2 & \\ & & & & & & & +2 \end{matrix}$
 $\begin{matrix} U & C & K & S & W & E & M & U \\ & & & +2 & & & & \\ & & & & +2 & & & \\ & & & & & +2 & & \\ & & & & & & +2 & \\ & & & & & & & +2 \end{matrix}$
 04. The earth moves on its Axis. Similarly, the wheel moves on its Hub.
 05. Except (C), all are divisible by 4.
 06. Except (B), all are dependent on each other to run properly.
 07. Except (B), all are part of medical science
 08. mno/ nopq/ opqrs/ pqrst
 09. $\begin{matrix} & & & 420 & & & & \\ 462 & & 422 & & 380 & & 342 & & 306 \\ & -42 & & -40 & & -38 & & -36 & \end{matrix}$
 10. ANIMAL
 11. $9(-1) \Rightarrow 8(-1) = 7$
 $18(-2) \Rightarrow 16(-2) = 14$
 $36(-3) \Rightarrow 33(-3) = 30$
 12.
 $\begin{matrix} V & VIII & XI & XIV & XVII & XX \\ +3 & +3 & +3 & +3 & +3 & +3 \end{matrix}$
 13.
 14. $18 \times 14 + 6 \cdot 16 \div 4$
 $= 18 \times 14 + 6 \cdot 4$
 $= 252 + 6 \cdot 4$
 $= 258 \cdot 4$
 $= 254$
 15. $8 \cdot 7 = 8 \times 7 = 56$

$4 \cdot 7 = 4 \times 7 = 28$
 $13 \cdot 6 = 13 \times 6 = 78$
 $18 \cdot 9 = 18 \times 9 = 162$

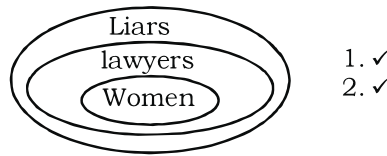


\oplus represents 'Men'.
 \ominus represents 'Women'.

Here, W and Y are adjacent to D.

17.

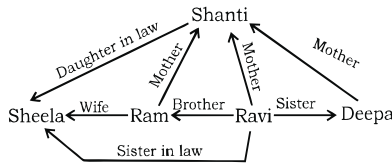
18.



19. Crime → Police → Judge →
 (3) (1) (4)

Judgement → Punishment
 (5) (2)

20.



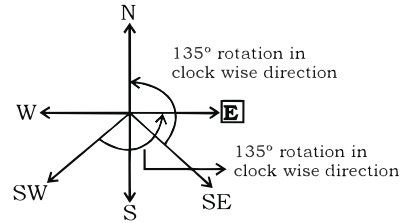
21. $\begin{matrix} A_L & \leftarrow & 9 & \leftarrow & 5 & \leftarrow & B_R \end{matrix}$

$A_L \rightarrow$ Left side
 $B_R \rightarrow$ Right side
 Total number of children = $A_L + B_R - 1$
 $= 18 + 5 - 1 = 22$
 After interchanging their positions,
 $T = A_L + B_R - 1$
 $22 = 9 + B_R - 1$
 $\Rightarrow B_R = 14$

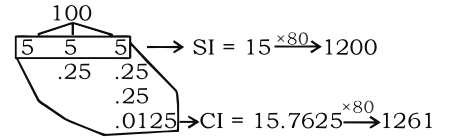
22. M a d a g a s c a r
 $\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$
 (4) (7) (2) (7) (8) (7) (9) (6) (7) (0)

Similarly,
 M a d r a s
 $\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$
 4 7 2 0 7 9

25.

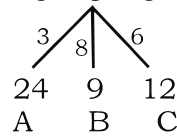


26. Let the principal amount be 100%.



So, CI will be ₹1261.

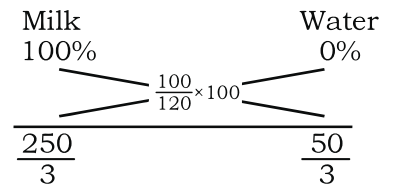
27. $3 \times 8 \times 3$



The work completed by B & C in 3 days
 $= 3(8 + 6)$
 $= 42$ units
 Remaining work = $72 - 42$
 $= 30$ Units

Required days = $\frac{30}{3} = 10$ days

28. Let the CP of Milk be 100%



Ratio of Milk & Water 5 : 1
 So, Ratio of Water and Milk = 1 : 5

29. Let the height and radius be 'r'.
 Ratio of volumes

$= \frac{1}{3} \pi r^2 \times r : \frac{2}{3} \pi r^3 : \pi r^2 \times r$
 $= 1 : 2 : 3$

30. $\tan(x + y) = \sqrt{3} = \tan 60^\circ$

$n + y = 60^\circ$ (i)

$\sin(x - y) = \sin 30^\circ$

$x - y = 30^\circ$ (ii)

$\frac{x + y = 60^\circ}{x = 45^\circ}$ (i)

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

$\Rightarrow a^3 + b^3 + c^3 - 3abc = \frac{1}{2}(a + b + c)\{(a-b)^2 + (b-c)^2 + (c-a)^2\}$

$\Rightarrow (a-b)^2 + (b-c)^2 + (c-a)^2 = 0$
 $a = b, b = c, c = a$

So, $a = b = c$

32. $\cos 10^\circ \cdot \cos 30^\circ \cdot \cos 50^\circ \cdot \cos 70^\circ$
 $= \cos(90 - 80) \cdot \cos 30^\circ \cdot \cos(90 - 40) \cdot \cos(90 - 20)$
 $= \sin 80 \cdot \cos 30^\circ \cdot \sin 40^\circ \cdot \sin 20^\circ$

$$= \frac{1}{4} \sin 3 \times 20^\circ \times \cos 30^\circ$$

$$\left[\begin{array}{l} \because \sin \theta \cdot \sin 2\theta \cdot \sin 4\theta \\ = 1/4 \sin 3\theta \end{array} \right]$$

$$= \frac{1}{4} \sin 60^\circ \times \cos 30^\circ$$

$$= \frac{1}{4} \times \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}$$

$$= \frac{\sqrt{3} \times \sqrt{3}}{16} = \frac{3}{16}$$

33. $(x-2a)(x-4a)(x-10a)(x-11a) + Ka^4$

$$(2a \times 4a \times 10a \times 11a) + Ka^4$$

$$(880a^4) + Ka^4$$

$$a^4(880 + K)$$

By putting $K = 81$, the equation will be a perfect square.

34. $A : B = 5 : 2 : 2$

$$B : C = \frac{7 : 7 : 13}{35 : 14 : 26}$$

$$\text{Share of A} = \frac{35}{75} \times 60,000$$

$$= ₹28000$$

35. Let the number be x .

$$x \times \frac{80}{100} + 80 = x$$

$$\Rightarrow x - \frac{4}{5}x = 80$$

$$\Rightarrow \frac{x}{5} = 80$$

$$\Rightarrow x = 400$$

36. $\frac{x + \sqrt{x^2 - 1}}{x - \sqrt{x^2 - 1}} + \frac{x - \sqrt{x^2 - 1}}{x + \sqrt{x^2 - 1}} = 14$

$$\Rightarrow \frac{(x + \sqrt{x^2 - 1})^2 + (x - \sqrt{x^2 - 1})^2}{(x - \sqrt{x^2 - 1})(x + \sqrt{x^2 - 1})} = 14$$

$$\Rightarrow \frac{2[x^2 + (\sqrt{x^2 - 1})^2]}{x^2 - (\sqrt{x^2 - 1})^2} = 14$$

$$\left[\begin{array}{l} (a+b)^2 + (a-b)^2 \\ = 2(a^2 + b^2) \end{array} \right]$$

$$\Rightarrow \frac{2[x^2 + x^2 - 1]}{x^2 - x^2 + 1} = 14$$

$$\Rightarrow 2[2x^2 - 1] = 14$$

$$\Rightarrow 2x^2 - 1 = 7$$

$$\Rightarrow 2x^2 = 8$$

$$\Rightarrow x^2 = 4$$

$$\Rightarrow x = \pm 2$$

37. $(2\cos^2 \theta - 1) \left(\frac{1 + \tan \theta}{1 - \tan \theta} + \frac{1 - \tan \theta}{1 + \tan \theta} \right)$

$$(\cos 2\theta) \left[\frac{(1 + \tan \theta)^2 + (1 - \tan \theta)^2}{(1 - \tan \theta)(1 + \tan \theta)} \right]$$

$$(\cos 2\theta) \left[\frac{2(1 + \tan^2 \theta)}{1 - \tan^2 \theta} \right]$$

$$\cos 2\theta \left[\frac{2 \times \sec^2 \theta}{1 - \frac{\sin^2 \theta}{\cos^2 \theta}} \right]$$

$$\cos 2\theta \left[\frac{2 \times \sec^2 \theta \times \cos^2 \theta}{\cos^2 \theta - \sin^2 \theta} \right]$$

$$= \cos 2\theta \left[\frac{2 \times 1}{\cos 2\theta} \right]$$

$$\Rightarrow 2 \times 1 = 2$$

38. Clearly $a * b = \sqrt{a^2 + b^2}$

$$\therefore 5 * 12 = \sqrt{5^2 + 12^2}$$

$$= \sqrt{169}$$

$$= 13$$

39. Sum of present age of husband, wife and child = $(27 \times 3 + 3 \times 3)$ years = 90 years.

\Rightarrow Sum of present age of wife and child = $(20 \times 2 \times 5 \times 2)$ years = 50 years

\Rightarrow Present age of husband = $90 - 50 = 40$ years

40. Let the original weight be 100%
Weight of container = 25%, then fluid = 75%

New weight of fluid = $50\% \cdot 25\% = 25\%$

$$\therefore \text{Required fraction} = \frac{75\% - 25\%}{75\%}$$

$$= \frac{50\%}{75\%} = \frac{2}{3}$$

41. Let the C.P. of retailer be 100%.
Marked Price = 150%

$$S.P = 150 \times \frac{75}{100} = \frac{225}{2}\%$$

$$\text{Actual profit} = \frac{225}{2}\% - 100\%$$

$$= \frac{25}{2}\% = 12\frac{1}{2}\%$$

42. Let the number be x and $(184 - x)$ then,

$$\frac{x}{3} - \frac{(184 - x)}{7} = 8$$

$$\Rightarrow 7x - 3(184 - x) = 168$$

$$\Rightarrow 10x = 720$$

$$x = 72$$

$$\Rightarrow (184 - x) = 184 - 72 = 112$$

\therefore Smaller number is 72.

43. Work done by the leak in one hour

$$= \frac{1}{3} - \frac{1}{7} \text{ unit}$$

$$= \frac{7-6}{21} \text{ unit}$$

$$= \frac{1}{21} \text{ unit}$$

So, leakage will take 21 hours to empty tank.

44. Monday to Wednesday = 37×3

Tuesday to Thursday = 34×3

Monday - Thursday = $3(37 - 34)$

Monday - Thursday = 9°C

Monday - $\frac{4}{5}$ Monday = 9°C

Monday = 45°

Thursday = $45 - 9$

= 36°C

45. Let the C.P. be 100%.

then, SP = 80% [$100\% - 20\%$]

Actual C.P. = $100\% \cdot 40\% = 60\%$

$$\text{Profit \%} = \frac{80 - 60}{60} \times 100$$

$$= \frac{20}{60} \times 100$$

$$= 33\frac{1}{3}\%$$

46. Area of regular pentagon

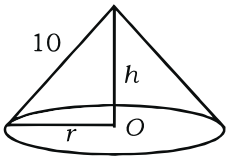
$$= 5a^2 \frac{\sqrt{3}}{4}$$

$$5a^2 \times \frac{\sqrt{3}}{4} = 125\sqrt{3}$$

$$a^2 = \frac{125\sqrt{3} \times 4}{5\sqrt{3}} = 100$$

Each side = $a = 10$ cm.

47.



$$\begin{aligned} \text{Volume} &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \pi r^2 (\sqrt{10^2 - r^2}) \\ &= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \sqrt{100 - 49} \\ &= \frac{1}{3} \times 22 \times 7 \times \sqrt{51} \\ &= \frac{154}{3} \sqrt{51} \text{ m}^3 \end{aligned}$$

48. Since, one root = $2 + \sqrt{5}$, then
another root = $2 - \sqrt{5}$

$$\begin{aligned} \text{sum of roots} &= (2 + \sqrt{5}) + (2 - \sqrt{5}) = 4 \\ \text{Multiplication of the roots} \\ &= (2 - \sqrt{5})(2 - \sqrt{5}) \\ &= 4 - 5 = -1 \end{aligned}$$

Then, required quadratic equation is

$$x^2 - (\text{sum of roots})x + (\text{Multiplication of roots}) = 0$$

$$\Rightarrow x^2 - 4x + (-1) = 0$$

$$\Rightarrow x^2 - 4x - 1 = 0$$

49. Let C.P of watch = 100%

Then, marked price = 140%

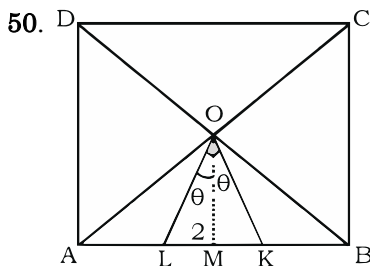
$$\text{Then, S.P} = 140 \times \frac{90}{100} = 126\%$$

Gross Profit = 26%

$$\text{Net profit} = 26\% \times \frac{90}{100} = \frac{117}{5}\%$$

$$\frac{117}{5}\% = ₹468 \text{ (Given)}$$

$$100\% = ₹2000$$



Let sides of square be a.

$$AO = \frac{\sqrt{2}a}{2} = \frac{a}{\sqrt{2}} = AK = BL$$

$$LM = \frac{a}{\sqrt{2}} - \frac{a}{2} [BL - BM]$$

$$OM = \frac{a}{2}$$

In ΔLOM ,

$$\tan \frac{\theta}{2} = \frac{LM}{OM} = \frac{\frac{a}{\sqrt{2}} - \frac{a}{2}}{\frac{a}{2}}$$

$$= \frac{a \left(\frac{2 - \sqrt{2}}{2\sqrt{2}} \right)}{\frac{a}{2}}$$

$$= \frac{2 - \sqrt{2}}{2\sqrt{2}} \times 2$$

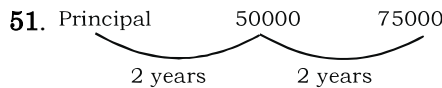
$$= \sqrt{2} - 1$$

$$\tan \theta = \frac{2 \tan \frac{\theta}{2}}{1 - \tan^2 \frac{\theta}{2}} = \frac{2(\sqrt{2} - 1)}{1 - (2 + 1 - 2\sqrt{2})}$$

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

$$\tan \theta = 1 = \tan 45^\circ$$

$$\theta = 45^\circ$$



$$\text{Ratio} = 50,000 : 75,000 = 2 : 3$$

\therefore P : IInd year amount must also be in the ratio of 2 : 3.

$$\frac{P}{50000} = \frac{2}{3}$$

$$P = \frac{100000}{3}$$

$$= ₹33333.33$$

52. Girls in college R and S

$$= 1500 + 3000$$

$$= 4500$$

Boys in college R and S

$$= 2500 + 4500$$

$$= 7000$$

$$\text{Ratio of Girls \& Boys} = 4500 : 7000$$

$$= 9 : 14$$

53. Required Percentage = $\frac{4500}{3500} \times 100$

$$= 128.57\%$$

$$= 129\%$$

54. Boys = 5500 + 3500 + 2500 + 4500 + 4000

$$\text{Average of boys} = 20000$$

$$\text{Average of boys} = \frac{20000}{5}$$

$$= 4000$$

55. Girls in college R & S

$$= 1500 + 3000 = 4500$$

$$\text{Girls in College P and T} = 2500 + 1500 = 4000$$

$$\text{Required ratio} = 4500 : 4000$$

$$\Rightarrow 9 : 8$$

57. The Pancreas maintains the body's blood glucose (sugar) balance. Primary hormones of the pancreas include insulin and glucagon and both regulate blood glucose. Diabetes is the most common disorder associated with it. Pancreas is both an endocrine and exocrine gland i.e. it has a dual function of secreting hormones into blood (endocrine) and secreting enzymes through ducts (exocrine).

58. The Jet plane engine works on the principal of conservation of linear momentum. This law states that when no net external force acts on a system consisting of several particles, the total linear momentum of the system is conserved and is the vector sum of each particle in the system. It can be deduced from Newton's third law of motion i.e every action has equal and opposite reaction. When the fuel of rocket and Jet plane is exploded, gases escape with a large velocity and hence a large momentum. The escaping gases in turn, impart an equal and opposite momentum to the rocket and Jet planes.

59. Anthracite coal is almost made entirely of Carbon. It is harder than other forms of coal such as bituminous and is found in areas surrounding mountains or deep valleys. It burns much cleaner than other forms of coal due to its low pollutant content. It contains 91% to 98% pure carbon which burns with a blue, smokeless flame.

60. Temperature, pressure and volume are regulated in a complex system. Refrigerators contain gas, which is drawn through a long line at low pressure and low temperature. Then, gas is condensed or compressed using electricity. Next, it is converted to a higher pressure, which in turn causes internal temperatures to rise. Heat and elec-

tricity are then transferred to a unit called a condenser, which removes excess heat. As a result, gas begins to cool, and ultimately condenses into a liquid form.

61. The brain is one of the most metabolically active organ in the body. Together with the heart, liver and kidneys, it consumes about 60% of the body's energy requirements. The heart and kidney are more metabolically active than the brain, but as the brain is large, it takes a higher proportion of the body's energy needs. At rest, it uses approx 20% to 23% of the body's total energy requirements despite accounting for only 2% of the body's mass. Almost all of the oxygen is used to oxidize glucose to carbon dioxide and water.
62. Thyroid gland regulates metabolism, helps in breaking down the food and convert it to energy. Main thyroid hormones are T3 and T4. Thyroid disorders are common, and they include goiters, hyperthyroidism and hypothyroidism.
63. The Beaufort scale is a scale for measuring wind speeds. It is based on observation rather than accurate measurement. The scale was developed in 1805 by Sir Francis Beaufort.
64. Thigmonastic or seismonastic movements in Touch-me-not (*Mimosa pudica*) plant is done by pulvinus which shows elastic properties and induced movements of the petiole.
65. The right Auricle or Atrium is one of the four hollow chambers in the interior of the heart. It is located in the upper right corner of the heart superior to the right ventricle. Deoxygenated or impure blood entering the heart through veins from the tissues of the body first enters the heart through the right Auricle before being pumped into the right Ventricle.
66. When cells between the columns of vascular tissue connect the cambia inside the columns of vascular tissue to form a complete cylinder around the stem. The cells formed toward the inside are called secondary xylem or wood and those formed toward the outside of the cambium are called secondary phloem.
69. The rice fruit is a caryopsis with

a single seed fused to the ripened ovary wall, pericarp. Lemma and palea enclose the caryopsis and constitute the husk. The rice grain is also known as rough rice.