> ANSWER KEY

1. (a)	**2.** (b)	**3.** (b)	**4.** (d)	**5.** (a)	**6.** (a)	**7.** (d)	**8.** (d)	**9.** (b)	**10.** (c)
11. (c)	**12.** (c)	**13.** (d)	**14.** (b)	**15.** (d)	**16.** (b)	**17.** (b)	**18.** (a)	**19.** (a)	**20.** (c)
21. (d)	**22.** (b)	**23.** (d)	**24.** (a)	**25.** (b)	**26.** (b)	**27.** (b)	**28.** (c)	**29.** (b)	**30.** (c)
31. (d)	**32.** (d)	**33.** (a)	**34.** (c)	**35.** (d)	**36.** (a)	**37.** (d)	**38.** (b)	**39.** (d)	**40.** (d)
41. (b)	**42.** (d)	**43.** (b)	**44.** (d)	**45.** (c)	**46.** (a)	**47.** (b)	**48.** (c)	**49.** (d)	**50.** (a)
51. (d)	**52.** (c)	**53.** (d)	**54.** (c)	**55.** (a)	**56.** (b)	**57.** (d)	**58.** (d)	**59.** (b)	**60.** (c)
61. (b)	**62.** (c)	**63.** (b)	**64.** (b)	**65.** (d)	**66.** (a)	**67.** (d)	**68.** (d)	**69.** (b)	**70.** (a)
71. (a)	**72.** (b)	**73.** (c)	**74.** (d)	**75.** (c)	**76.** (b)	**77.** (b)	**78.** (c)	**79.** (c)	**80.** (a)
81. (a)	**82.** (a)	**83.** (c)	**84.** (c)	**85.** (b)	**86.** (c)	**87.** (b)	**88.** (a)	**89.** (c)	**90.** (b)
91. (b)	**92.** (a)	**93.** (c)	**94.** (a)	**95.** (a)	**96.** (c)	**97.** (a)	**98.** (b)	**99.** (a)	**100.** (d)

HINT & SOLUTIONS

1. **(A)**

2. **(B)** $3 : 9 :: 6 : \boxed{18}$
3×3 6×3

3. **(B)** BADC : XWZY : : FEHG : $\boxed{\text{TSVU}}$

4. **(D)** Geeta, Quran and Bible all are holy books but $\boxed{\text{Mahabharata}}$ is an epic.

5. **(A)** Only option **'A' (7431)** is divisible by 3.

6. **(A)** Only option **'A' (AEIOU)** letters are vowels.

7. **(D)**

78, 86, **80**, 88, 82, 90

8. **(D)** ADG, FIL KNQ $\boxed{\text{PSW}}$

9. **(B)** **a**bcd/a**b**cd/ab**c**d/abc**d**

10. **(C)** $^{18}R \xrightarrow{+1} 5^{19}$ Similarly, $^{18}R \rightarrow \boxed{S^{19}}$

E $\rightarrow$ 2   E $\rightarrow$ **2**

$^{17}Q \xrightarrow{+1} R^{18}$ $^{20}T \rightarrow \boxed{U^{21}}$

U $\rightarrow$ 5

E $\rightarrow$ 2   E $\rightarrow$ **2**

$^{19}S \xrightarrow{+1} T^{20}$ $^{19}S \rightarrow \boxed{T^{20}}$

$^{20}T \xrightarrow{+1} U^{21}$ $^{20}T \rightarrow \boxed{U^{21}}$

Only vowels are coded with number and all constants are coded with next letter of English Alphabets.

11. **(C)**
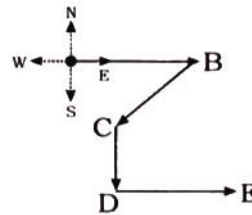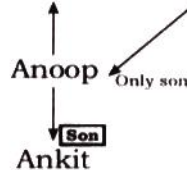

12. **(C)**

Integument	Intellect	Intelligent
5	2	4

Intend	Intense
3	1

Hence, English dictionary order is $\boxed{52431}$.

13. **(D)**

Key	Lock	Door	Room
1	3	2	4

Switch on
5

Hence, the meaning full order is $\boxed{13245}$.

14. **(B)** Father's $\longrightarrow$ Wife

Anoop

Ankit

Ankit is the **son** of Anoop.

15. **(D)**
$23 \Rightarrow 2 + 3 = 5$
$31 \Rightarrow 3 + 1 = 4$
$43 \Rightarrow 4 + 3 = 7$
$\overline{16} \qquad\qquad \overline{16}$

$51 \Rightarrow 5 + 1 = 6$
$72 \Rightarrow 7 + 2 = 9$
$21 \Rightarrow 2 + 1 = 3$
$\overline{18} \qquad\qquad \overline{18}$

Similarly,

$80 \Rightarrow 8 + 0 = 8$
$12 \Rightarrow 1 + 2 = 3$
$21 \Rightarrow 2 + 1 = 3$

14   **14**

16. **(B)** At 4 o' clock, the hour hand is at 4 and the min hand is at 12 i.e., the two hands are 20 min. spaces apart. To be in the 180° angle they have to make 30 min. space.

So, the min. hand will have 20 gain
20 + 30 = 50 min. spaces over the hour hand

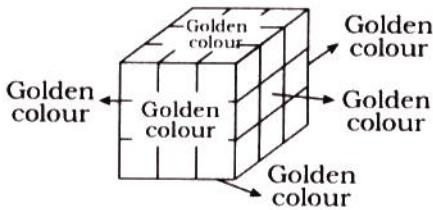Now, **55 min. are gained in 60 min.**
50 min. will be gained in

$\left[\dfrac{60}{55} \times 50\right]$ min.

$= \dfrac{600}{11} = 54\dfrac{6}{11}$ min.

The hands will make 180° angle at

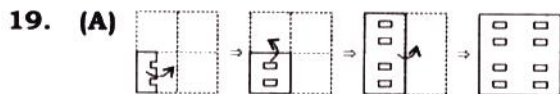**$54\dfrac{6}{11}$ min. past 4**.

17. **(B)**

Shortcut:
After cutting any cube in small cubes. Always corner cubes are painted with three faces.
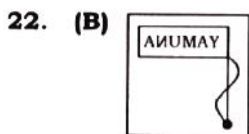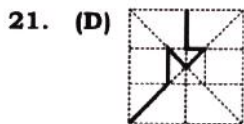[Note: A cube have a **8** corners]

18. **(A)** There is no such cubes which have a two opposite face are coloured.

19. **(A)**

20. **(C)** If any century year is divisible by 400. Only then it's a leap year.

So, $\dfrac{2000}{400} = 5$

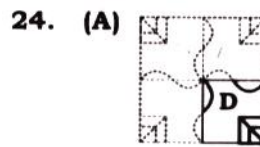Here **2000** completely divisible by 400. It's a leap year.

21. **(D)**

22. **(B)**

23. **(D)**

Shortcut:

$6 \times 9 = 54$
$5 \times 8 = 40$
$4 \times 7 = 28$
$3 \times 6 = 18$
$2 \times 5 = 10$
$1 \times 4 = 4$

154

24. **(A)**

25. **(B)** Solving from the options.
(A) 32, 75, 44, 76
(B) **14, 89, 12, 78**
(C) 23, 52, 36, 68
(D) 41, 66, 23, 25

51. **Let the maximum marks be x**
Then
$523 - 439 = 7\%$ of x / x

$84 = \dfrac{7x}{100}$

$\therefore \quad x = \dfrac{84 \times 100}{7} = 1200$

$\therefore$ Maximum marks
$= 1200$

52. **Let, the total articles bought by man**
$= x$
Articles sold at 16% profit
$= \dfrac{2x}{3}$

Selling price of $\dfrac{2}{3}$ articles
$= \dfrac{2x}{3} \times \dfrac{116}{100} = \dfrac{58}{75}x$

Articles sold at 30% profit
$= \dfrac{x}{5}$

Selling price of $\dfrac{1}{5}$ articles
$= \dfrac{x}{5} \times \dfrac{130}{100} = \dfrac{13x}{50}$

Remaining articles
$= \left(x - \dfrac{2x}{3} - \dfrac{x}{5}\right) = \dfrac{2x}{15}$

Remaining article sold at 10% profit, selling price

$$= \frac{2x}{15} \times \frac{110}{100} = \frac{11x}{75}$$

53. **Selling price of cycle**

$$= 486 \times \frac{90}{100} = \frac{586 \times 9}{10}$$

$\therefore$ Buying price of cycle

$$= \frac{486 \times 9}{10} \times \frac{100}{135} = 324$$

54. **In one year there are '4' quaterly months**

$\therefore$ Rate $= \frac{16}{4}\% = 4\%$

$\therefore \qquad CI = P\left(1 + \frac{r}{100}\right)^2$

$$= \left[25000\left(1 + \frac{4}{100}\right)^3\right] - 25000$$

$$= \left[25000 \times \frac{26}{25} \times \frac{26}{25} \times \frac{26}{25}\right] - 25000$$

55.
	Milk	**:**	**Water**
Vessel 1	3	:	1
Vessel 2	14	:	3

For the quantity of milk

Vessel 1   Vessel 2
बर्तन-1   बर्तन-2

$$\frac{3}{4} \qquad\qquad \frac{14}{17}$$

$$\frac{4}{5}$$

$$\frac{14}{17} - \frac{4}{5} \qquad\qquad \frac{4}{5} - \frac{3}{4}$$

$$= \frac{70 - 68}{85} \qquad\qquad = \frac{16 - 15}{20}$$

$$= \frac{2}{85} \qquad\qquad = \frac{1}{20}$$

Ratio of the quantity of the two vessels have to be mixed

$$= 8:17$$

56. **Let their monthly incomes are $9x$ and $7x$ respectively**

$\therefore \qquad \dfrac{9x - 1500}{7x - 2000} = \dfrac{4}{3}$

$\qquad 28x - 8000 = 27x - 4500$

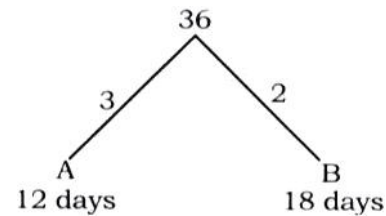$\quad x = 8000 - 4500 = 3500$

$\therefore$ Difference in monthly incomes

$$= 9x - 7x = 2x$$
$$= 2 \times 3500 = 7000$$

57. **Let, total work to be done by A and B**

$$= 36 \text{ units}$$

```
          36
         /  \
        3    2
       /      \
      A        B
   12 days   18 days
```

Efficiency of A and B are 3 units and 2 units respectively
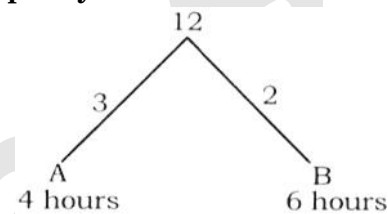
Work done by both in 4 days

$$= 5 \times 4 = 20 \text{ units}$$

Remaining work $= 36 - 20 = 16$ units

Time taken by B to complete remaining work

$$= \frac{16}{2} = 8 \text{ days}$$

58. **Let, Capacity of tank = 12 units**

```
          12
         /  \
        3    2
       /      \
      A        B
   4 hours   6 hours
```

Efficiency of A and B 3 units and 2 units respectively

Part of tank filled by pipe A in 1 hour

$$= 3$$

$\therefore$ Remaining part $= 12 - 3 = 9$ units

Time taken to fill the tank by A and B

$$= \frac{9}{5} = 1\frac{4}{5}$$
$$= 1 \text{ hour } 48 \text{ minutes}$$

$\therefore$ The tank will be full at 9 : 48

59. **Let the distance travelled by riding**

$$= x \text{ km}$$

Distance travelled by bicycle

$$= (160 - x) \text{ km}$$

$\therefore \qquad \dfrac{160 - x}{16} + \dfrac{x}{32} = 8$

$\Rightarrow \qquad \dfrac{320 - 2x + x}{32} = 8$

$\Rightarrow \qquad 320 - x = 256 \Rightarrow x = 64$

$$= 64 \text{ km}$$

60. **Let the numbers be $8x$ and $7x$ respectively**

$\therefore \qquad 8x \times 7x = 2016$

$\qquad x^2 = \dfrac{2016}{56} = 36 \Rightarrow x = 6$

$\therefore$ The sum of the numbers

$$= 15x = 15 \times 6 = 90$$

61. **Put the value of $x = 2$ in equation**

$= (2)^3 + 24 \times 2^2 + 241 \times 2 + 324$

$\qquad\qquad = 8 + 24 \times 4 + 482 + 324$

$= 8 + 96 + 483 + 324 = 910$

62. $5x + \dfrac{1}{2x} = 2$

Multiply both side by $\dfrac{2}{5}$

$$5x \times \dfrac{2}{5} + \dfrac{1}{2x} \times \dfrac{2}{5} = 2 \times \dfrac{2}{5}$$

$$2x + \dfrac{1}{5x} = \dfrac{4}{5}$$

Taking cube of both sides

$$8x^3 + \dfrac{1}{125x} + 3 \times 2x \times \dfrac{1}{5} \times \dfrac{4}{5} = \dfrac{64}{125}$$

$$8x^3 + \dfrac{1}{125x^3} + \dfrac{24}{25} = \dfrac{64}{125}$$

$$8x^3 + \dfrac{1}{125x^3} = \dfrac{-56}{125}$$

63. In ΔOQR

$$\angle OQR = \angle ORQ$$

$(\because OQ$ and OR are radius

$\therefore \qquad \angle ORQ = 74°$

$$\angle QOP = (180° - (74° + 74°) = 32°$$

Now In ΔOPR

$$\angle POR = 180° - (23° + 74°)$$

$$= 180° - 97° = 83°$$

$\therefore \qquad \angle POQ = \angle POR - \angle QOR$

$$= 83° - 32° = 51°$$

64.
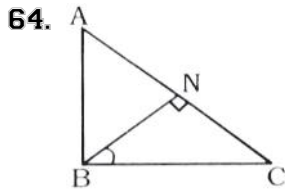
$AB = 12$ cm, $\qquad AC = 20$cm

$\therefore \qquad\qquad BC = 16$ cm

$(\because 12, 16, 20$ are pythagorian triplet)

Now $\Delta ABC \sim \Delta ANB$

$\therefore \qquad\qquad \dfrac{AB}{AC} = \dfrac{AN}{AB}$

$\Rightarrow \qquad\qquad AB^2 = AC \times AN$

$$= 12 \times 12 = 20 \times AN$$

$\Rightarrow \qquad\qquad AN = 7.2$

$\therefore \quad NC = 20 - 7.2 = 12.8$ cm

$\Rightarrow \qquad AN:NC = 7.2 = 12.8 = 9:16$

65. Let, the numbers are, a, b and c respectively

$$\dfrac{a+b}{2} - \dfrac{b+c}{2} = 12$$

$$\dfrac{a+b-b-c}{2} = 12$$

$$\dfrac{a-c}{2} = 12$$

$$a - c = 24$$

$\therefore$ Difference of first and third number

$$= 24$$

66. $A = \dfrac{(B+C)}{2} \Rightarrow \dfrac{A}{B+C} = \dfrac{1}{2} = \dfrac{5}{10}$

$B = \dfrac{(A+C)}{4} \Rightarrow \dfrac{B}{A+C} = \dfrac{1}{4} = \dfrac{3}{12}$

$\therefore \qquad\qquad A:B:C = 5:3:7$

$\therefore$ Total value $\qquad = 15$

$\because$ 1 unit $\qquad\qquad = \dfrac{22,500}{15} = 1500$

The share of A is more than that of B

$$= 2 \times 1500 = 3000$$

67. $\cos \phi = \dfrac{1}{2}\left(p + \dfrac{1}{p}\right)$

Squaring both sides

$$\cos^2 \phi = \dfrac{1}{4}\left[\left(p + \dfrac{1}{p}\right)^2\right]$$

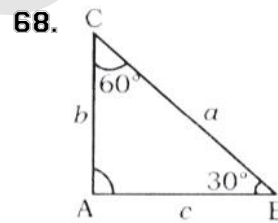$$2\cos^2 \phi = \dfrac{1}{2}\left[\left(p + \dfrac{1}{p}\right)^2\right]$$

Subtracting 1 from both sides

$$2\cos^2 \phi - 1 = \dfrac{1}{2}\left[\left(p + \dfrac{1}{p}\right)^2\right] - 1$$

$$\cos 2\phi = \dfrac{1}{2}\left(p^2 + \dfrac{1}{p^2} + 2\right) - 1$$

$$= \dfrac{1}{2}\left(p^2 \dfrac{1}{p^2}\right) + 1 - 1$$
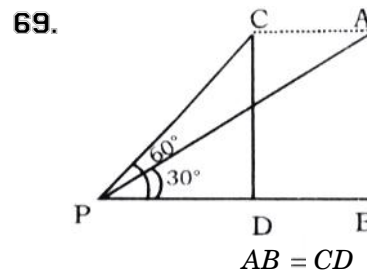
$$= \dfrac{1}{2}\left(p^2 + \dfrac{1}{p^2}\right)$$

68.

By using sine rule

$$= \dfrac{a}{\sin 90°} = \dfrac{b}{\sin 30°} = \dfrac{c}{\sin 60°}$$

$\Rightarrow \qquad \dfrac{a}{1} = \dfrac{b}{\dfrac{1}{2}} = \dfrac{c}{\dfrac{\sqrt{3}}{2}}$

$\Rightarrow \qquad \dfrac{a}{1} = \dfrac{2b}{1} = \dfrac{2c}{\sqrt{3}} = k$

$$a:b:c = 1:\dfrac{1}{2}:\dfrac{\sqrt{3}}{2} = 2:1:\sqrt{3}$$

69.

$$AB = CD$$

$= 3600\sqrt{3}$ (Height of aeroplane

In ΔPDC

$$\tan 60° = \frac{CD}{PD}$$

$$\sqrt{3} = \frac{CD}{PD}$$

$\Rightarrow \quad CD:PD = \sqrt{3}:1$

In ΔPBA

$$\tan 30° = \frac{AB}{PB}$$

$$\frac{1}{\sqrt{3}} = \frac{AB}{PB}$$

$\Rightarrow \quad AB:PB = 1:\sqrt{3}$ ...(ii)

$\quad AC = BD$

$\quad DB = PB - PD$

$\quad\quad = 3 - 1 = 2$ units

$\quad AB = \sqrt{3}$ units

$\quad\quad = 3600\sqrt{3}$ m

$\Rightarrow$ 1 unit $\quad = 3600$ m

$\quad CA = DB = 2$ units

$\quad\quad = 7200$ m

Speed $\quad = \dfrac{7200}{20} = 360$

$\quad\quad = \dfrac{360 \times 18}{5}$

$\quad\quad = 1296$ km/h

70. Volume of cylinder

$\quad\quad = 144\pi h$ cm^3

$\therefore \quad \pi r^2 h = 144\,\pi h$

$\quad\quad r = 12$ cm

$\therefore$ Diameter of cylinder

$\quad\quad = 2 \times 12 = 24$ cm

71.
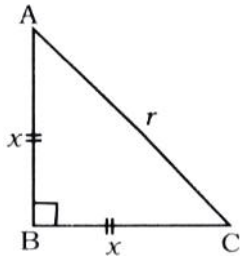
Let the base of prism ΔABC has side, x, x and r respectively

$\therefore \quad x^2 + x^2 = r^2 \Rightarrow 2x^2 = r^2$

$$x^2 = \frac{r^2}{2}$$

$$x = \frac{r}{\sqrt{2}}$$

$\therefore$ Volume of prims= Base area

$$= \frac{1}{2} \times \frac{r}{\sqrt{2}} \times \frac{r}{\sqrt{2}} \times s = \frac{r^2 s}{4}\ \text{cm}^3$$

72. $\sqrt{4 + \sqrt{137 + \sqrt{43 + \sqrt{28 + 8}}}}$

$= \sqrt{4 + \sqrt{137 + \sqrt{43 + \sqrt{36}}}}$

$= \sqrt{4 + \sqrt{137 + \sqrt{43 + 6}}}$

$= \sqrt{4 + \sqrt{137 + \sqrt{49}}}$

$= \sqrt{4 + \sqrt{137 + 8}}$

$= \sqrt{4 + \sqrt{144}}$

$= \sqrt{16} = 4$

73. The number of male employees from all companies

$= \dfrac{720 \times 5}{9} + \dfrac{440 \times 8}{11} + \dfrac{560 \times 4}{7}$

$\quad\quad + \dfrac{520 \times 9}{13} + \dfrac{250 \times 3}{5}$

$= 400 + 320 + 320 + 360 + 150$

$= 1550$

74. Total number of female employees from all companies

$= \dfrac{720 \times 4}{9} + \dfrac{440 \times 3}{11} + \dfrac{560 \times 3}{7}$

$\quad\quad + \dfrac{520 \times 4}{13} + \dfrac{250 \times 2}{5}$

$= 320 + 120 + 240 + 160 + 100$

$= 940$

Average $= \dfrac{940}{5} = 188$

75. Total nuber of male employees from company **A** and **C**

$\quad\quad = 400 + 320 = 720$

Total number of female employees from company **B** and **D**

$\quad\quad = 120 + 160 = 280$

Difference $\quad = 720 - 280 = 440$