1. **(D)**

(Sister) C ← A (Brother) ← B → D (Brother) ← E
↓
F (Daughter)

As there is no connection of D with any-one else apart from E (who is D's brother),

hence, data is inadequate to obtain a unique solution.

2. **(B)**

M	I	G	H	T
13	9	7	8	20
−2	−2	−2	−2	−2
11	7	5	6	18
K	G	E	F	R

Similarly,

D	I	A	R	Y
4	9	1	18	25
−2	−2	−2	−2	−2
2	7	25	16	23
B	**G**	**Y**	**P**	**W**

3. **(C)**

$$\times \begin{bmatrix} 5 \\ 4 \\ 8 \end{bmatrix} \times \begin{bmatrix} 7 \\ 8 \\ 6 \end{bmatrix} \times \begin{bmatrix} 9 \\ 2 \\ \boxed{6} \end{bmatrix}$$
160   336   108

4. **(C)** The word **MERCY** can't be formed by using the letters of the word 'CUMBERSOME', Because the letter **'Y'** present in MERCY is not present in the word 'CUMBERSOME'.

5. **(D)** Solving from the choices:
(A) Inserting the signs (+, −, ×)
We get,
   70 + 7 − 113 × 13 = 390
                [Use 'BODMAS' rule]
   77 − 1469 = 390 ⇒ − 1392 ≠ 390

(B) Inserting the signs (×, +, −)
We get,
   70 × 7 + 113 − 13 = 390
                [Use 'BODMAS' rule]
   490 + 100 = 390 ⇒ 590 ≠ 390

(C) Inserting the signs (×, ÷, −)
We get,
   70 × 7 ÷ 113 − 13 = 390
                [Use 'BODMAS' rule]
   4.33 − 13 = 390 ⇒ − 8.67 ≠ 390

(D) Inserting the signs (×, −, +)
We get,

   70 × 7 − 113 + 13 = 390
                [Use 'BODMAS' rule]
   490 − 100 = 390 ⇒ 390 = 390

6. **(D)**
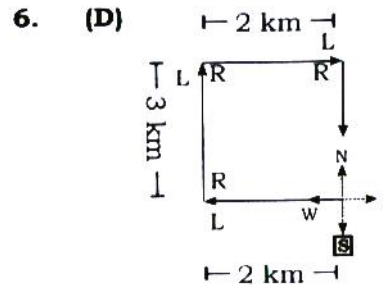
Shortcut:

West + 2 Right turns = East

East + 1 Right turn = **South**

7. **(B)** As per the reproduction category, 'Whale' is a 'Mammal'. Similarly, 'Turtle' is **Oviparous** (Egg-Laying).

8. **(A)** C : I :: D : **L**
   (3, 9) (4, 12)
   [3 × 3↑] [4 × 3↑]

9. **(B)** 27 : 3 :: 873 : **97**
   [27÷9↑]   [873÷9↑]

10. **(C)** Content, Bibiliography and preface all are related to books but **Press** is different from them as it is related to printing.

11. **(D)** 1876, 1984 and 2024. Are leap year, but **2014** is not a leap year.

12. **(D)** (A) 3 — 9   (B) 5 — 25
          Square and   Square and
          odd number   odd number

     (C) 7 — 49   (D) **8 − 64**
          Square and   **Square and**
          odd number   **even number**

13. **(D)** (A) D H F   (B) K O M
          4 8 6   11 15 13
          [+4↑][−2↑] [+4↑][−2↑]

     (C) R V T   (D) **W Y X**
          18 22 20   13 25 24
          [+4↑][−2↑] [+2↑][−1↑]

14. (A)

| $\underset{2}{\text{F}\underline{\text{a}}\text{n}}$ | $\underset{4}{\text{F}\underline{\text{e}}\text{ast}}$ | $\underset{1}{\text{F}\underline{\text{i}}\text{sh}}$ | $\underset{3}{\text{F}\underline{\text{l}}\text{esh}}$ | $\underset{5}{\text{F}\underline{\text{r}}\text{aud}}$ |

Hence, as per English dictionary, the correct order is $\boxed{24135}$

15. (C) Total students (28) = Kapil's position from the start (8) + Kapil's position from the end (x) -1

$28 = 8 + x - 1 \Rightarrow 28 - 8 + 1 = x$

$20 + 1 = x \Rightarrow x = 21$

Kapil's position from the end = $\boxed{21}$

16. (C) $\underset{1}{\text{A}}, \underset{3}{\text{C}}, \underset{6}{\text{F}}, \underset{11}{\text{K}}, \underset{18}{\boxed{\text{R}}}$

      $\underset{+2}{\curvearrowright} \underset{+3}{\curvearrowright} \underset{+5}{\curvearrowright} \underset{+7}{\curvearrowright}$

17. (A) a$\underline{b}$c/a$\underline{a}$bc/ab$\underline{b}$c/ab$\underline{c}$c

18. (A) $\underset{2^2}{2\ 4}, \underset{3^2}{3\ 9}, \underset{5^2}{5\ 25}, \underset{7^2}{7\ 49}, \underset{11^2}{\boxed{11\ 121}}$

All are prime numbers

19. (D) $\boxed{\text{Only conclusion IV follow}}$

A poor man can earn wealth if he is a hard worker.

20. (A)
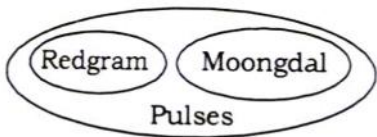
Redgram and Moongdal both are pulses, but both are different from each other.

21. (A)

22. (D) $\boxed{\text{ƎↄИAЯUↃИƎ}}$

23. (B)

24. (D) Formula:

$$\theta = (M - 5H) \times 6 - \frac{M}{2}$$

M = Minute, H = Hour, T = Time

T = 2:30, H = 2, M = 30

$$= (30 - 5 \times 2) \times 6 - \frac{30}{2}$$

$$= (30 - 10) \times 6 - \frac{30}{2} = 20 \times 6 - \frac{30}{2}$$

$$= 120 - \frac{30}{2} = 120 - 15 = \boxed{105°}$$

25. (A) Solving from the options.

(A) $\boxed{11,\ 21,\ 85,\ 66}$
(B) 43, 30, 44, 02
(C) 78, 43, 85, 11
(D) 10, 95, 59, 03

51. (C) $\dfrac{1}{60} + \dfrac{1}{84} + \dfrac{1}{126} + \dfrac{1}{198} + \dfrac{1}{286}$

$= \dfrac{1}{2}\left[\dfrac{1}{30} + \dfrac{1}{42} + \dfrac{1}{63} + \dfrac{1}{99} + \dfrac{1}{143}\right]$

$= \dfrac{1}{2}\left[\dfrac{1}{5\times 6} + \dfrac{1}{6\times 7} + \dfrac{1}{7\times 9} + \dfrac{1}{9\times 11} + \dfrac{1}{11\times 13}\right]$

$= \dfrac{1}{2}\left[\dfrac{1}{5} - \dfrac{1}{6} + \dfrac{1}{6} - \dfrac{1}{7} + \dfrac{1}{7} - \dfrac{1}{9} + \dfrac{1}{9} - \dfrac{1}{11} + \dfrac{1}{11} - \dfrac{1}{13}\right]$

$= \dfrac{1}{2}\left[\dfrac{1}{5} - \dfrac{1}{13}\right] = \dfrac{1}{2}\left[\dfrac{13-5}{65}\right] = \dfrac{1}{2}\left[\dfrac{8}{65}\right]$

$= \dfrac{4}{65}$

52. (C) Given/

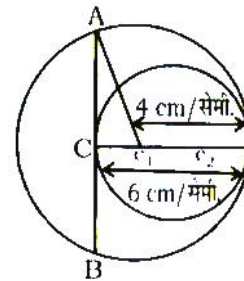$(1640)^2 + (1641)^2 + (1662)^2 + (1693)^2$

Unit digit

$$= 0^2 + 1^2 + 2^2 + 3^2$$
$$= 0 + 1 + 4 + 9 = 14$$

$\therefore$ Unit digit = 4

53. (B) Given

C_1 = Centre of larger circle

C_2 = Centre of smaller circle

In ΔACC_1 / ΔACC_1

$AC_1^2 = AC^2 + CC_1^2 \Rightarrow 4^2 = AC^2 + 2^2$

$AC^2 = 16 - 4 \Rightarrow AC^2 = 12$

$AC = 2\sqrt{3} \Rightarrow AB = 2AC$

$\quad\quad\quad = AB = 4\sqrt{3}$ cm

$\therefore$ Length of the chord

$\quad\quad\quad = 4\sqrt{3}$ cm

54. (B) Given

$$x + \frac{1}{x} = 4$$
$$x^2 + 1 = 4x$$
$$x^2 - 4x = -1$$

$\therefore \qquad \dfrac{4}{x^2 - 4x + 5} = \dfrac{4}{-1 + 5} = \dfrac{4}{5} = 1$

55. (A) $\sin^2\theta + \dfrac{1 + \cos\theta}{\sin\theta} + \dfrac{1}{\sec^2\theta} - \dfrac{\sin\theta}{1 - \cos\theta}$

$= \sin^2\theta + \dfrac{1}{\sec^2\theta} + \dfrac{1 - \cos^2\theta - \sin^2\theta}{\sin\theta(1 - \cos\theta)}$

$= \sin^2\theta + \cos^2\theta + \dfrac{\sin^2\theta - \sin^2\theta}{\sin\theta(1 - \cos\theta)}$

$\{\because \sin^2\theta + \cos^2\theta = 1\}$

$= 1$

56. (D) Given

$x = 3 + 2\sqrt{2}$

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

$\quad = \dfrac{3 - 2\sqrt{2}}{9 - 8} = 3 - 2\sqrt{2}$

$x + \dfrac{1}{x} = 3 + 2\sqrt{2} + 3 - 2\sqrt{2}$

$x + \dfrac{1}{x} = 6$

$x - \dfrac{1}{x} = 3 + 2\sqrt{2} - 3 + 2\sqrt{2}$

$x - \dfrac{1}{x} = 4\sqrt{2}$

$\therefore \left(x + \dfrac{1}{x}\right)\left(x - \dfrac{1}{x}\right) = 6 \times 4\sqrt{2}$

$\qquad x^2 - \dfrac{1}{x^2} = 24\sqrt{2}$

57. (A) $A : B : C = 3 : 4 : 5$

Let $A = 3k$, $B = 4k$, $C = 5k$

$\dfrac{A + B}{C} : \dfrac{B + C}{A} : \dfrac{C + A}{B}$

$= \dfrac{3k + 4k}{5k} : \dfrac{4k + 5k}{3k} : \dfrac{5k + 3k}{4k}$

$= \dfrac{7}{5} : 3 : 2 = 7 : 15 : 10$

58. (D) $\sin\theta + 3\cos\theta = 1$

Square both sides

$(\sin\theta + 3\cos\theta)^2 = 1$

$\sin^2\theta + 9\cos^2\theta + 6\sin\theta\cos\theta = 1$

$(1 - \cos^2\theta) + 9(1 - \sin^2\theta) + 6\sin\theta.\cos\theta = 1$

$1 - \cos^2\theta + 9 - 9\sin^2\theta + 6\sin\theta.\cos\theta = 1$

$10 - 9\sin^2\theta - \cos^2\theta + 6\sin\theta.\cos\theta = 1$

$9\sin^2\theta + \cos^2\theta - 6\sin\theta.\cos\theta = 9$

$(3\sin\theta - \cos\theta)^2 = 9$

$\therefore \ 3\sin\theta - \cos\theta = 3$

59. (D) When the amount divided in ratio $1 : \dfrac{1}{2} : \dfrac{1}{3}$,

then

Share of A $= \dfrac{1}{\left(1 + \dfrac{1}{2} + \dfrac{1}{3}\right)} \times 132$

$= \dfrac{6}{(6 + 3 + 2)} \times 132 = \dfrac{6}{11} \times 132 = $ Rs. 72

Share of B $= \dfrac{\dfrac{1}{2} \times 6}{(6 + 3 + 2)} \times 132 = $ Rs. 36

Share of C $= \dfrac{\dfrac{1}{3} \times 6}{(6 + 3 + 2)} \times 132 = $ Rs. 24

When the amoutn divided in ratio of $1 : 2 : 3$. Then

Share of A $= \dfrac{1}{(1 + 2 + 3)} \times 132 = $ Rs. 22

Share of B $= \dfrac{2}{6} \times 132 = $ Rs. 44

Share of C $= \dfrac{3}{6} \times 132 = $ Rs. 66

It is clear that C has got maximum Profit.

60. (A) **Eqution of line passing through the point (3,–2) and (–3,–5)**

$y + 2 = \dfrac{-5 + 2}{-3 - 3}(x - 3)$

$y + 2 = \dfrac{-3}{-6}(x - 3)$

$y + 2 = \dfrac{1}{2}(x - 3)$

$2y + 4 = x - 3$

$x - 2y - 7 = 0$

Slople of line $= -\left(\dfrac{-2}{1}\right) = 2$

$\therefore$ Slope of line prependicular that line $= \dfrac{-1}{2}$

61. **Let the radius of sphere** $= r$ **cm**

So, Volume of sphere = Volume of rectangular block

$\dfrac{4}{3}\pi r^3 = l \times b \times h$

$\dfrac{4}{3} \times \dfrac{22}{7} \times r^3 = 77 \times 64 \times 63$

$r^3 = \dfrac{77 \times 64 \times 63 \times 3 \times 7}{4 \times 22}$

$r = 2 \times 7 \times 3$

$r = 42\,\text{cm}$

$\therefore$ The diameter of sphere

$= 2 \times 42 = 84\,\text{cm}$

62. (B) **Radius of the base of cone** $= 7$ **cm**

Height of the cone $(h) = 24$ cm

$\therefore$ Slant height of cone $(l) = \sqrt{r^2 + h^2}$

$= \sqrt{49 + 576} = 25\,\text{cm}$

$\therefore$ Curved surface area of the cone

$= \pi r l = \pi \times 7 \times 25$

$= 175\pi\ \text{cm}^2$

63. **(B)** Let the total quantity of rice $= x$ quintals

Total C.P. $=$ Rs. $250x$

To gain 20% percent, S.P./20%

$$= \frac{120}{100} \times 250x = \text{Rs. } 300\,x$$

The remaining rice $= \dfrac{9x}{10}$ quintals

So, price of one quintal rice

$$= \frac{300x \times 10}{9x} = \frac{3000}{9} = \frac{1000}{3}$$

$$= \text{Rs. } 333.33$$

64. **(C)** Let the price of the rice, sugar and oil be $5x, 4x$ and $3x$ respectively

$\therefore$ Total Expenditure $= 5x + 4xx + 3x = 12x$

After increment

The price of rice $= 5x \times \dfrac{120}{100} = 6x$

Price of sugar $= 4x + \dfrac{130}{100} = \dfrac{52}{10}x$

Price of oil $= 3x \times \dfrac{150}{100} = \dfrac{45}{10}x$

Total New Expenditure $= \dfrac{60 + 52 + 45}{10}x = \dfrac{157}{10}x$

% increase in expenditure $= \dfrac{\dfrac{157x}{10} - 12x}{12x} \times 100$

$$= \frac{37x}{120x} \times 100 = 30\frac{5}{6}\%$$

65. One day work of A and C/A $= \dfrac{1}{10}$

One day work of A/A $= \dfrac{1}{15}$

C's one day work/C $= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{5}{150} = \dfrac{1}{30}$

One day work of A, B and C/A, B and C $= \dfrac{1}{6}$

$\therefore$ One day work of A and B/A, B $= \dfrac{1}{6} - \dfrac{1}{30} = \dfrac{4}{30}$

Number of days, taken by A and B to complete the work

$$= \frac{30}{4} = \frac{15}{2} = 7\frac{1}{2} \text{ days}$$

66. **(A)** Product of the number $= 1365$

Let the numbers be x and y

$$xy = 1365 \qquad\qquad \text{(i)}$$

$\therefore$ Greatest number $= 39$

67. **(B)** A monkey climbs in 1st minute $= 5$ meters

Monkey slips in 2nd min $= 3$ meters

Total distance climbed by monkey in 2 min $= 2$ meters

Distance climb by monkey in 16 min $= 16$ meters

Next five meter, it climbs in next min

$\therefore$ Total time taken by monkey $= (16 + 1)$

$$= 17 \text{ min}$$

68. **(B)** Mean of 4 observations $= 20$

Sum of 4 observations $= 20 \times 4 = 80$.

If 'e' constant is added to each, then mean of observations $= 24$

$$\frac{80 + 4e}{4} = 24$$

$\Rightarrow \qquad 80 + 4x = 96 \Rightarrow 4e = 16$

$$e = 4$$

69. **(A) Volume of the water in each case is same**

$\therefore$ Area of first pipe $\times$ time taken (t_1)

Area of second pipe $\times$ time taken (t_2)

$$\pi r_1^2 \times t_1 = \pi r_2^2 \times t_2$$

$$t_2 = \left(\frac{r_1}{r_2}\right)^2 \times t_1 = t_2 = \left(\frac{\frac{5}{2}}{\frac{10}{2}}\right)^2 \times 40$$

$$t_2 = \frac{1}{4} \times 40 = t_2 = 10 \text{ min}$$

$\therefore$ Time taken by second pipe $= 10$ min

70. **(C)** Le the length of ladder be AC

In $\triangle ABC \quad \cos 60° = \dfrac{BC}{AC}$

$$AC = BC / \cos 60°$$

$$AC = 5 \times 2$$

$$AC = 10$$

$\therefore$ Length of the ladder $= 10$ m

71. **(D)** Ratio of total investment by A, B and C

$$A : B : C = \left(105x \times 4 + \left(\frac{105 \times 3}{2}\right)x \times 8\right) :$$

$$(40x \times 12) : (36x \times 12)$$

$$A : B : C = (420 + 1260)x : 480x : 432x$$

$$= 1680\,x : 480\,x : 432x$$

$$A : B : C = 35 : 10 : 9$$

$\therefore \qquad$ B's Share $= \dfrac{10}{54} \times 21,600$

$$= \text{Rs. } 4,000$$

72. **(C)** %Profit $= \left(\dfrac{\textit{Income} - \textit{Expenditure}}{\textit{Expenditure}} \times 100\right)$

$$40 = \left(\frac{250 - x}{x}\right) \times 100$$

$$\frac{2}{5} = \frac{250 - x}{x}$$

$$2x = 1250 - 5x$$

$$7x = 1250, \ x = \frac{1250}{7}$$

$\therefore$ Expenditure in 2010/2010

$$= 178.5 \text{ crores}$$

73. **(B) Percentage of average profit**

$$= \frac{(20 + 40 + 30 + 50 + 20 + 10 + 40)}{7}$$

$= \dfrac{210}{7} = 30\%$

74. (D) %Profit

$= \left(\dfrac{Income - Expenditure}{Expenditure} \times 100 \right)$

To calculate expenditure we need income

So, data is not sufficient to calculate the minimum expenditure

75. (C) 17117117 ÷171

$= 171 \times 100\ 100 + 17$

$\therefore$ Quotient = 100100

> ANSWER KEY

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