J ANSWER KEY

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

HINT & SOLUTIONS

1. **(B)**

W	V	R	T
23	22	18	20
-10	-10	-11	-10
13	12	7	10
M	L	G	J

Similarly,

S	R	N	P
19	18	14	16
-10	-10	-11	-10
9	8	3	6
I	**H**	**C**	**F**

2. **(A)** 5 : 23 : : 9 : **39**

$5\times4+3$ $9\times4+3$

3. **(D)** A group of cows is called a herd. Similarly, A group of fish is called a **school**.

4. **(C)** (A) T G R I — opp, opp

(B) W D U F — opp, opp

(C) **N H L I** — opp, **not opp**

(D) Z A X C — opp, opp

5. **(D)** (A) $72 = 9\times8$, $81 = 9\times9$

(B) $48 = 8\times6$, $56 = 8\times7$

(C) $42 = 7\times6$, $49 = 7\times7$

(D) **36 ⊗ →45**

9×4 $9\times5 = 45$

6. **(B)** Solving from the options.

(A) 24, 31, 10, 59, 57

(B) **31, 34, 23, 76, 79**

(C) 12, 20, 40, 68, 65

(D) 43, 42, 41, 78, 79

7. **(A)**

Foundation	Lintel	Roofing
3	**4**	**2**

Plastering	Flooring	House
5	**6**	**1**

Hence, the appropriate sequence is

3 4 2 5 6 1
iii, iv, ii, v, vi, i

8. **(B)**

REP**A**IR	REP**E**AL	REP**I**ECE
v	**ii**	**i**

REP**L**ACE	REP**O**INT
iii	**iv**

Hence, as per English dictionary correct order is

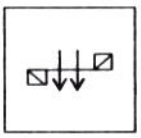
v, ii, i, iii, iv

9. **(C)**

3	9	14	20	25	5	10
C	I	N	T	**Y**	E	J

+6, +5, +6, +5, +6, +5

10. **(D)**



11. **(A)**

5	6	7	8	10	11	14	**15**	19
	+2		+3		+4		+5	

(+2, +3, +4)

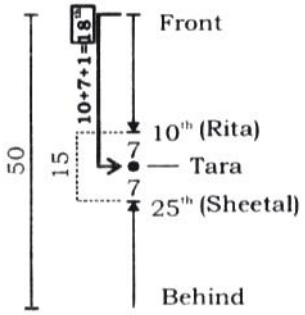
12. **(D)** **b** ab **d** / ba **b** d / **b** ab **d** / ba **b** d

13. **(A)** **B E A** D and **L** A **T E**
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
8 5 1 4 **3** 1 **6 5**

then,

T A B L E
↓ ↓ ↓ ↓ ↓
6 1 8 3 5

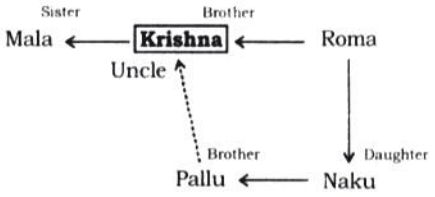
14. **(A)**



Shortcut :
Total students (50) = Rita's position from start (10) + Sheetal's position from end (25) + Middle persons(x).
$50 = 10 + 25 + x \Rightarrow 50 = 35 + x$
$\Rightarrow 15 = x$
Tara's position from start = Rita's position from start (10) + Tara's position from Rita (8).
$= 10 + 8 \Rightarrow 18$
Hence, Tara's position from start = **18th**

15. **(A)** From the choices.
(A) Interchange – to × or 5 to 8
We get,
5 × (8 – 3) = 25 [Use 'BODMAS' rule]
$5 \times 5 = 25 \Rightarrow 25 = 25$
(B) Interchange – to × or 5 to 8
We get,
$(3 - 8) - 5 = 34$ [Use 'BODMAS' rule]
$-5 - 5 = 34 \Rightarrow -10 \neq 34$
(C) Interchange – to × or 5 to 8
We get,
$(8 \times 3) - 5 = 26$ [Use 'BODMAS' rule]
$24 - 5 = 26 \Rightarrow 19 \neq 26$
(D) Interchange – to × or 5 to 8
We get,
$(8 \times 3) - 5 = 12$ [Use 'BODMAS' rule]
$24 - 5 = 12 \Rightarrow 19 \neq 12$

16. **(A)**



Hence, **Krishna** is the Uncle of Pallu.

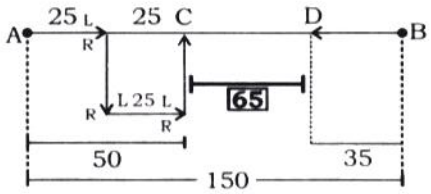
17. **(C)** The word **SCHOOL** can't be formed by using the letters of the word 'CONGRATULATIONS' because the letter 'H' present in 'SC**H**OOL' is not present in the word 'CONGRATULATIONS'.

18. **(C)** 937 (28) 216
521 (?) 418
(28) → 9 + 3 + 7 + 2 + 1 + 6 = 28
Similarly,
(?) → 5 + 2 + 1 + 4 + 1 + 8 = **21**

19. **(C)**

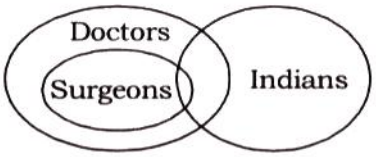
7 × 9 × 3	8 × 9 × 2	3 × 4 × **8**
189	144	96

20. **(C)**

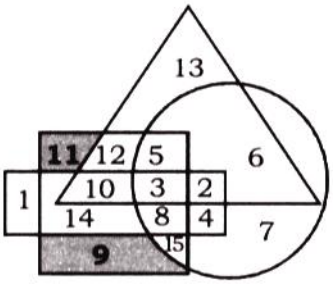


Required distance = CD
CD = AB – (AC + BD)
CD = 150 – (50 + 35) ⇒ CD = **65**

21. **(B)**

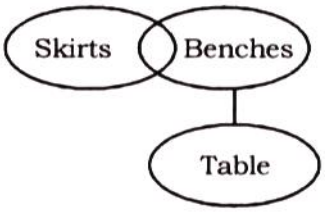


22. **(B)**



9 and **11** are two numbers, which are represent the same category.

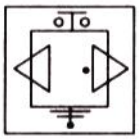
23. (B)



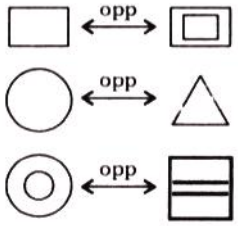
Conclusions : I = ×, II = ✓, III = ×, IV = ×

Hence, option 'B' **only II followed**.

24. (B)



25. (A) After folding the paper,



26. (D) The percentage of Silver in the alloy German Silver is **zero.** The usual formation of German Silver is 60% Copper, 20% Nickel and 20% Zinc.

51. **Given $x + y = 1$ and x, y are positive integers**

For minimum value $x = y = \frac{1}{2}$

$$\therefore \left(\frac{x^2+1}{x}\right)^2 + \left(\frac{y^2+1}{y}\right)^2$$

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

$$= \left(\frac{5}{2}\right)^2 + \left(\frac{5}{2}\right)^2$$

$$= (2.5)^2 + (2.5)^2$$

$$= 6.25 + 6.25 = 12.50$$

52. $\sqrt{15 + \sqrt{80 + \sqrt{120 + \sqrt{96}}}} = \sqrt{a} + \sqrt{b} + \sqrt{c}$

Squaring both sides

$15 + \sqrt{80} + \sqrt{120} + \sqrt{96}$

$= a + b + c + 2\sqrt{ab} + 2\sqrt{bc} + 2\sqrt{ca}$

$\Rightarrow 15 + 2\sqrt{20} + 2\sqrt{30} + 2\sqrt{24}$

$= A + B + C + 2\sqrt{AB} + 2\sqrt{BC} + 2\sqrt{CA}$

$\Rightarrow 15 + 2\sqrt{4+5} + 2\sqrt{5\times 6} + 2\sqrt{6\times 4}$

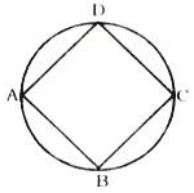
$= A + B + C + 2\sqrt{ab} + 2\sqrt{bc} + \sqrt{ca}$

comparing on both sides

$$a = 4, b = 5, c = 6$$

$$\therefore \quad a + b + c = 15$$

53.



$ABCD$ is cyclic quadrilateral

$$\therefore \quad \angle A + \angle C = \angle B + \angle D = 180^\circ$$

$$\therefore \quad \angle A = 180^\circ - \angle C$$

$$\cos A = \cos(180^\circ - C) = -\cos C$$

Similarly $\cos B = -\cos D$

$\cos A + \cos B + \cos C + \cos D$

$= \cos A + \cos B + \cos C + \cos B = 0$

54. $\tan 15^\circ + \tan 30^\circ + \tan 15^\circ \tan 30^\circ$

$\tan 15^\circ + \tan 30^\circ + \tan 15^\circ . \tan 30^\circ$...(i)

$= \tan(15^\circ + 30^\circ)$

By using formula

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$\tan(a+b) - \tan A \tan B \tan(a+b)$

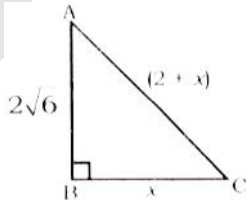
On comparing from equation (i)

$\tan A = \tan 15^\circ, \tan B = \tan 30^\circ$

$\tan(A+B) = \tan(15^\circ + 30^\circ)$

$= \tan 45^\circ = (1)$

55.



$AB = 2\sqrt{6}$ cm

$AC - BC = 2$ cm

Let $BC = x$ cm

Then $AC = 2 + x$ cm

In ΔABC

Using pythagoras theorem

$$(2+x)^2 = x^2 + (2\sqrt{6})^2$$

$$4 + x^2 + 4x = x^2 + 24$$

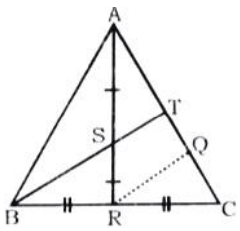
$$4x + 4 = 24$$

$$4x = 20$$

$$x = 5$$

In ΔABC $\cos A = \frac{2\sqrt{6}}{7}$

56.



Draw a line QR Parallel to the line BT

In ΔARQ

$$\frac{AS}{SR} = \frac{AT}{TQ} = 1$$

($\because S$ is mid point of AR

$\therefore AT = TQ$

In ΔBTC

$$\frac{BR}{RC} = \frac{TQ}{QC} = 1$$

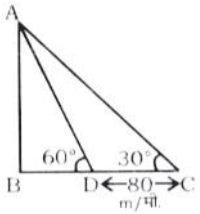
($\because R$ is mid point of BC / R

$\therefore TQ = QC$

Hence

$$\frac{AT}{AC} = \frac{AT}{AT + TQ + QC} = \frac{1}{3}$$

57.



Let AB is height of tower and C is the position of observer

$\therefore$ $DC = 80\text{m}$

In ΔABC

$$\tan\theta = \frac{AB}{BC}$$

$\therefore$ $$\tan 30^\circ = \frac{AB}{BC}$$

$\therefore$ $$\frac{1}{\sqrt{3}} = \frac{AB}{BC}$$

$$BC = AB\sqrt{3}$$

In ΔABD

$$\tan 60^\circ = \frac{AB}{BD}$$

$$\tan 60^\circ = \frac{AB}{BC - CD}$$

$$\sqrt{3} = \frac{AB}{BC - 80}$$

Put the value of BC from equation

$$\sqrt{3} = \frac{AB}{AB\sqrt{3} - 80}$$

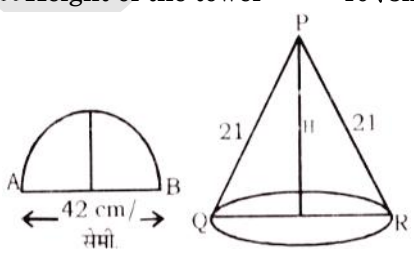
$$3AB - 80\sqrt{3} = AB$$

$$2AB = 80\sqrt{3}$$

$$AB = 40\sqrt{3}$$

$\therefore$ Height of the tower $= 40\sqrt{3}\text{m}$

58.



Perimeter of base of cone

=Perimeter of semicircle

$$2\pi r_1 = \frac{2\pi R}{2}$$

Where R =Radius of semi circle r_1

Radius of cone

$$2\pi r_1 = \pi 21$$

$$r_1 = \frac{21}{2}$$

In cone

$$H = \frac{\sqrt{3}}{2}A = \frac{\sqrt{3} \times 21}{2} = \frac{21\sqrt{3}}{2}$$

Volume of cone $= \frac{1}{3} \times$ base area

$$= \frac{1}{3} \times \frac{22}{7} \times \frac{22}{2} \times \frac{21}{2} \times \frac{21\sqrt{3}}{2}$$

$$= \frac{4851\sqrt{3}}{4}\text{ cm}^3$$

59. Volume of rectangular block of metal

$$= (49 \times 36 \times 22)\text{ cm}^3$$

Volume of sphere

Volume of rectangular block of metal

$$= (49 \times 36 \times 22)\text{cm}^3$$

$$\frac{4}{3}\pi r^3 = 22 \times 49 \times 36$$

$$\frac{4}{3} \times \frac{22}{7} \times r^3 = 22 \times 49 \times 36$$

$$r^3 = r^3 \times 7^3 \times 3^3$$

$\therefore$ $$r = 7 \times 3 = 21\text{ cm}$$

$\therefore$ Ratio of the sphere

60. Let, the length of rectange = l

Breadth of rectangle $= b$

$\therefore$ Area of rectnagle $= l \times b$

If length increase by $= 14\frac{2}{7}\%$, then new length

$$= l + l \times 14\frac{2}{7}\%$$

$$= l + \frac{1}{7} = \frac{8l}{7}$$

Breadth is decreased by $14\frac{2}{7}\%$, then

$$= b - b \times 14\frac{2}{7}\% = \frac{6}{7}b$$

New area of rectangle $= \frac{8l}{7} \times \frac{6b}{7} = \frac{48lb}{49}$

% change in Area $= \frac{lb - \frac{48lb}{49}}{lb} \times 100$

$$= \frac{lb}{49lb} \times 100$$

$$= \frac{100}{49}\% \text{ decrease}$$

Shortcut

% Decrease in area

$$= \frac{\left(\frac{100}{7}\right)^2}{100} = \frac{100}{49}\%$$

61. $\because$ ***SP* of 6 lemous = 14**

$\therefore SP$ of 1 lemon $= \frac{14}{6} = \frac{7}{3}$

$\therefore CP$ of 1 lemon $= \frac{7}{3} \div \left(\frac{1}{1} + \frac{1}{6}\right) = \frac{7}{3} \div \left(\frac{7}{6}\right)$

$\therefore CP$ of 1 lemon $= 2$

$\therefore$ CP of 2 dozen lemons $= 2$

62. **Amount after 3 years = Principal+SI**

$$2320 = \frac{PRT}{100} + P$$

$$2320 = \frac{3PR}{100} + P \quad ...(i)$$

Amount after 5 years $= 5$

Principal +SI

$$2800 = O + \frac{PR5}{100}$$

Subtract equation (i) from equation

$$2800 - 2320 = \frac{2PR}{100}$$

$$480 = \frac{2PR}{100} = \frac{PR}{50}$$

Put the value of PR in equation (i)

$$2320 = \frac{3 \times 24000}{100} + P$$

$$P = 1600$$

$$720 = \frac{1600 \times 3 \times R}{100}$$

$R = 15\%$ per annum

Half yearly rate $= \frac{15}{2}\%$

$= 7.5\%$

63. **Let the incomes of two persons are $4x$ and $5x$ respectively and expenses are $3x$ and $4x$ respectively**

$\therefore$ Saving $= 4x - 3x = x = 1200$

$\therefore$ Income of first persons $= 4 \times 1200 = 4800$

Income of second person $= 5 \times 1200 = 6000$

64. **A can do $\frac{1}{3}$ part of work in 5 days**

$\therefore$ Work done by A in one day

$$= \frac{1}{15}$$

B can do $\frac{2}{5}$ part of work in 4 days

$\therefore$ Work done by B in 1 day

$\therefore$ Total work done by A and B in 1 day

$$= \frac{1}{15} + \frac{1}{10} = \frac{2+3}{30} = \frac{5}{30} = \frac{1}{6}$$

$\therefore$ Total time taken by A and B to complete the work

$= 6$ days

65. **Pipe *A* fills the tank in 10 hours**

$\therefore$ Part of tank filled by B in 1 hour

$$= \frac{1}{8}$$

Pipe C empties the tank in 12 hours

$\therefore$ Part of tank emptied by C in 1 hour

$$= \frac{1}{12}$$

$\therefore$ Part of tank filled by A, B and C in 1 hour

$$= \frac{1}{10} + \frac{1}{8} = \frac{1}{12} = \frac{12+15-10}{120} = \frac{17}{120}$$

$\therefore$ If all pipes opened together, then $\left[\frac{17}{24}\right]$ part of tank will fill in 5 hours

66. **Let the usual speed of man = *S***

Now, speed of man $= \frac{9}{11}S$

We know

Speed is inversely proportional to time

$\therefore$ Time $= \frac{11}{9}T$

$$\frac{11}{9}T - T = 15 \text{ minutes}$$

$$\frac{11T - 9T}{9} = 15$$

$$2T = 135$$

$\Rightarrow$ $T = 67{,}5$minutes

67. $\times\times\times$) **64329** ($\times\times\times$

$\overline{\times\times\times}$

1752 — Given/दिया है

$\overline{\times\times\times\times}$

1149 — Given/दिया है

$\overline{\times\times\times\times}$

213 — Given/दिया है

Number (1) 643 —175=468

Number (2) 1752—114 $= 1638$

Number (3) 1149 —213 $= 936$

$\therefore$ Divisor $= 234$

68. $\sqrt{7+4} - \frac{1}{\sqrt{7}+\sqrt{4}}$

$$= \sqrt{7+2} - \frac{1}{\sqrt{7+2}} = 3 - \frac{1}{3}$$

$$= \frac{9-1}{3} = \frac{8}{3}$$

69. $x = \frac{1}{\frac{4}{1} + \frac{1}{4}} = \frac{1}{\frac{16-1}{4}} = \frac{4}{17}$

$\therefore$ $x^{-1} = \frac{1}{x} = \frac{\frac{1}{4}}{17} = \frac{17}{4}$

71. Ratio of profits of A and $B = 5:6$

Time invested by B in business

$= 9$ months

Time invested by A in business

$= 10$ months

Ratio of invested capitals of A and B

$$= \frac{5}{10}:\frac{6}{9} = \frac{1}{2}:\frac{2}{3} = 3:4$$

72. The marks obtained by a student in Mathematics, General knoweldge and Reasoning ability

$$= 90^\circ + 65^\circ + 55^\circ = 210^\circ$$

The marks obtained by a student in English and computer knowledge

$$= 70^\circ + 80^\circ = 150^\circ$$

Difference $= 210^\circ - 150^\circ = 60^\circ$

$\therefore$% Difference $= \frac{60^\circ \times 100}{150^\circ} = 40\%$

73. Marks obtained by student in computer knowledge

$= \frac{80^\circ \times 100}{360^\circ} = 22.22\% \approx 22\%$ Required subject = Computer knowledge

74. Total marks = 180

Marks of mathematics $= \frac{90^\circ}{360^\circ} \times 180 = 45$

A student is obtained 45 marks in Mathematics

75. Total marks = 180

Marks obtained in Maths $= \frac{90^\circ}{360^\circ} \times 180 = 45$

Marks obtained in computer knowledge

$$= \frac{80^\circ}{360^\circ} \times 180 = 40$$

Difference in marks $= 45 - 40 = 5$