Date: 24/10/2021

Test Booklet Code

13-15

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005 | Ph.: 011-47623456

Time: 120 Min.

Answers & Solutions

Max. Marks: 100

for

NTSE (Stage-II)-2021

MENTAL ABILITY TEST

(For Students of Class X)

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the Test-booklet.

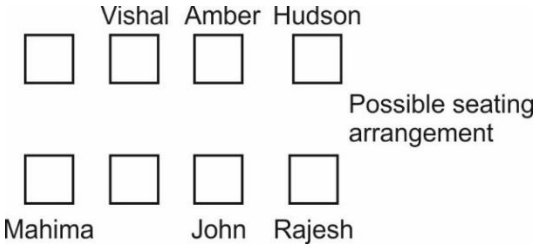
1. There are **100 questions** in this test. All are compulsory.
2. Since the time allotted for this question paper is very limited, you should make the best use of it by not spending too much time on any one question.
3. Each correct answer will be awarded one mark.
4. **THERE WILL BE NO NEGATIVE MARKING**.
5. English version of the question paper will be considered as final in case of any dispute arising out of variation in translated version.

1. **Answer (3)**

Sol. $2^2-1,\ 4^2-1,\ 8^2-1,$ 16^2-1 → 129 (Wrong term), $,\ 32^2-1,\ 64^2-1$

2. **Answer (1)**

Sol.



Statements I and III are definitely true.

3. **Answer (1)**

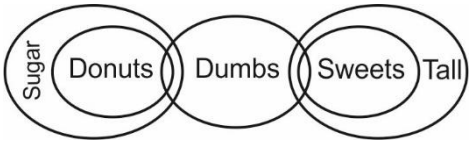
Sol. All Faculties will report to Vice-Chancellor.

4. **Answer (2)**

Sol. By given structure, we get (2).

5. **Answer (1)**

Sol.



6. **Answer (*)**

Sol. In LAUGH : GHTZL 2nd and 3rd positions satisfied the condition asked in question but 4th position not satisfied the condition, hence no option is correct.

7. **Answer (2)**

Sol. 3 → February = Thursday

4 → February = Friday

5 → February = Saturday

6 → February = Sunday

8. **Answer (4)**

Sol. $\bar{D} \Leftrightarrow V^+$

$P^+ Z^+$

V is father of P

9. **Answer (4)**

Sol. $\bar{C}$

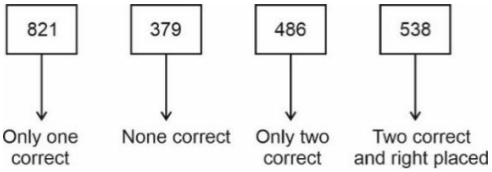
$M^+ \quad P^- \Leftrightarrow L^+$

M is brother-in-law of L

10. **Answer (1)**

11. **Answer (4)**

Sol.

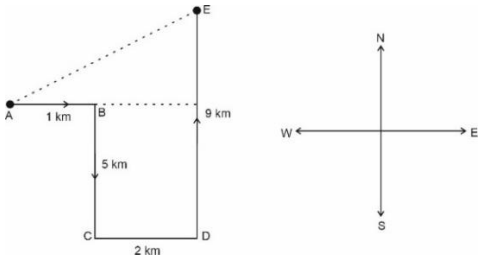


From 821 and 486, we get 8 is correct.

From 538, we get | 5 | 4 | 8 |

12. **Answer (3)**

Sol.



$AE = \sqrt{3^2 + 4^2}$

AE = 5 km

13. **Answer (4)**

Sol. Neither statement (i) nor statement (ii) is sufficient to answer the question.

14. **Answer (4)**

Sol. As per the statements

8 + 4 = 12

4 + 8 = 12

So, number can be 48 or 84.

Neither statement (i) nor statement (ii) is sufficient to answer the question.

15. **Answer (1)**

Sol. Aashvi > Kimaya, Vihana and Aashvi is not tallest, that means Pari is tallest.

Only statement (i) sufficient to answer the question.

16. **Answer (2)**

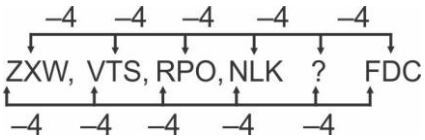
Sol. $\xleftarrow{7^{th} \text{ from right}}$

PACEMAKING

C interchange with E

17. **Answer (3)**

Sol.



18. **Answer (2)**

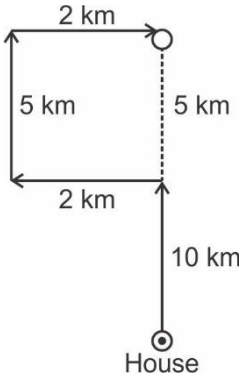
Sol. Total Sunday = '5'

$$\text{Avg} = \frac{5\times520+25\times100}{30}$$

$= 170$

19. **Answer (1)**

Sol.



Total distance from his house = 15 km

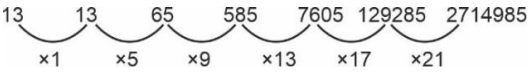
20. **Answer (3)**

Sol.

Persons between X and Z = 8

21. **Answer (4)**

Sol.



22. **Answer (2)**

Sol. $(4 + 1) \times 11 = 55$

$(55 + 9) \times 9 = 576$

$(576 + 25) \times 7 = 4207$

$(4207 + 49) \times 5 = 21280$

$(21280 + 81) \times 3 = 64083$

$(64083 + 121) \times 1 = 64204$

23. **Answer (2)**

Sol. $Z = 2197 = (13)^3 = 2 \times 13 = 26$

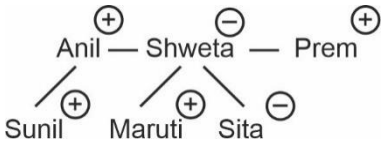
$R = 729 = 9^3 = 2 \times 9 = 18$

$P = 512 = 8^3 = 2 \times 8 = 16$

$J = 10 = \frac{10}{2} = 5 = (5)^3 = 125$

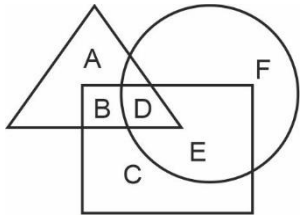
24. **Answer (1)**

Sol.



25. **Answer (2)**

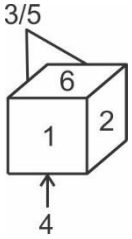
Sol.



B represents girls which are sports persons but not coaches.

26. **Answer (3)**

Sol. 3/5



Opposite of 1 would be 3 or 5

So, 3 must be adjacent to 5

27. **Answer (3)**

Sol. By comparing,

Sun shines brightly → ba lo sul …(1)

Light comes from sun → dopi kup lo nro …(2)

We get, sun common

So, Sun code will be 'lo'

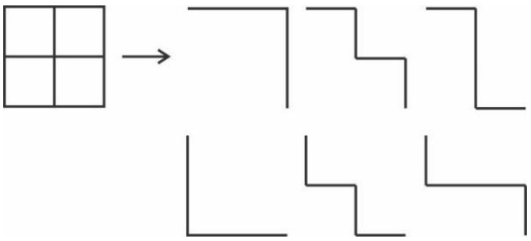
Houses are brightly lit → 'kado ula ari ba' …(3)

By comparing (1) and (3)

Brightly would be 'ba'

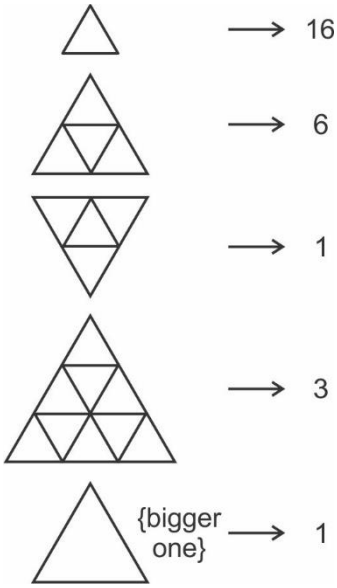
28. **Answer (3)**

Sol.



29. **Answer (1)**

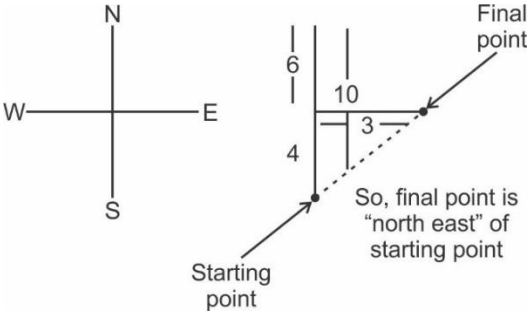
Sol.



Total → 27

30. **Answer (4)**

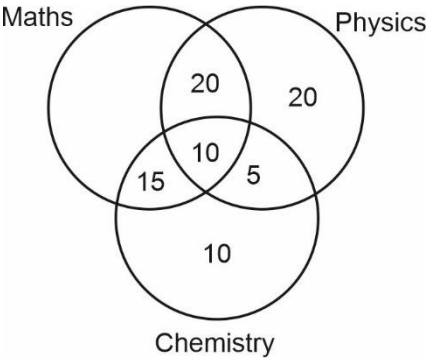
Sol.



By Pythagoras theorem, final point is 5 km far from starting point.

31. **Answer (4)**

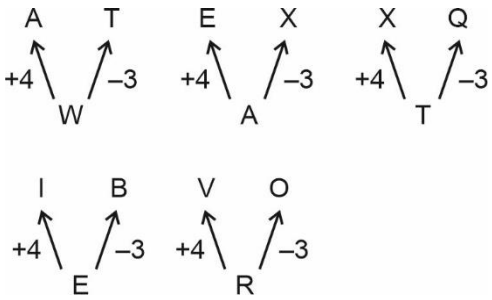
Sol.



100 – (20 + 20 + 10 + 5 + 10 + 15) = 20%

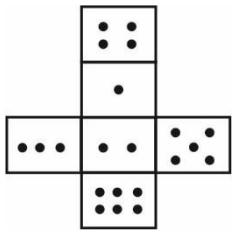
32. **Answer (4)**

Sol.



33. **Answer (4)**

Sol.



Open net of dice.

34. **Answer (3)**

Sol. Z(26) + (4 + 4 + 5) = 39 ⇒ 13(M)

S(19) + (7 + 2 + 5) = 33 ⇒ 7(G)

35. **Answer (4)**

Sol. **Logical -**

Sri > Ruchi > Puchi

Nichi > Chiki

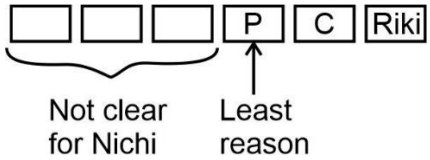
Puchi > Chiki

Reasoning -

Sri > Ruchi > Puchi

Riki > Nichi > Chiki > Sri > Ruchi > Puchi

Logical order -



36. **Answer (2)**

Sol.

Logical-

Sri > Ruchi > Puchi

Nichi > Chiki

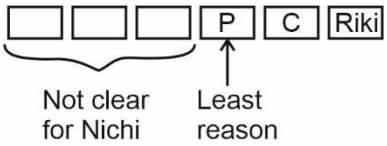
Puchi > Chiki

Reasoning-

Sri > Ruchi > Puchi

Riki > Nichi > Chiki > Sri > Ruchi > Puchi

Logical order



37. **Answer (1)**

Sol. In first sequence number of females entered

= 21 + 6 [as 7G and 6P]

= 27

Females exited = 6 [as 3R]

In second sequence number of females entered

= 9 + 2 = 11 [as 3G and 2P]

Females exited = 14 [as 7R]

∴ Total females remaining = Number of females entered – number of females exited

= (27 + 11) – (6 + 14)

= 18

38. **Answer (4)**

Sol.

4	9	1	13	15	14	4
D	I	A	M	O	N	D

22 33 1 13 35 27 22

2	18	15	14	26	5
B	R	O	N	Z	E

2 233 35 27 213 5

19	9	12	22	5	18
S	I	L	V	E	R

19 33 223 211 5 29 [From options]

39. **Answer (3)**

Sol. Time from Tuesday noon to following

Tuesday 2 P.M.

= 7 × 24 + 2

= 170 hours

Total time gained = 2 min + 4 min 48 sec

$$= \frac{34}{5} \text{ min}$$

$\frac{34}{5}$ min gained in 170 hours

$$1 \text{ min} = \frac{170}{34} \times 5$$

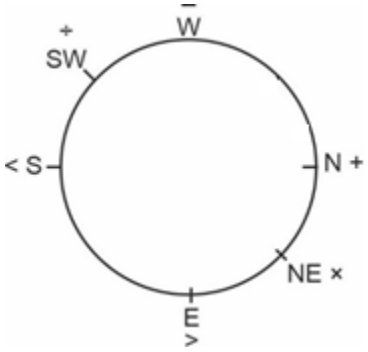
$$2 \text{ min} = \frac{170}{34} \times 5 \times 2$$

= 50 hours

Tuesday 12 : 00 PM + 50 hours = 2 : 00 P.M. on Thursday.

40. **Answer (1)**

Sol.



6 + 4 ÷ 8 × 2 > 9 – 6 × 2 ÷3 > 3 × 2 ÷ 1 – 5

7 > 5 > 1

41. **Answer (1)**

Sol. + → 7:25 + 0:05 = 7:30

× → 5:15 + 0:15 = 5:30

÷ → 9:00 – 0:20 = 8:40

< → 10:55 + 0:25 = 11:20

> → 3:30 – 0:30 = 3:00

= → 1:05 + 0:35 = 1:40

– → 11:25 – 0:10 = 11:15

(1) 6 – 4 × 1 ÷ 2 + 3 > 1 × 8 ÷ 4

4 + 3 > 2 (correct)

(2) 6 + 4 – 1 × 2 ÷ 3 > 1 = 8 < 4

(3) 6 – 4 < 1 ÷ 2 > 3 = 1 + 8 × 4

$2 < \frac{1}{2} > 3 = 33$

(4) 6 ÷ 4 × 1 × 2 + 3 = 1 – 8 > 4

$\frac{3}{2} \times 2$ = –7

Clearly only (1) is correct

42. **Answer (4)**

Sol.

Yashi	Aman	Simran	Anil
Table			
Ashok	Female hostess	Khushi	Abdul

43. **Answer (Wait)**

Sol. Wait

44. **Answer (4)**

Sol. Chik $\xrightarrow{\text{Brother}}$ Pik $\xleftarrow{\text{Husband}}$ Nik $\xleftarrow{\text{Mother}}$ Wik

Wik $\xrightarrow{\text{Daughter}}$ Mik $\xrightarrow{\text{Father}}$ Tik

Hence Pik is daughter-in-law of Mik.

45. **Answer (4)**

Sol. + → 78° → 13 + 5 = 18

– → 162° → 27 – 7 = 20

× → 210° → 35 + 9 = 44

÷ → 114° → 19 – 11 = 08

= → 240° → 40 + 13 = 53

< → 312° → 52 – 15 = 37

6 : 44, 7 : 08, 9 : 18, 10 : 20, 2 : 53

↓ ↓ ↓ ↓ ↓

× ÷ + – =

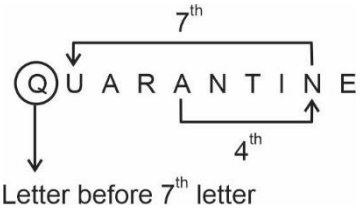
8 × 20 ÷ 5 + 9 – 3 = 38

8 × 4 + 6 = 38

38 = 38

46. **Answer (1)**

Sol.



47. **Answer (2)**

Sol. $\frac{12+3}{5} = 3$ $\frac{15+5}{4} = 5$ $\frac{21+4}{5} = 5$(a) $\frac{29+7}{4} = 9$

12 + 3 + 15 + 5 = 35 ⇒ 3 + 5 = 8, 21 + 4 + 29 + 1 = 61 ⇒ 6 + 1 = 7(b)

a = 5, b = 7

48. **Answer (3)**

Sol. By observation

Total triangle = 17

49. **Answer (2)**

Sol. Lions released to claws same way eagle released to talon.

50. **Answer (1)**

Sol. Number of students who failed in at least two subjects = (12 + 12 + 10 + 5) = 39

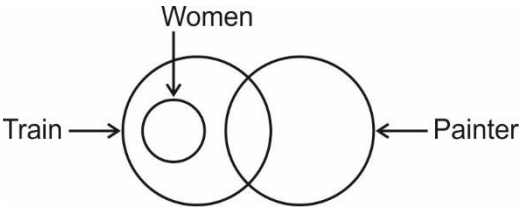
$\% = \frac{39}{500} \times 100\% = 7.8\%$

51. **Answer (1)**

Sol. Seed → Sprout → Sapling → Plant → Tree.

52. **Answer (1)**

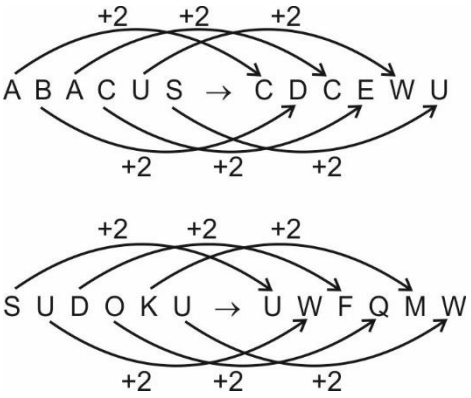
Sol.



Only Conclusion I follows.

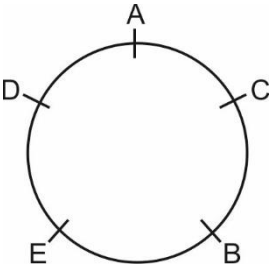
53. **Answer (2)**

Sol.



54. **Answer (3)**

Sol.



C is sitting between A and B

55. **Answer (1)**

Sol. B $\rightarrow$ F

A $\rightarrow$ D

C $\rightarrow$ E

56. **Answer (4)**

Sol. (I) is not sufficient alone

(II) is not sufficient alone solve the question

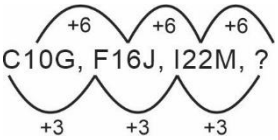
Both (I) and (II) are give the answer.

57. **Answer (4)**

Sol.

58. **Answer (4)**

Sol.



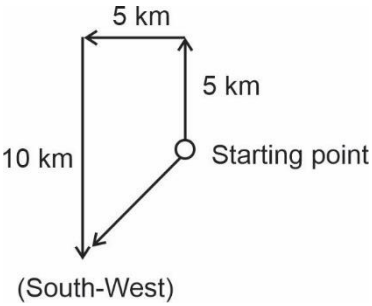
L28P

59. **Answer (1)**

Sol. By observation

60. **Answer (4)**

Sol.



61. **Answer (4)**

Sol. By observation

62. **Answer (3)**

Sol. 7th of the month is Tuesday.

Hence 31st will be Friday.

63. **Answer (4)**

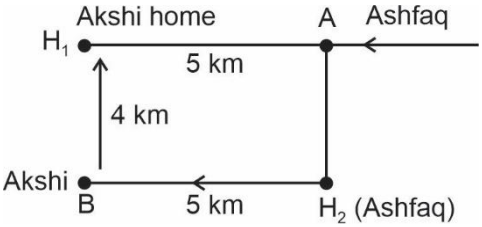
Sol. a b c d e = (a + b + c) | d × e

64. **Answer (*)**

Sol. Only direction is given no question is available.

65. **Answer (1)**

Sol.



66. **Answer (2)**

Sol. Letter represents married scientists who do not live in a joint family 'B'.

67. **Answer (4)**

Sol.

Bicycle =80 (B) | Walk = 100 (A) | Bus = 20 ↓

Cricket (C) = (24 + 40) | 8 persons are not playing cricket

Best representation diagram option (4)

68. **Answer (4)**

Sol. Total + 1 = Top + Bottom

21 + 1 = T + 10

So, Madhav from Top is 12th

So by question

Neethu is 13th from the top

Now, Total students are 22

So, 14th from the back means

9th from the top

So, by question

Madhav is at 9th from the top

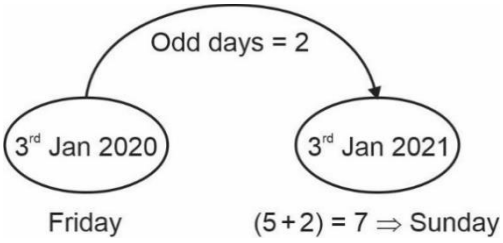
So, 3 students between Madhav and Neethu.

69. **Answer (1)**

Sol. 9 + 5 + 5 = 10 + 9 = 19

70. **Answer (3)**

Sol.



71. **Answer (1)**

Sol. By observation

72. **Answer (2)**

Sol.

①	②	③	④	⑤	⑥
$,	AN ,	# ,	AT ,	* ,	IN ,

⑦	⑧	⑨	⑩	⑪	⑫
– ,	IT ,	+ ,	IF ,	Δ ,	AF

Class start at - IT, # = 8 : 15

Teaches till - AN, * = 2 : 25

Class till = 10 : 40

Break = 1 : 30 hr

Time = 12 : 10

AF AN

73. **Answer (Wait)**

74. **Answer (2)**

Sol. F 5 A Q 2 E 8 I 9 O L U R I 6 U J K A E 2 E V B I A M 3 O

75. **Answer (1)**

Sol. 7 Bamboo – – – Peepal – – – Neem – – – – Banyan 1

13 + 7 = 20

76. **Answer (3)**

Sol.

P O P U L A R
16 15 16 21 12 1 18
+ + + + +
32 36 28 22 30

V O C A L I S T
22 15 3 1 12 9 19 20
+ + + + + +
25 16 15 10 31 29

T E A C H E R
20 5 1 3 8 5 18
+ + + + + +
21 8 9 8 26

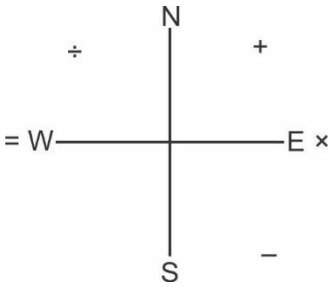
77. **Answer (3)**

Sol. Smallest perfect square is 1024 for 1st hour distance is x then for 2nd hour distance will be 2*x* Odometer reading in the last is same from back then it may be 1111 difference is 87. No option is matching so, it can be 1221 difference is 197.

$\frac{197}{3} = 65.66 \cong 65.7\ (\text{approx})$

78. **Answer (3)**

Sol.



+ ⇒ NE

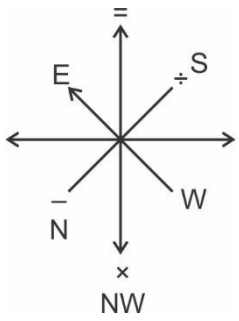
– ⇒ SE

× ⇒ E

÷ ⇒ NW

= ⇒ W

After rotation 180° and 45° clockwise



33 × 11 ÷ 3 – 6 = 115

NW, S, N, SE

79. **Answer (4)**

Sol. Go by option

So, 5 – 4 × 3 < 4 + 10 ÷ 2 = 3 × 2 + 3 > 4 ÷ 7 × 1

80. **Answer (1)**

81. **Answer (2)**

Sol. Δ ^ O → Δ ≤ O

Δ * O → Δ = O

$\Delta \# O \rightarrow \Delta \geq O$

$\Delta \sqcap O \rightarrow \Delta > O$

$\Delta \square O \rightarrow \Delta < O$

Statements:

(A) $\leftarrow \leq \propto$ $\qquad \propto \geq \leftarrow > \$ \Rightarrow \propto > \$$

(B) $\% > \$$ $\qquad \leftarrow > \$$

(C) $\$ \geq \downarrow$ $\qquad \leftarrow > \$ \geq \downarrow \Rightarrow \leftarrow > \downarrow$

(D) $\leftarrow > \$$

Conclusions:

I. $\propto < \$ \rightarrow$ incorrect

II. $\$ = \downarrow \rightarrow$ incorrect

III. $\leftarrow > \downarrow \rightarrow$ correct

Only III is true.

82. **Answer (1)**

Sol. $7:00 \underset{0}{-} 8:00 \underset{+100}{-} 9:00 \underset{-100}{-} 10:00 \underset{0}{-} 11:00 \underset{-200}{-} 12:00 \underset{-100}{-} 1:00 \underset{-300}{-} 2:00 \underset{-200}{-} 3:00 \underset{-400}{-} 4:00 \underset{-300}{-} 5:00 \underset{-500}{-} 6:00 \underset{-400}{-} 7:00 \underset{-600}{}$

(−200, +100, −200, +100, −200, +100, −200, +100, −200, +100, −200)

Total loss of 10 minutes.

83. **Answer (1)**

Sol. By observation.

84. **Answer (2)**

Sol. Required pairs are AL, DR, IM, OT, ES, CH, OP, EH, OT, ER, NO, NT PR and MO.

85. **Answer (1)**

Sol. Mon is grand-daughter of Fri and niece of Tues.

86. **Answer (4)**

Sol. By observation

Total number of triangles = 48

and total squares = 22

87. **Answer (1)**

Sol. By observation option (1) is correct

88. **Answer (4)**

Sol. $5 + 6(\text{hexagon}) = 11$

$(1 + 3) + 3(\text{triangle}) = 7$

$9 + 8(\text{octagon}) = 17$

$(2 + 1) + (4)(\text{square}) = 7$

All prime

89. **Answer (2)**

Sol. Figure (I), (II) and (III)

Sum of (1st and 2nd row) numbers

(3 + 8 + 5), (7 + 6 + 4), (2 + 13 + a)

16, 17, 2 + 13 + a = 18

a = 3

Similarly

Last row from figure (I), (II) and (III)

(4 + 7), (9 + 4), (b + 10)

11, 12, b + 10 = 13

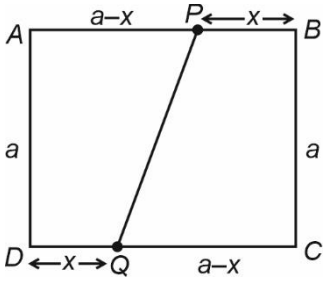
b = 3

90. **Answer (Wait)**

91. **Answer (Wait)**

92. **Answer (4)**

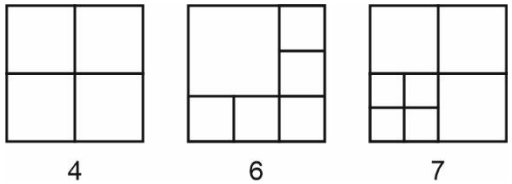
Sol.



Such infinite cases are possible.

93. **Answer (2)**

Sol.



94. **Answer (1)**

Sol. Up to 9, 45 digits $\left\{\frac{9 \times 10}{2} = 45\right\}$

Now, 10 will be 10 times

So, 20 digits

Similarly for 11 → 22

12 → 24

13 → 26

14 → 28

15 → 30

45 + 20 + 130 = 195

It means,

Up to 195th digit it would be like 151⑤

195

So, we need to add 3 digits to get 198

∴ It will be like .....1 6 ① 6 1 6

198th

95. **Answer (4)**

Sol. Let the radius 'r' of semicircle in the II path

So,

(Path I) AXB $\rightarrow \frac{1}{2} \cdot 2\pi(7r) = 7\pi r$

(Path II) AYB $\rightarrow \frac{1}{2} \cdot 2\pi\, r \times 7 = \pi r \times 7$ (7 semicircle)

(Path III) for AZB, 2 types of semicircle

Small semicircle diameter is 3r

So, $\frac{1}{2} \cdot 2\pi\left(\frac{3r}{2}\right) \times 2$ (for two semicircle)

∴ $3\pi r$

For bigger semi-circle

Radius is 4r

∴ $\frac{1}{2} \cdot 2\pi(4r) = 4\pi r$

Total = $7\pi r$

96. **Answer (1)**

Sol. For 1st line ₹1 for the perpendicular line we need to mark 4 arc i.e. ₹80.

Now we will draw 1 line by joining the arc

∴ ₹82 for a pair.

∴ $\frac{1000}{82} = 12.195$ (approx.)

12 pairs

97. **Answer (3)**

Sol. Number of factors.

98. **Answer (3)**

Sol. 'A' is the only enclosed figure.

99. **Answer (3)**

Sol. Skipping two digit prime numbers by 1, 2, 4, 8 … and so on.

100. **Answer (1)**

Sol. 13 → 5 {2 prime numbers}

17 → 5 {3 prime numbers}

29 → 7 {5 prime numbers}

41 → 11 {7 prime numbers}

∴ 73 → 11 {15 prime numbers}

❑ ❑ ❑