class 10

MAT

Mental Ability Test

TARGET

NTSE

National Talent Search Examination

Solved Paper

2017

Stage 2

Time : 45 Minutes **Max. Marks : 50**

Instructions for Candidates

Read the following instructions carefully before you open the questions booklet :

1. Answers are to be given on a separate answersheet.
2. Write your eight-digit Roll Number very clearly on the test-booklet and answer-sheet as given in your letter/ admission card.
3. Write down the Booklet Number in the appropriate box on the answer sheet.
4. There are 50 questions in this test. All are compulsory.
5. Please follow the instructions for marking the answers given on the answer sheet.
6. For questions 1 – 50, put a cross mark (×) on the number of the correct alternative on the answer-sheet against the corresponding question number.
7. If you do not know the answer to any question, do not spend much time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and try them again.
8. 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.
9. Rough work can be done anywhere in the booklet but not on the answer sheet/loose paper.
10. Every correct answer will be awarded one mark.
11. Please return the Test-booklet and answer-sheet to the invigilator after the test.

1. Some translated words in an artificial Language (in which the word order is not necessarily same) are given below

mie pie sie	good person sing
pie sie rie	sing good lyrics
tie rie sie	love good lyrics

What is the translation for "person love lyrics"?

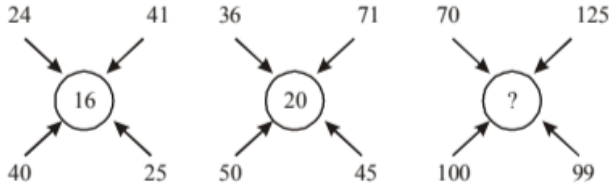
(1) pie tie rie (2) tie rie sie
(3) rie mie tie (4) sie mie pie

2. In the given sequence, some letters are missing. Which of the given options can fill the blanks in the correct order from left to right ?

ab_ab_aaa_bbaaa_bbbb

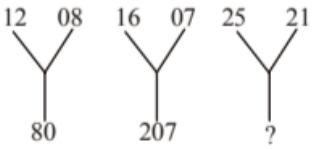
(1) abab (2) abba
(3) aabb (4) baba

3. Identify the number in the position of '?'



(1) 24 (2) 28
(3) 32 (4) 36

4. Find the missing number.



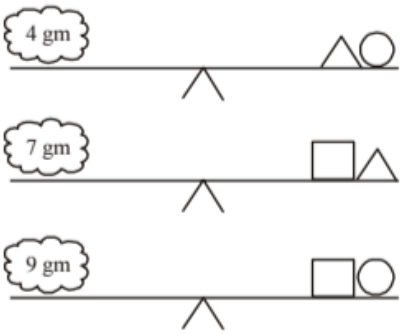
(1) 184 (2) 210
(3) 241 (4) 425

5. If A, B, C, D are distinct decimal digits, then which of the following options is correct ?

$$\begin{array}{r} A4BC \\ \times\ C \\ \hline 1A1DC \end{array}$$

(1) A = 3 B = 7 C = 5 D = 9
(2) A = 2 B = 3 C = 6 D = 5
(3) A = 3 B = 8 C = 6 D = 5
(4) A = 2 B = 3 C = 5 D = 7

6. Observe the following figures representing a balance.



Which of the following figures represents the correct balance?

(1) 

(2) 

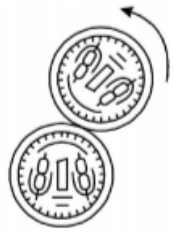
(3) 

(4) 

7. Choose appropriate option from given alternatives such that the relationship defined by ':' is preserved. PNLJ : LIFC and VTRP : _____

(1) ROLI (2) SOLH
(3) RPOM (4) DMEN

8. A coin is in a fixed position. Another identical coin is rolled around the edge of the first one. How many complete revolutions will be made by the revolving coin before it reaches its starting position ?



(1) 1 (2) 2 (3) 3 (4) 4

9. If South-East becomes North; and North-East becomes West; then West becomes

(1) North East (2) South East
(3) North West (4) South West

10. A cube is 6 cm in length, breadth and height. It is painted red on two opposite faces, black on the other two opposite faces and green on the left over faces. It is then cut into 216 cubes of side 1 cm. How many small cubes have no face painted ?

(1) 16 (2) 8 (3) 64 (4) 24

11. Find the odd one out of the following terms :

EF22, JK42, GH24, VW90, IJ38

(1) EF22 (2) GH24
(3) IJ38 (4) VW90

12. Choose the conclusions which logically follow from the given statements.

Statement: All the pens are papers
All the papers are boats
Some birds are boats.

Conclusions : (A) Some boats are pens
(B) Some birds are papers
(C) None of the pens are birds

(1) Only A and B (2) Only A
(3) Only C (4) Only A and C

13. How many quadrilaterals are there in the given figure ?

(1) 10 (2) 11
(3) 12 (4) 13

14. Which of the following alternatives will fit in place of 'M'?

255, 3610, 4915, M, 8125

(1) 5100 (2) 5420
(3) 6420 (4) 6422

15. Which of the following alternatives will fit in place of 'M'?
L6, O8, R11, M, X25, A42, D75
(1) U15 (2) U16 (3) W14 (4) U14

16. Which of the following alternatives will fit in place of 'M'?

7	3	6	2
2	8	5	4
1	1	2	4
4	2	1	M

(1) 6 (2) 5 (3) 4 (4) 3

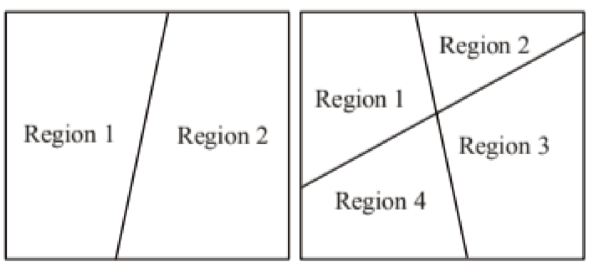
17. If 'Σ' means '×', 'δ' means '÷', 'σ' means '+' and '∝' means '–' then evaluate the following expression using standard operator precedence.
56δ(6σ8)Σ4∝1
(1) 52 (2) 24 (3) 15 (4) 43

18. With what operators, should the symbols @ and < be replaced so that the following expression is valid.
$100 - 81 \div 27 @ 3 < 6 = 115$
(1) + and – (2) × and ÷
(3) + and × (4) ÷ and –

19. x is an integer such that it leaves a remainder of 2 when divided by 3, leaves a remainder of 3 when divided by5, and leaves a remainder of 5 when divided by 7. What could be a possible value of x from among the following options ?
(1) 53 (2) 68 (3) 74 (4) 83

20. In how many ways can you distribute 10 identical balls into two non-identical boxes so that none are empty ?
(1) 2 (2) 8 (3) 9 (4) 10

21. One line forms two regions in a plane. Similarily, two lines in a plane can form a maximum of four regions.These are shown in the figures below :



What is the maximum number of regions that can be formed by 4 lines in a plane ? Lines need not be concurrent.
(1) 7 (2) 8 (3) 10 (4) 11

22. You need to take n arbitrary points on or inside a square of side 2 cm such that there will always be a pair of points at a distance of not more than $\sqrt{2}$ cm. What is the minimum value of n ?
(1) 2 (2) 4 (3) 5 (4) 8

23. The following facts are known about an unknown number X:
I : The sum of digits of X is 15.
II : The unit's digit of X is 6.
Then which of the following statement is certainly true about X ?
(1) X is divisible by 3 but not by 6
(2) X is divisible by 6 but not by 9
(3) X is not divisible by 6 but divisible by 9
(4) X is divisible by both 6 and 9

24. The average age of A, B and C is 43 years. Which of the following statements are required to find the eldest among them ?
Statements: I : Age of C is 65 years.
II : Age of A is 25 years.
(1) I is sufficient
(2) Both I and II are required
(3) I and II together are not sufficient
(4) II is sufficient

Directions (Qs. 25-26): A class is to be taught five subjects- Hindi, Physics, Chemistry, Biology and Mathematics by five different teachers - A, B, C, D and E in five periods (1 to 5). A teacher can teach in only one of the periods. The following details are available about the teaching.

A teaches mathematics which is not taught in the first period.

- Physics is taught by D in an even numbered period.
- Chemistry is taught in an odd period, and it precedes mathematics period.
- E teaches in the first period.
- C teaches Chemistry but not in the first or the last periods.
- Hindi is taught in the last period.

25. Which of the following statements is necessarily true?
(1) Third period is of Hindi taught by B
(2) Second period is of Physics taught by C
(3) Fourth period is of Mathematics taught by A
(4) Fifth period of Biology taught by D

26. Which subject is taught by B?
(1) Physics (2) Chemistry
(3) Biology (4) Hindi

27. A solid metallic cylinder of radius 12 cm and height 175 cm is melted and moulded into another solid cylinder of height 63 cm. What is the radius of the new cylinder?
(1) 14 (2) 4π
(3) 20 (4) 5π

28. Choose the option which shows the correct mirror image of the characters given below.

DIVERT6475ALE

(1) D I Λ Я ⊥ ɘ ɐ ⅃ ƨ ∀ Γ E
(2) D I Λ ʁ ⊥ 9 ɐ ⅃ ƨ ∀ Γ E
(3) D I Λ E ʁ ⊥ ɘ ɐ ⅃ ƨ ∀ Γ E
(4) D I Λ E Я ⊥ ɘ ɐ ƨ ∀ Γ E

Directions (Qs. 29 - 30): There are 150 students in a class. 20 students play both hockey and kabaddi. The same numbers of students play only football. 35 students play both hockey and football but not kabaddi. 25 play both football and kabaddi but not hockey. The number of students who play only hockey is the same as the number of students who do not play any of three mentioned games and the number of students who play only hockey is half of the number of students who play only football.

29. How many students play only kabaddi?
(1) 10 (2) 20
(3) 30 (4) 40

30. How many students play only hockey?
(1) 10 (2) 15
(3) 20 (4) 25

31. What will be the number in the blank box?

1	3	4	6	7	9
2	14	5	77	8	

(1) 98 (2) 128
(3) 189 (4) 194

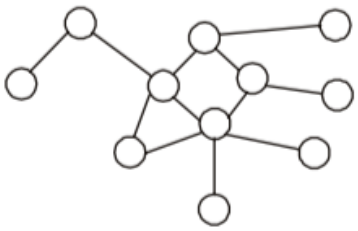
32. What is the total number of circles in the figure given below?

(1) 13 (2) 14 (3) 15 (4) 16

33. A bucket contains milk mixed with water, of which 3 parts are water and 5 parts are milk. A part of the mixture is removed from the bucket and is replaced by water. What portion of the mixture should have been removed so that the new mix contains milk and water in equal proportion?

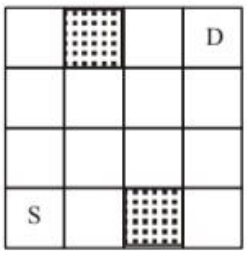
(1) $\frac{1}{3}$ (2) $\frac{1}{4}$ (3) $\frac{1}{5}$ (4) $\frac{1}{6}$

34. You need to colour the circles in such a way that no two circles connected by a line get the same colour. What is the minimum number of distinct colours needed to colour all the circles in the figure?



(1) 4 (2) 5 (3) 6 (4) 7

35. From each box you can move only to the immediate right box or the immediate top box. You cannot move into or through a shaded box. How many ways are there to move from the box marked S to the box marked D?



(1) 8 (2) 10 (3) 12 (4) 14

36. Which number will come in the place of M ?

16	7	2	20
25	8	2	30
36	9	5	24
49	10	7	M

(1) 21 (2) 32 (3) 40 (4) 63

37. The square of the length of a rod AB is 72 cm^2. If we place the rod in the corner of a room, so that the end A is always on the edge between the two walls of the corner and the end B is always on the floor, what is the maximum possible area of the triangle formed by the rod, the edge between the walls and the floor?

(1) 6 cm^2 (2) 12 cm^2 (3) 18 cm^2 (4) 24 cm^2

38. What is the missing term '?' in the following series?
2, 6, 6, 5, 10, 4, 14, 3, 18, ?

(1) 1 (2) 2 (3) 19 (4) 22

39. In the question given below, there are two statements followed by two conclusions. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions,and then decide which of the given conclusions logically follows from the given statements?

Statements :

Some kings are queens

All the queens are beautiful.

Conclusions:

I. All the kings are beautiful

II. All the queens are kings.

(1) Only I follows (2) Only II follows

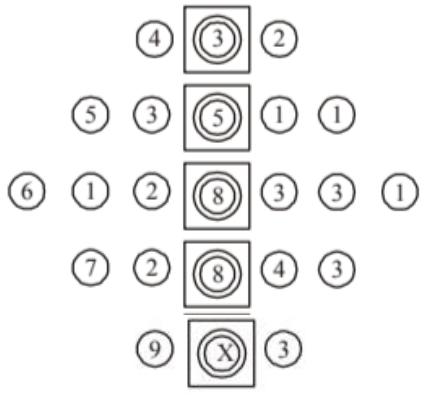
(3) Neither I nor II follows (4) Both I and II follow

40. If prime numbers are assigned to English alphabets from A to Z in order MAT will be :

(1) 31 1 67 (2) 41 1 67

(3) 37 2 71 (4) 41 2 71

41. What number comes inside the square in place of X



(1) 5 (2) 6

(3) 7 (4) 8

42. Find the alphabet that will replace '?'

I	2	2	3	1	5
II	3	4	2	4	2
III	H	P	I	?	Y

(1) A (2) D

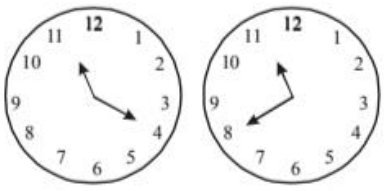
(3) O (4) N

43. In a certain language IMPHAL is coded as JLRFDI. How will MYSURU be coded in the same language?

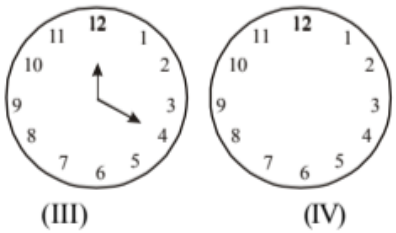
(1) NXUSUR (2) RUSUXN

(3) NXSUUR (4) NXTTUR

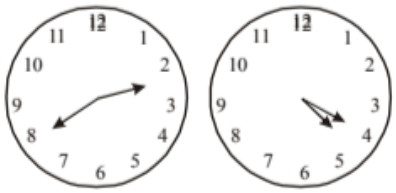
44. What time should the IV clock show?



(I) (II)



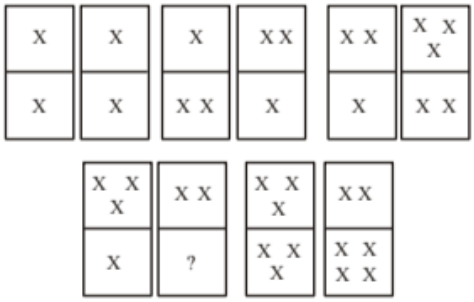
(III) (IV)



(V) (VI)

(1) 1:00 (2) 1:20
(3) 1:40 (4) 2:00

45. How many crosses should be there in the box marked with '?' ?



(1) 1 (2) 2
(3) 3 (4) 4

46. Find the missing term.
a, b, d, __,p
(1) h (2) i (3) j (4) k

47. A is East of B and West of C, D is South-West of C, and B is South-East of E. When seen from West to East, which of the following sequences are possible?
I: EBDAC II: DEBAC
III: EBADC IV: EDBAC
(1) I and II (2) I, III and IV
(3) I, II and III (4) All I, II, III and IV

48. A, B, C and D are to be seated in a row. C and D cannot be on adjacent seat. Also, B cannot be at the third place. Which of the following must be false?
(1) A is at the fourth place (2) A is at the third place
(3) A is at the second place (4) A is at the first place

49. Mrs. Kirandeep, a driving instructor, has to arrange training schedule for some of her pupils. She has 8 new pupil who wish to book either a morning or evening of a particular day. The appointment can be given for Tuesday, Wednesday, Friday and Saturday. The instructor instructs only one pupil in morning and one in the evening session.

- Mrs. Sabita is only available Tuesday morning but Mr. Aaditya can make any time on a Wednesday.
- Mrs. Firdaus is free on Tuesday all day but Mr. Naved is only free Wednesday evening.
- Mrs. Seema is only available Friday morning whereas Mrs. Ritu can only make Saturday evening.
- Mrs. Shalu is available all day Fridays whereas Mr. Ronald can make any time on a Saturday.

Which of the following two should have morning appointments?
(1) Mr. Ronald and Mrs. Shalu
(2) Mr. Ronald and Mrs. Firdaus
(3) Mr. Aaditya and Mrs. Firdaus
(4) Mr. Aaditya and Mr. Ronald

50. Just before sunset Veena and Zeba were talking to each other standing face-to-face. If Veena sees Zeba's shadow to be exactly towards the right of Zeba, which direction was Veena facing?
(1) South (2) North (3) East (4) North-East

ANSWER KEY

1	(3)	**6**	(3)	**11**	(2)	**16**	(3)	**21**	(4)	**26**	(4)	**31**	(4)	**36**	(1)	**41**	(2)	**46**	(1)
2	(2)	**7**	(1)	**12**	(2)	**17**	(3)	**22**	(3)	**27**	(3)	**32**	(3)	**37**	(3)	**42**	(1)	**47**	(4)
3	(2)	**8**	(2)	**13**	(3)	**18**	(3)	**23**	(2)	**28**	(3)	**33**	(3)	**38**	(2)	**43**	(1)	**48**	(4)
4	(1)	**9**	(2)	**14**	(3)	**19**	(2)	**24**	(1)	**29**	(c)	**34**	(1)	**39**	(3)	**44**	(2)	**49**	(4)
5	(4)	**10**	(3)	**15**	(2)	**20**	(3)	**25**	(3)	**30**	(a)	**35**	(3)	**40**	(4)	**45**	(4)	**50**	(1)

Hints & Explanations

1. (3) mie pie sie — **good** person sing ..... (1)

pie sie rie — sing **good** lyrics ..... (2)

tie rie sie — love **good** lyrics ..... (3)

From (1), (2) & (3) code for **good** is **sie**

From (2) & (3) code for lyrics is rie

From (1) & (2) code for sing is pie

So code for a **person** is mie
From (3) code for **love** is **tie**
Therefore, the code for 'person love lyrics' is 'rie mie tie'.

2. (2) The sequence of the series is as follows :
ab/**a**ab**b**/aaa**b**bb/aaa**a**bbbb

3. (2) As, in 1st figure, $\frac{(41+40)-(24+25)}{2} = 16$

and In 2nd figure, $\frac{(71+50)-(36+45)}{2} = 20$

Similarly, In 3rd figure, $\frac{(125+100)-(70+99)}{2} =$ 28

4. (1) As, In 1st figure,
$12^2 - 8^2 = 144 - 64 = 80$
In 2nd figure,
$16^2 - 07^2 = 256 - 49 = 207$
Similarly, In 3rd figure,
$25^2 - 21^2 = 625 - 441 = \boxed{184}$

5. (4) Given, $\begin{array}{r} A4BC \\ \times\quad C \\ \hline 1A1DC \end{array}$ $\Rightarrow$ By putting values, $\begin{array}{l} A=2 \\ B=3 \\ C=5 \\ D=7 \end{array}$

$$\begin{array}{r} 2435 \\ \times\quad 5 \\ \hline 12175 \end{array}$$

6. (3)
$4 = \Delta + O$ ___ (i)
$7 = \square + \Delta$ ___ (ii)
Given, $9 = \square + O$ ___ (iii)
$20 = 2(\Delta + O + \square)$
$10 = \Delta + O + \square$

Put the value in equ. (i), (ii) and (iii)

(i) $10 = 4 + \square$
$\square = 6$

(ii) $10 = 7 + O$
$O = 10 - 7$
$O = 3$

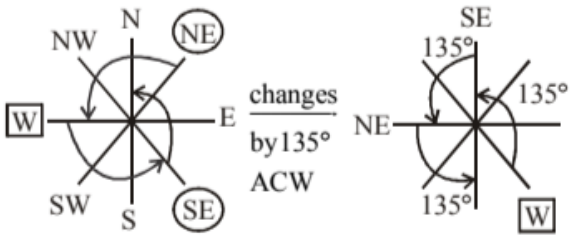
(iii) $10 = \square + O + \Delta$
$10 = 9 + \Delta$
$\Delta = 1$.
Now, put the values in options (c),
$8 + \Delta = \square + O$
$8 + 1 = 6 + 3$
$9 = 9$.

7. (1) As, P N L J $\xrightarrow{-4}$ L I F C

Similarly, V T R P $\xrightarrow{-4}$ R O L I

8. (2) The point of contact no. both the stationary coin and the rotating coin must move the same distance, half the circumference of the coin.

9. (2) The direction diagram is as shown below :



So, it is clear from the above diagram that west becomes south - east.

10. (3) $\sqrt[3]{216} = 6$
Number of small cubes have no face painted $= (6-2)^3$
$= 64$

11. (2) As,

E F
↓ ↓
(positonal value)
$5 + 6 = 11 \times 2 = 22$

J K
↓ ↓
$10 + 11 = 21 \times 2 = 42$

V W
↓ ↓
$22 + 23 = 45 \times 2 = 90$

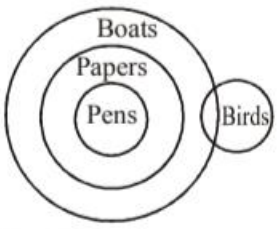
and

I J
↓ ↓
$9 + 10 = 19 \times 2 = 38$

but,

G H
↓ ↓
$7 + 8 = 15 \times 2 = 30 \neq 24$

12. (2) The venn diagram is as shown below :

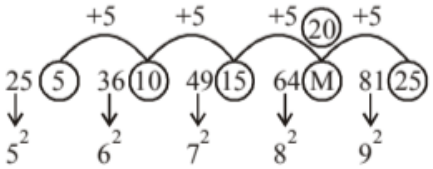


Conclusions :
I. ✓ II. × III. ×
So, only (A) is true.

13. (3)

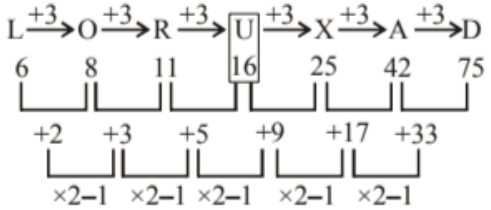
Quadrilaterals are 12, 123, 1234, 12345
23, 234, 2345
3, 34, 345
4, 45
Total Quadrilaterals = 12

14. (3) The pattern of the series is as follows :



So 6420 will fit in place of M.

15. (2) The pattern of the series is as follows :



16. (3) As, In column 1,
$7 + 2 + 1 + 4 = 14$
In column 2,
$3 + 8 + 1 + 2 = 14$
and In column 3,
$6 + 5 + 2 + 1 = 14$
Similarly, In column 4,
$2 + 4 + 4 + M = 14$
$\boxed{M = 4}$

17. (3) Given, $56\delta(6\sigma 8)\sum 4 \propto 1$
After putting the signs,
$56 \div (6+8) \times 4 - 1$
$56 \div 14 \times 4 - 1$
$4 \times 4 - 1$
$16 - 1 = 15$

18. (3) Given, $100 - 81 \div 27 @ 3 < 6 = 115$
After replacing the symbols,
$\Rightarrow$ $100 - 81 \div 27 + 3 \times 6$
$\Rightarrow$ $100 - 3 + 18$
$\Rightarrow$ $100 + 18 - 3$
$\Rightarrow$ $118 - 3 \Rightarrow 115$

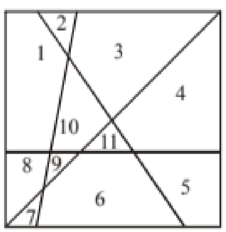
19. (2) According to the questions, the number is
$x = 3Q_1 + 2$
Also, $x = 5Q_2 + 3$
and $x = 7Q_3 + 5$
From option (2), put the 68 in x.
Then, $x = 3Q_1 + 2 = 5Q_2 + 3 = 7Q_3 + 5$
$\Rightarrow 68 = 3Q_1 + 2 = 5Q_2 + 3 = 7Q_3 + 5$
$\Rightarrow$ On solving we get $Q_1 = 22, Q_2 = 13, Q_3 = 9$
So, $x = 68$

20. (3)

Box 1	9	8	7	6	5	4	3	2	1
Box 2	1	2	3	4	5	6	7	8	9

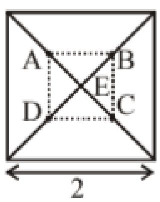
Clearly total ways are 9.

21. (4)



So, the maximum number of regions that can be formed by 4 lines in plane is 11.

22. (3)



Minimum No. of points inside a square of side 2 cm are A, B, C, D, E whose pairwise distance is not more than $\sqrt{2}$.

23. (2) Sum of digit's is divisible by 3 and unit digit is even $\rightarrow$ number is divisible by 6.
And sum of digit is not divisible by 9.

24. (1) The average age of A, B, C, $= \dfrac{A+B+C}{3} = 43$
$\therefore A + B + C = 129$
If $C = 65$ $\quad A + B = 64$
Since sum of ages of A + B is less than age of C, hence statement I alone is sufficient.

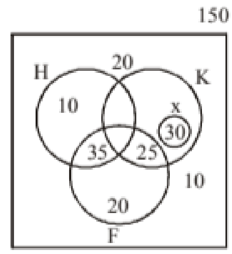
Solution (25 - 26) The arragement is as following :

	Phy	Chem	Bio	Maths	Hindi
A	x	x	x	4	x
B	x	x	x	x	5
C	x	3	x	x	x
D	2	x	x	x	x
E	x	x	1	x	x

25. (3) Fourth period is of Mathematics taught by A.
26. (4) Hindi subject is taught by B.
27. (3) Volume of C_1 = Volume of C_2
$\pi R_1^2 h_1 = \pi R_2^2 h_2$
$12^2 \times 175 = R_2^2 \times 63$
$\therefore R_2 = 20$

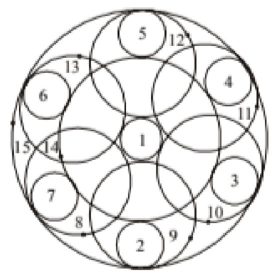
28. (3) The image of the characters is as follows :

29 - 30



29. (3)
30. (1)
31. (4) As, In 1st Figure,
$1^2 + 2^2 + 3^3 = 14$
In 2nd figure, $4^2 + 5^2 + 6^2 = 77$
Similarly In 3rd figure, $7^2 + 8^2 + 9^2 = \boxed{194}$

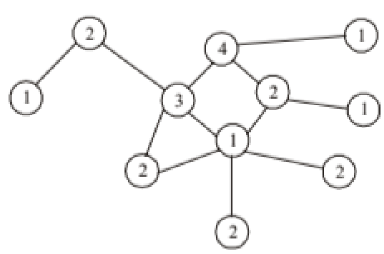
32. (3)



So, by observation, there are 15 number of circles in the figure.

33. (3) Let total quanity be x litre
Water $= \dfrac{3x}{8}$ lit and milk $= \dfrac{5x}{8}$ lit
Let y lit mixture is removed
Water removed $= \dfrac{3y}{8}$, Milk removed $= \dfrac{5y}{8}$
$\therefore$ According to question,
$$\frac{3x}{8} - \frac{3y}{8} + y = \frac{5x}{8} - \frac{5y}{8}$$
On solving we get $\boxed{\dfrac{y}{x} = \dfrac{1}{5}}$

34. (1)



So, 4 minimum number of distinct colours needed to colour all the circles in the figure.

35. (3)

	0	5	(12)
1	3	5	7
1	2	2	2
S	1	0	

So, 12 ways are there to move from the box marked S to the box marked D.

36. (1) As, In 1st row, $\sqrt{16}\times(7-2)=20$

In 2nd row, $\sqrt{25}\times(8-2)=30$

and In 3rd row, $\sqrt{36}\times(9-5)=24$

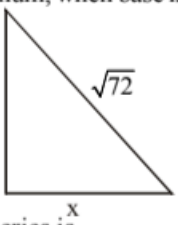
Similarly, In 4th row, $\sqrt{49}\times(10-7)=\boxed{21}$

37. (3) Area of right triangle is maximum, when base is equal to perpendicular.

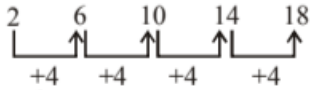
$x^2+x^2=\left(\sqrt{72}\right)^2$

$x=6\,cm$

$\therefore \text{Area}=\frac{1}{2}\times6\times6=18\,cm^2$

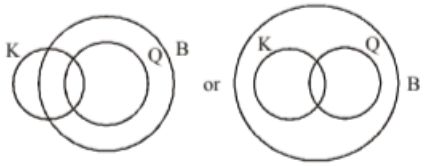


38. (2) The pattern of the alternate series is



and

39. (3) The venn diagram is as follows :



K - King
Q - Queen
B - Beautiful

Conclusions :

I. All kings are beautiful → not follow
II. All the Queens are kings → not follow
∴ Neither I nor II follows.

40. (4)

2	3	5	7	11	13	17	19	23	29	31	
A	B	C	D	E	F	G	H	I	J	K	
37	41	43	47	53	59	61	67	71	73	79	
L	M	N	O	P	Q	R	S	T	U	V	
83	89	97									
W	X	Y									

So, MAT will be 41 2 71.

41. (2) As, $\frac{4+2}{2}=3,\frac{5+3+1+1}{2}=5,\frac{6+1+2+3+3+1}{2}=8$

and $\frac{7+2+4+3}{2}=8$

Similarly, $\frac{9+3}{2}=\boxed{6}$

42. (1) As, $2^3=8=H$ (8 is positional value of H)
$2^4=16=P$ (16 is positional value of P)
$3^2=9=I$ (9 is positional value of I)

and, $\boxed{1^4=1=A}$ (1 is positional value of A)

Similarly, $5^2=25=Y$ (25 is positional value of Y)

43. (1) As,

	I	M	P	H	A	L
	+1 ↓	−1 ↓	+2 ↓	−2 ↓	+3 ↓	−3 ↓
	J	L	R	F	D	I

Similarly,

	M	Y	S	U	R	U
	+1 ↓	−1 ↓	+2 ↓	−2 ↓	+3 ↓	−3 ↓
	N	X	U	S	U	R

44. (2) The pattern of clocks is as shown below :

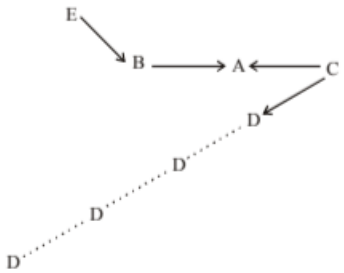
(I)	11 : 20	+ 20
(II)	11 : 40	+ 40
(III)	12 : 20	+ 60
(IV)	1 : 20	+ 80
(V)	2 : 40	+ 100
(VI)	4 : 20	

45. (4) Total number of X is the given pair as 4, 6, 8, 10, 12
So, 4 crosses should be there in the box marked with '?'.

46. (1)

a	b	d	h	p
	+1 ↑	+2 ↑	+4 ↑	+8 ↑

47. (4) The direction diagram is as shown below :



In the above figure when seen from west to east, then possible sequence are -
EBDAC, DEBAC, EBADC, EDBAC.

48. (4) The sitting arrangement is as following :

D/C	A	C/D	B		B	C/D	A	D/C			
1	2	3	4		1	2	3	4			
D/C	B	C/D	A								
1	2	3	4								

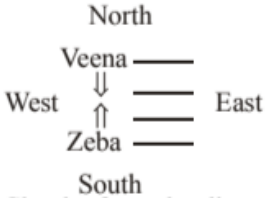
Clearly, from the figure A will not sit at the first place.

49. (4) The arrangement is as following :

	Tuesday	Wednesday	Friday	Saturday
Morning	Mrs. Sabita	Mr. Aaditya	Mrs. Seema	Mr. Ronald
Evening	Mrs. Firadus	Mr. Naved	Mrs. Shalu	Mrs. Ritu

Clearly, Mr. Aaditya & Mr. Ronald have morning appointments.

50. (1) The direction diagram is as follows :



Clearly, from the diagram, veena was facing south direction.