

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

1. If MENTAL = 390, ABILITY = 546, REASONING = 918, then COMPETENCY = ?
 (1) 782 (2) 842 (3) 1190 (4) 1340

Ans. (3)

Sol. MENTAL = 390 ABILITY = 546
 $13 + 5 + 14 + 20 + 1 + 12 = 65$ $1 + 2 + 9 + 12 + 9 + 20 + 25 = 78$
 $65 \times 6 = 90$ $78 \times 7 = 546$
 Sum of Alphabets \times Number of alphabets
 COMPETENCY = $3 + 15 + 13 + 5 + 20 + 5 + 14 + 3 + 25 = 119$
 $119 \times 10 = 1190$

2. Which number replaces the question mark in the given figure?

2	1	8	3	6	?
4	21	5	98	3	94

- (1) 4 (2) 5 (3) 7 (4) 9

Ans. (3)

Sol. $4^2 + 2^2 + 1^2 = 21$
 $5^2 + 8^2 + 3^2 = 98$
 $3^2 + 6^2 + 7^2 = 94$

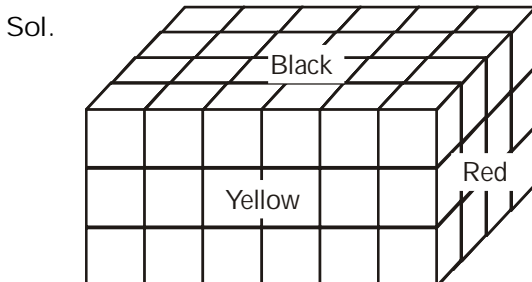
Direction: (Question 3-4)

The following questions are based on the information given below:

- A cuboid shaped wooden block has 4 inches length, 3 inches breadth and 6 inches height.
- Two faces measuring 6 inches \times 4 inches are coloured in black.
- Two faces measuring 4 inches \times 3 inches are coloured in red.
- Two faces measuring 6 inches \times 3 inches are coloured in yellow.
- Now the block is divided into small cubes of side 1 inch each.

3. How many small cubes will have no faces coloured?
 (1) 8 (2) 12 (3) 36 (4) 18

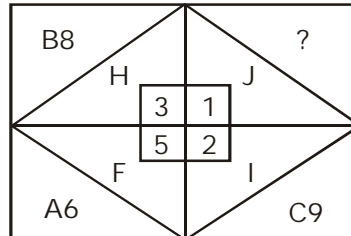
Ans. (1)



No faces coloured = 8

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

8. Which expression will replace the question mark?



- (1) E7 (2) D10 (3) D7 (4) E10

Ans. (4)

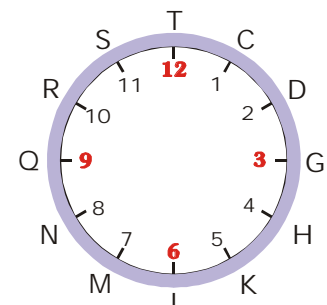
Sol. $8 \div B = 8 \div 2 = 4 \Rightarrow 4 - 1 = 3$
 $6 \div A = 6 \div 1 = 6 \Rightarrow 6 - 1 = 5$
 $9 \div C = 9 \div 3 = 3 \Rightarrow 3 - 1 = 2$
 $10 \div E = 10 \div 5 = 2 \Rightarrow 2 - 1 = 1$

9. The digits/numbers from 1 to 12 of the clock dial are replaced by the letters of the English alphabet. The replacement starts with letter 'C' but vowels and immediate next consonants of vowel are not included in the replacement. The classes in the school start at N : T and last till a time when the minute hand is at K and the hour hand between S and T, very slightly ahead of S. Five periods of equal duration are held during this interval. The break of 7 minutes is given to students after 1st period and duration of break increases by 2 minutes after each period. The exact duration of a period in minutes is:

- (1) 32 (2) 33 (3) 34 (4) 35

Ans. (2)

Sol. N : T = 8 : 00 AM to 11 : 25 AM
 Total = 205 minutes
 Break = 7 + 9 + 11 + 13 = 40 min
 So, 205 - 40 = 165 min

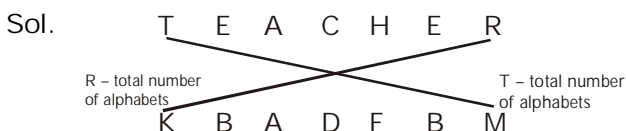


$$\frac{165}{5} = 33 \text{ min}$$

10. If TEACHER is coded as KBADFBM, MATURE is coded as ALONEG, then the code of BOARD will be.

- (1) AMDJC (2) MADKC (3) MACKD (4) AMCJD

Ans. (1)



- E + B = 7 (total number of alphabets)
 A + F = 7 (total number of alphabets)
 C + D = 7 (total number of alphabets)
 E + A = 7 (total number of alphabets)

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

11. In a performing Arts competition, there are six participants M, P, B, K, L and V. It is given that M and P are good at dancing and acting. B and K are good at singing and playing tabla. L and M are good at tabla but not good at singing. P and V are good at playing Guitar and also good at singing. Who among them is/are good at dancing, singing, playing Guitar and acting?

- (1) M and P (2) Only P (3) Only V (4) Only B

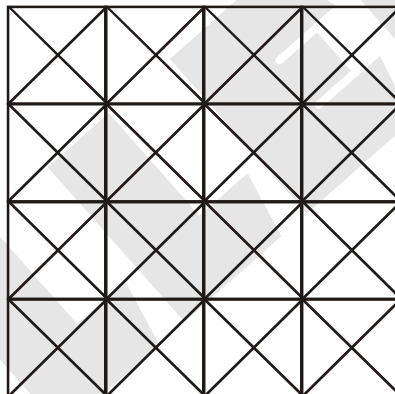
Ans. (2)

Sol.

	Dancing	Singing	Tabla	Acting	Guitar
M	✓	x	✓	✓	
P	✓	✓		✓	✓
B		✓	✓		
K		✓	✓		
L		x	✓		
V		✓			✓

Only P

12. What is the total number of squares in the given figure?



- (1) 62 (2) 72 (3) 82 (4) 92

Ans. (2)

Sol. By observation

13. In a certain coding system if $25 + 10 \times 4 = 19$, $10 \div 3 - 3 = 10$. Then the value of $16 \times 5 + 40 - 10 \div 2$

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

Ans. (4)

Sol. $25 + 10 \times 4 = 19 \rightarrow 25 - 10 + 4 = 19$

$10 \div 3 - 3 = 10 \rightarrow 10 \times 3 \div 3 = 10$

i.e. $+ \rightarrow -$

$\times \rightarrow +$

$\div \rightarrow \times$

$- \rightarrow \div$

$16 + 5 - 40 \div 10 \times 2 = 13$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

14. In the given sequence, which symbol comes five symbols before the symbol which comes nine symbols after the second appearance of the symbol which occur four times in the sequence?

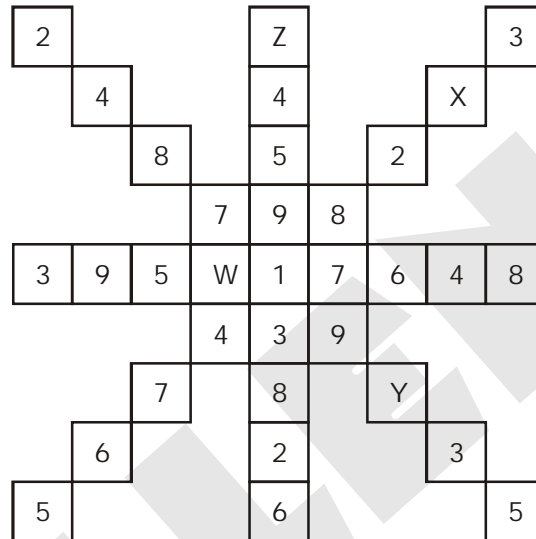
1 > 9 € < L * M 2 N > Q A ÷ S 8 > 4 U \$ V @ A > X 2 Q B = D < Z

- (1) A (2) S (3) @ (4) 8

Ans. (3)

Sol. By observation

15. Find the values of W, X, Y and Z in the given figure.



- (1) 2, 9, 6, 7 (2) 3, 5, 1, 5 (3) 4, 1, 8, 7 (4) 8, 1, 2, 5

Ans. (1)

Sol. $Z + 38 = 43 + W = 39 + Y = 36 + X$

So, $Z = 7, W = 2, Y = 6, X = 9$

Diagonal vertical, Horizontal sum are equal.

Direction : (Question 16-17) In the following questions, the symbols @, \$, #, © and % are used with the following meanings as illustrated below :

P\$ Q means 'P' is not smaller than Q.

P © Q means 'P is neither greater nor equal to Q.

P # Q means 'P' is neither smaller nor equal to Q.

P % Q means 'P' is not greater than Q.

P @ Q means 'P' neither greater nor smaller than Q.

Assuming the given statements to be true, find which of the conclusions given below is definitely true?

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

16. Statement : $T \% R, R \$ M, M @ D, D \odot H$

Conclusions :

I. $D \% R$

II. $H \# R$

III. $T \odot M$

IV. $T \% D$

(1) Only I

(2) I and III

(3) I and IV

(4) III and IV

Ans. (1)

Sol. $T \not\% R \rightarrow T \not\% R$

$R \not\$ M \rightarrow R \geq M$

$M @ D \rightarrow M = D$

$D \odot H \rightarrow D < H$

i.e. $T \leq R, M = D \leq R, M = D < H$

(i) $D \% R \rightarrow D \leq R$

(ii) $H \# R \rightarrow H > R$

(iii) $T \odot M \rightarrow T < M$

(iv) $T \% D \rightarrow T \leq D$

Only (1) true

17. Statement : $M @ B, B \# N, N \$ R, R \odot K$

Conclusions :

I. $K \odot R$

II. $R \odot B$

III. $M \$ R$

IV. $N \odot M$

(1) I and III

(2) I, II and III

(3) II, III and IV

(4) I, III and IV

Ans. (NA)

Sol. $M @ B \rightarrow M = B$

$B \# N \rightarrow B > N$

$N \$ R \rightarrow N \geq R$

$R \odot K \rightarrow R < K$

i.e. $M = B > N \geq R$ and $K > R$

(I) $K \odot R \rightarrow K < R$

(II) $R \odot B \rightarrow R < B$

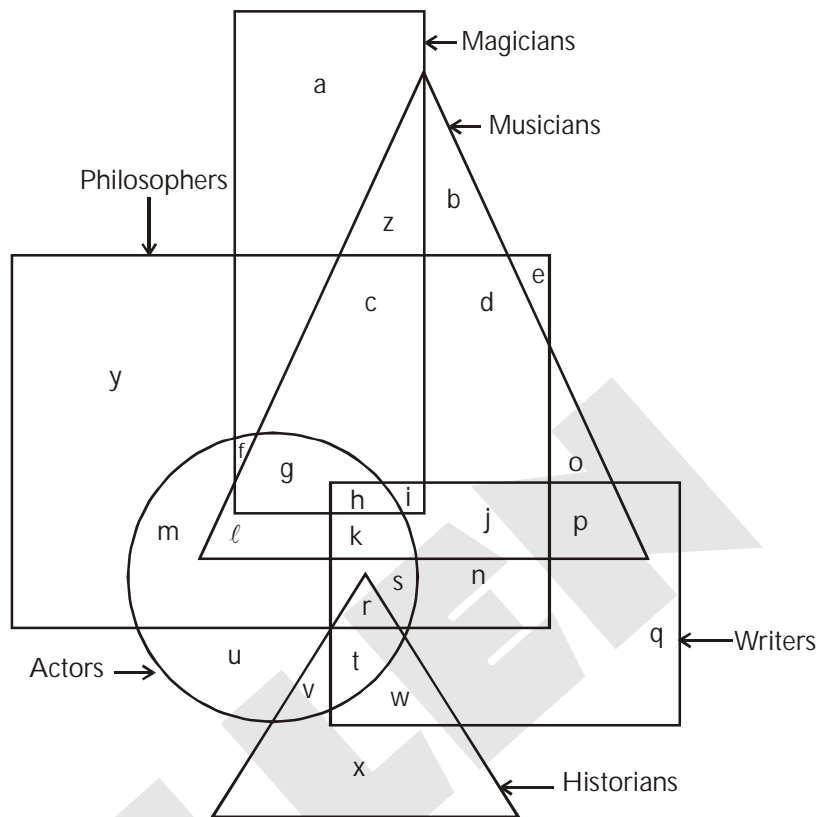
(III) $M \$ R \rightarrow M \geq R$

(IV) $N \odot M \rightarrow N < M$

2 & 4 Conclusion correct

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

Direction : (Question 18-20) Study the diagram and answer the questions.



18. Identify the region which represents philosophers who are musicians and writers.

- (1) $h + i + j + k$ (2) $h + i$ (3) $k + j$ (4) j

Ans. (1)

Sol. As per observation

19. How many actors are magicians?

- (1) g (2) $g + h$ (3) $f + g + h$ (4) $f + g - h$

Ans. (3)

Sol. As per observation

20. How many actors are also philosophers but not historians or musicians?

- (1) $l + k$ (2) $g + h + k$ (3) $m + f + l + k$ (4) $m + f + s$

Ans. (4)

Sol. As per observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

21. Bhupen's birthday is on the 13th of June and Mainu's birthday is on 23rd of April. If in a particular year, Mainu's birthday was on Monday, what will be the day on Bhupen's birthday in the same year?

- (1) Tuesday (2) Wednesday (3) Thursday (4) Friday

Ans. (2)

Sol. Mainu's Birthday → 23rd April (Monday)

Bhupen's Birthday → 13th June.

odd days from April 23th to 13th June,

April + May + June

$$0 + 31 + 13 = 9 \Rightarrow 2 \text{ odd days}$$

Bhupen's Birthday is on Wednesday

Direction : (Question 22-24) Study the following information and answer the questions below :

Dr. Ashutosh is available at a clinic from 12 Noon to 4 PM on Tuesday, Thursday and Sunday.

Dr. Dhanwantri is available at the same clinic from 10 AM to 2 PM on Monday, Thursday, Friday and Sunday.

Dr. Shehnaz is available at the same clinic between 9 AM to 12 : 30 PM on Monday, Wednesday and Thursday and 2 PM to 4 PM on Friday, Saturday and Sunday.

22. At what time duration of a week are all the doctors available at the clinic?

- (1) Sunday for 3 hrs (2) Thursday for $\frac{1}{2}$ hr (3) Thursday for 1 hr (4) Sunday for 1 hr

Ans. (2)

Sol. Dr. Ashutosh → 12 – 4 PM (Tuesday, Thursday and Sunday)

Dr. Dhanwantri → 10 Am – 2 PM (Monday, Thursday, Friday, Saturday)

Dr. Shehnaz → 9 Am – 12 : 30 PM (Monday, Wednesday and Thursday)

2 PM – 4 PM → (Friday, Saturday, Sunday)

Thursday → $\frac{1}{2}$ hour

23. On how many days and hours, Dr. Ashutosh and Dr. Shehnaz are available at the same time?

- (1) 1, $2\frac{1}{2}$ (2) 1, 2 (3) 2, $2\frac{1}{2}$ (4) 2, 2

Ans. (3)

Sol. Sunday → (2PM to 4 PM) = 2 hrs

and Thursday (12 PM to 12 : 30 PM) = $\frac{1}{2}$ hr

2 day, $2\frac{1}{2}$ hr

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

24. For how many hours in a week, Dr. Dhanwantri and Dr. Shehnaz are together available at the same time?

(1) $5\frac{1}{2}$

(2) 6

(3) 5

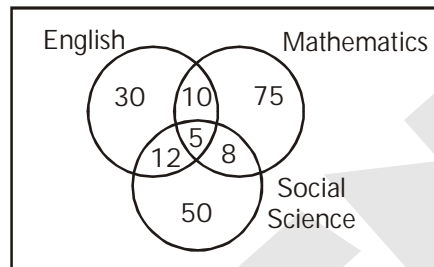
(4) $2\frac{1}{2}$

Ans. (3)

Sol. Thursday and Monday

10 AM to 12 : 30 = 5 hrs.

25. In a certain school, 62% of candidates qualified all the three subjects, namely English, Mathematics and Social Science. The following diagram gives the number of candidates who are not qualified in different subjects. What is the percentage of candidates who are not qualified in at least two subjects?



(1) 2.63

(2) 6.00

(3) 7.00

(4) 18.42

Ans. (3)

Sol. Let total students = x

62% qualified

38% not qualified

38% of x = 30 + 12 + 50 + 10 + 5 + 8 + 75 = 190

$$\frac{38}{100} \times x = 190 \rightarrow x = \frac{190 \times 100}{38} = 500$$

Atleast two = 12 + 10 + 8 + 5 = 35 (not qualified)

$$= \frac{35}{100} \times 100 = 7\%$$

26. Samungou's mother is the only daughter of Juhi's father. How is Juhi's husband related to Samungou?

(1) Brother

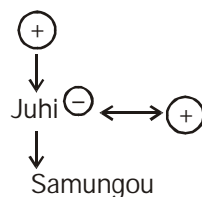
(2) Father

(3) Son

(4) Uncle

Ans. (2)

Sol.



Juhi's husband is father of samungou

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

27. A matrix of certain characters is given in the following. These characters follow a certain trend, row-wise or column wise. Find out this pattern and choose the missing character.

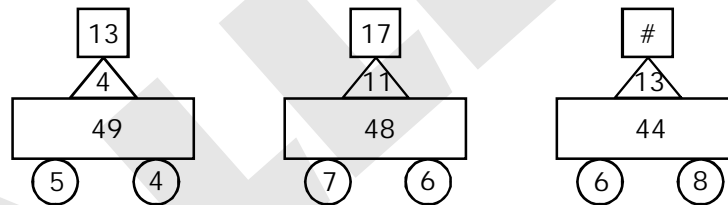
17	21	12	8
33	29	38	42
41	37	?	50

- (1) 12 (2) 42 (3) 46 (4) 50

Ans. (3)

Sol. In Ist row $(17 + 12) = (21 + 8)$
 IInd row $(33 + 38) = (29 + 42)$
 IIIrd row $(41 + x) = (37 + 50)$
 ↓
 So $x = 46$

28. Find the value of # in the figure given below :



- (1) 10 (2) 15 (3) 19 (4) 21

Ans. (3)

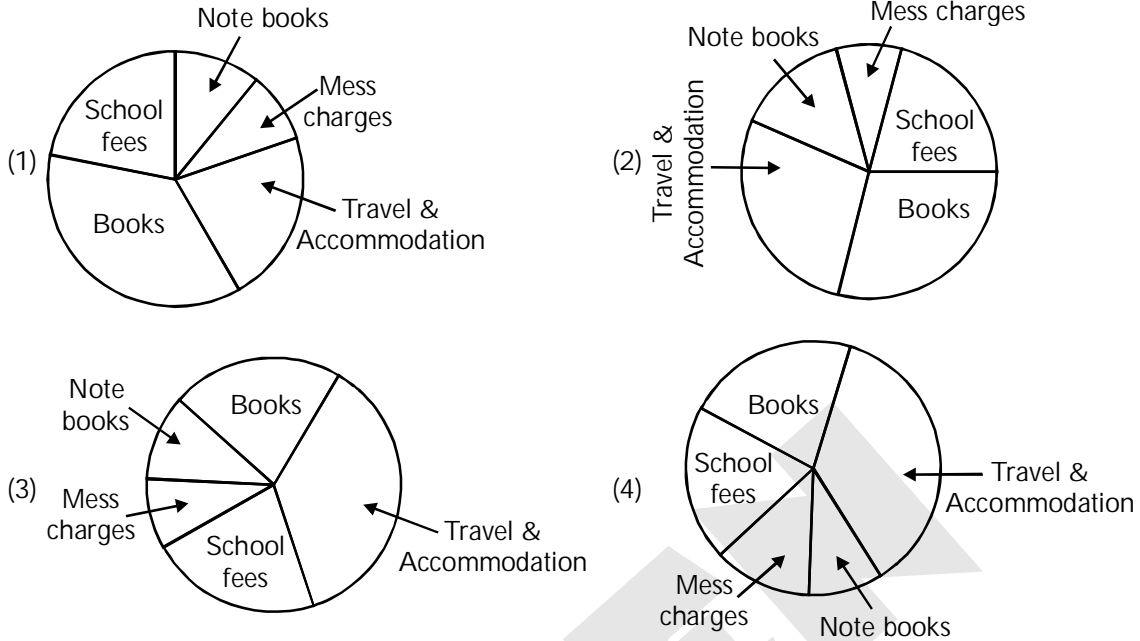
Sol. $(x - 13) \times 6 + 8 = 44$
 $x = 19$

Direction : (Question 29) The yearly percentage expenditure of a school student on various items is shown in table given below :

Items	Expenditure in percentage
Books	30
Note Books	10
School fee	20
Mess Charges	5
Travel & Accommodation	35

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

29. Which of the following figures represent the above data?



Ans. (2)

Sol.	Items	Expenditure in (%)	Angle at the centre
	Books	30	$\frac{30}{100} \times 360 = 108^\circ$
	Note book	10	$\frac{10}{100} \times 360 = 36^\circ$
	School Fee	20	$\frac{20}{100} \times 360 = 72^\circ$
	Mess charge	5	$\frac{5}{100} \times 360 = 18^\circ$
	Travel	35	$\frac{35}{100} \times 360 = 126^\circ$

and accomodation

30. In an examination students are graded with four grades namely A, B, C and D and 72 students of the school secured A grade. The ratio of students who secured A grade to students with D grade is 2 : 5. Out of the total students 30% students secured B grade and 40% secured C grade. What is the total number of students in the school?

- (1) 840 (2) 600 (3) 420 (4) 360

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

Ans. (1)

Sol. Student secured A grade = 72

$$\text{ratio} = \frac{2}{3} = \frac{72}{180}$$

So, students with D grade = $5 \times 36 = 180$

A and D grade students = $72 + 180 = 252$

$$30\% \text{ of total} = 252 = \frac{252}{32} \times 100 = 840$$

31. Given below are three statements followed by four alternatives. Select the alternative which follows logically, from the given statements.

- I. Only boys can register for a competition.
- II. Many of the competitors are toppers.
- III. All the name of toppers are marked with green colour.

- (1) All toppers are competitors.
- (2) Some of the competitors are boys.
- (3) Some of the competitors are marked with green colour.
- (4) Only the names of boys are marked with green colour.

Ans. (3)

Sol. By observation

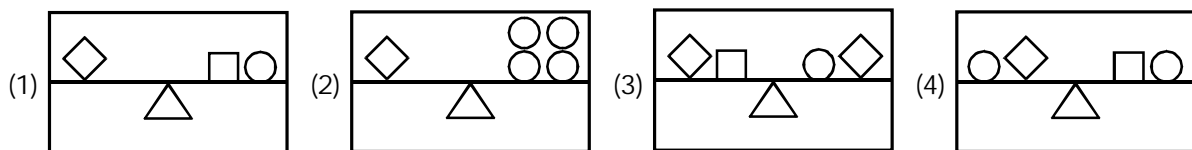
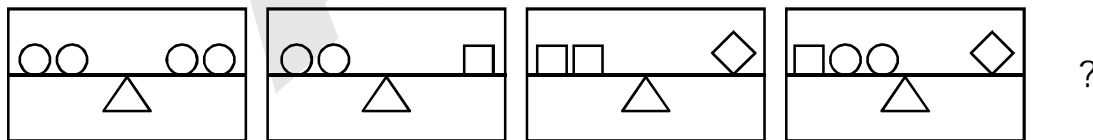
32. Find the missing number in the given sequence.

1, 2, 2, 4, ____, 4, 2

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

Ans. (NA)

33. Which figure among the given options will appropriately replace the question mark?

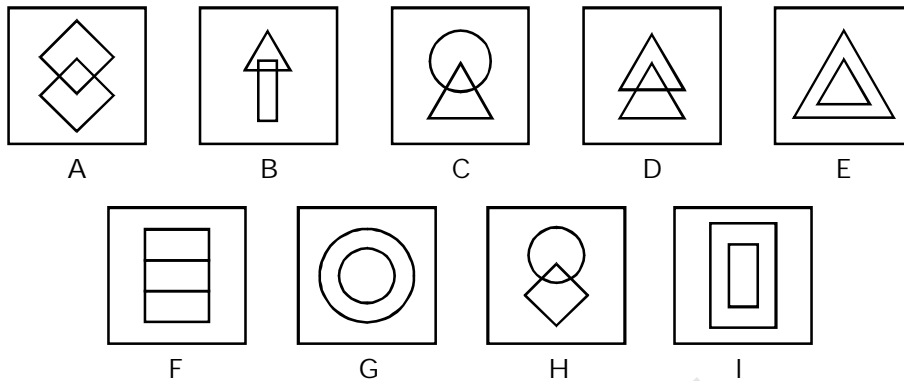


Ans. (2)

Sol. By observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

34. Given below are 9 pictures, A, B, C, D, E, F, G, H and I. On the basis of similar relationship, classify the pictures into three groups. Which among the given options represents the suitable group combination?



- (1) (A, D, F); (B, C, H); (E, G, I)
 (3) (A, D, F); (B, C, H); (E, G, I)

- (2) (A, D, H); (B, C, F); (E, G, I)
 (4) (B, C, H); (D, E, F); (A, G, I)

Ans. (1,3)

Sol. By observation

35. If - means \div , + means \times , \div means -, \times means +, then which of the following is correct?

- A. $36 - 12 \times 6 \div 3 + 4 = 60$
 C. $36 \times 4 - 12 + 5 \div 3 = 420$

- B. $52 \div 4 + 5 \times 15 - 3 = 37$
 D. $43 \times 7 + 5 + 4 - 8 = 25$

(1) A

(2) B

(3) C

(4) D

Ans. (2)

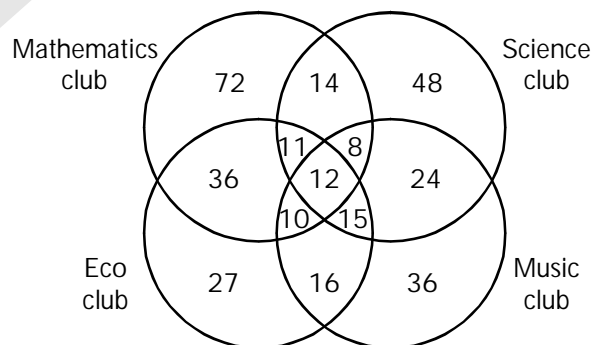
Sol. Here - mean \div
 + mean \times
 \div mean -
 \times mean +

So by putting these substitutions

In (B)

$$52 - 4 \times 5 + 15 \div 3 = 37$$

36. The following figure represents numbers of students in each of the clubs in a school.



Find the number of students representing at least two clubs of the school.

(1) 90

(2) 134

(3) 146

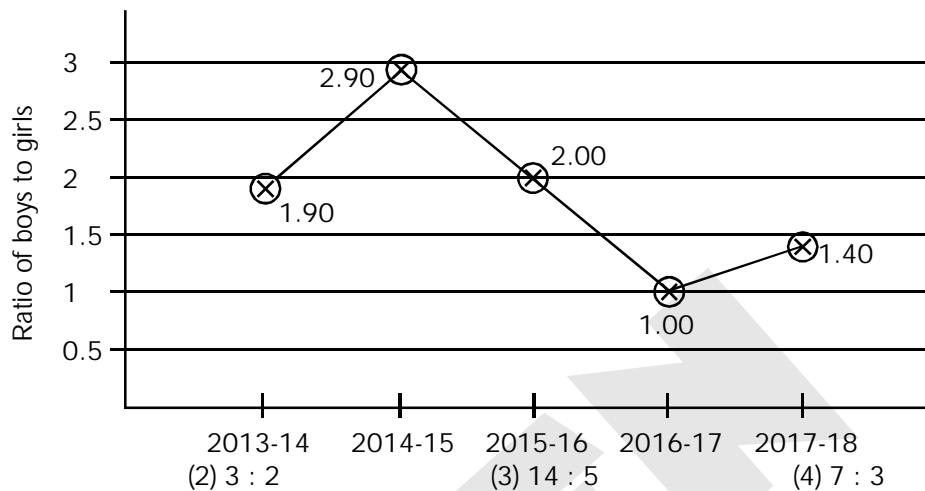
(4) 183

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

Ans. (3)

Sol. Number of students representing at least two clubs (means two or more than two clubs) of school are –
 $14 + 36 + 16 + 24 + 11 + 8 + 10 + 15 + 12 = 146$

37. The ratio of boys and girl in a school for the last five academic years are given in the following graph. If the number of girl in 2016-17 is half of that in 2017-18, what is the ratio of boys in 2017-18 to boys in 2016-17?



(1) 1 : 1

(2) 3 : 2

(3) 14 : 5

(4) 7 : 3

Ans. (3)

Sol. Ratio of boys and girls in 2016-17 is 1 : 1

Ratio of boys and girls in 2017-18 is 140 : 100 i.e. 7 : 5

$$\frac{\text{Boys 2016-17}}{\text{Girls 2016-17}} = 1$$

$$\frac{\text{Boys 2017}}{2(\text{Girls 2016})} = 1.4$$

38. A manufacture of tennis ball is claimed that their balls are the best as it (a ball) would rise constantly (10% of the height from which it was dropped. If the ball is dropped from 27 feet, how much approximately in feet the ball travels (in feet) before coming to rest?

(1) 32.4

(2) 33

(3) 34.6

(4) 36

Ans. (2)

Sol. $h + \frac{2h}{10} + \frac{2h}{100} + \dots \infty$

$$2h \left[1 + \frac{1}{10} + \frac{1}{100} + \dots \infty \right] - h$$

$$\frac{2h}{1 - \frac{1}{10}} - h$$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

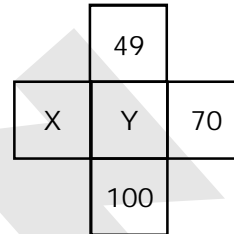
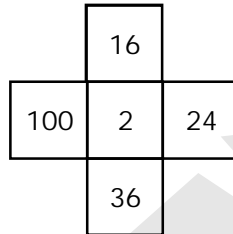
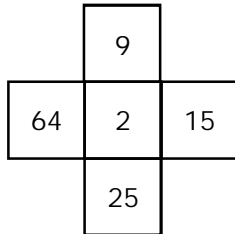
$$\frac{20h}{9} - h$$

$$\frac{11h}{9}$$

$$h = 27$$

$$\frac{11 \times 27}{9} = 33$$

39. Find the values of X and Y.



(1) 289, 3

(2) 289, 5

(3) 121, 7

(4) 121, 4

Ans. (1)

Sol. $9 = 3^2$

$$25 = 5^2$$

$$3 \times 5 = 15$$

$$(3 + 5) = 8$$

$$8^2 = 64$$

$$\text{middle number} = 5 - 3 = 2$$

Similarly

$$49 = 7^2$$

$$100 = 10^2$$

$$7 \times 10 = 70$$

$$7 + 10 = 17$$

$$17^2 = 289$$

$$\text{middle number } 10 - 7 = 3$$

40. Which is the missing term of the following sequence?

002 B, 009 I, 028 J, _____, 126 I

(1) 048 L

(2) 065 K

(3) 172 G

(4) 186 N

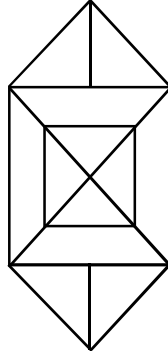
Ans. (2)

Sol. 002B, 009I, 028J, 065K, 126I,

↓	↓	↓	↓	↓
1^3+1	2^3+1	3^3+1	4^3+1	5^3+1

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

41. How many triangles are there in the given figure?



- (1) 21 (2) 22 (3) 23 (4) 24

Ans. (2)

Sol. By observation

42. In a class of 60 students, where girls and boys are in the ratio 2 : 3, the boy 'Kartik' is ranked 17th from the top. If there are 9 girls ahead of Kartik, what is the ratio of number of girls and boys after the rank position of Kartik?

- (1) 9 : 27 (2) 15 : 28 (3) 16 : 27 (4) 16 : 28

Ans. (2)

Sol. Boys = 24

Girls = 36

Total = 60

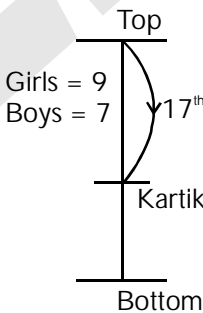
So boys after kartik

$$= 24 - (7 + 1) \text{ (kartik)}$$

$$= 16$$

Girls after kartik

$$36 - 9 = 27$$



43. Select the pair that has the same analogy as given pair 9876 : 12234567

- (1) 34562 : 89776 (2) 1234 : 122345 (3) 654321 : 922346 (4) 9993 : 8886

Ans. (4)

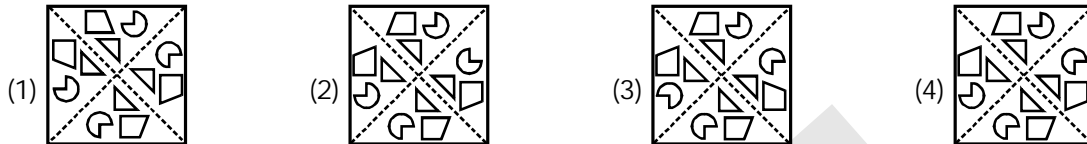
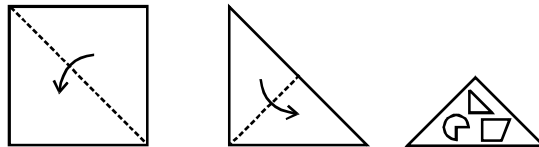
Sol. 9876 : 12234567

↓

$$9 + 8 + 7 + 6 = 1 + 2 + 2 + 3 + 4 + 5 + 6 + 7 = 30$$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

44. A square piece of paper is folded as shown, punched and unfolded. Which of the alternative figures resembles the unfolded paper?



Ans. (4)

Sol. By observation

45. If $\triangle / = 5$

$/ \perp \triangle = 7$

$/ \perp \square \triangle = 15$

$\square \text{pentagon} = 24$

then, 23 is given by

- (1) $\perp \square \text{pentagon} /$ (2) $\perp \triangle \square \text{pentagon}$ (3) $\square \setminus \triangle \perp$ (4) $\perp \triangle / \text{pentagon}$

Ans. (4)

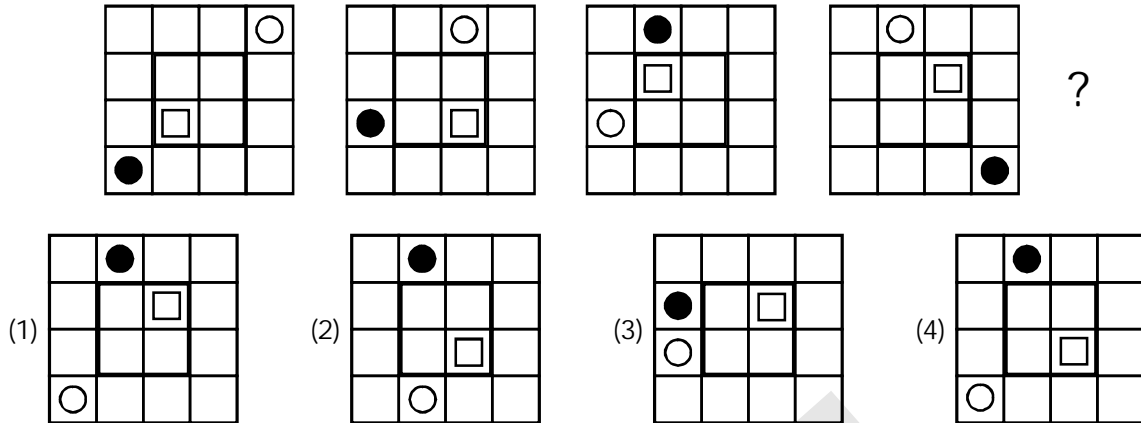
Sol. Here $\perp = 2$, $\square = 8$, $\text{pentagon} = 16$

$\triangle / = 5$, $\triangle \perp \triangle = 7$

So in option (4) $/ \perp \triangle \text{pentagon} = 23$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

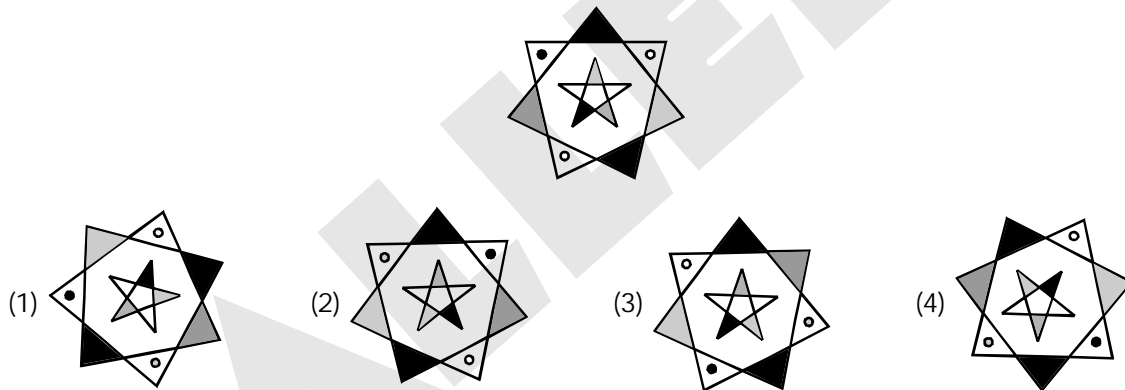
46. Complete the following figural series by choosing the correct answer from the given alternatives.



Ans. (1)

Sol. By observation

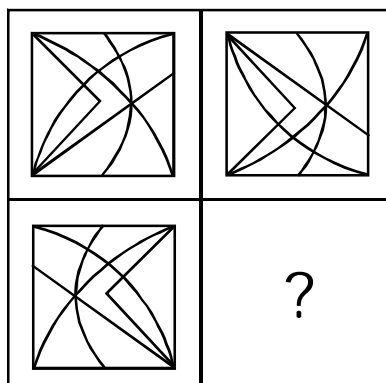
47. A problem figure is given below. When it is rotated, it fits into one of the option figures. Identify the option figure.



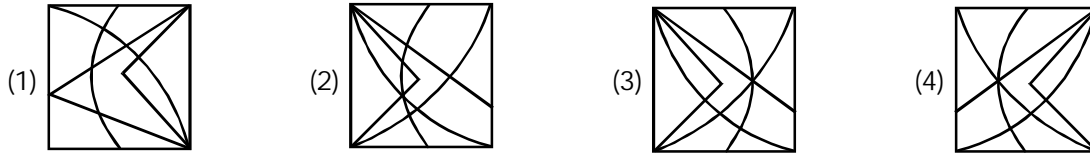
Ans. (4)

Sol. By observation.

48. The problem figure given below is a figure matrix. Complete the matrix with suitable option figure.



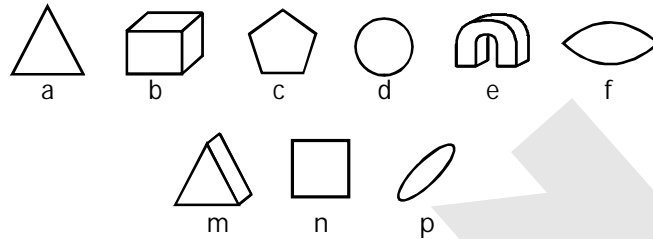
SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)



Ans. (4)

Sol. By observation.

49. Nine figures are given below. Identify the correct group of classification.



(1) a, d, m; b, e, n; c, f, p

(2) a, b, m; c, d, n; e, f, p

(3) a, d, f; b, e, p; c, m, n

(4) a, c, n; b, e, m; d, f, p

Ans. (4)

Sol. By observation.

50. An identity is given below through some symbols. In the options these symbols are decoded. Identify the correct option of which the signs satisfy the given identity.

$$12 \bigcirc 13 \square 15 \triangle 5 * 180 \wedge 21$$

(1) \wedge is $-$, $*$ is $=$, \triangle is \div , \square is $+$, \bigcirc is \times

(2) \bigcirc is $-$, \wedge is $=$, $*$ is $+$, \triangle is \div , \square is \times

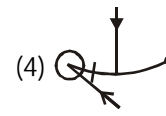
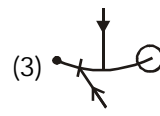
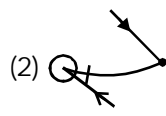
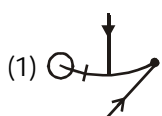
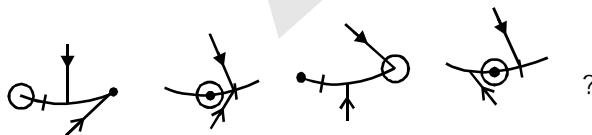
(3) \square is $-$, \bigcirc is $=$, \wedge is \times , $*$ is $+$, \triangle is \div

(4) \triangle is \div , \square is $=$, \bigcirc is $-$, \wedge is $+$, $*$ is \times

Ans. (1)

Sol. $12 \times 13 + 15 \div 5 = 180 - 21$

51. Complete the following figural series by choosing the correct answer from the given alternatives.

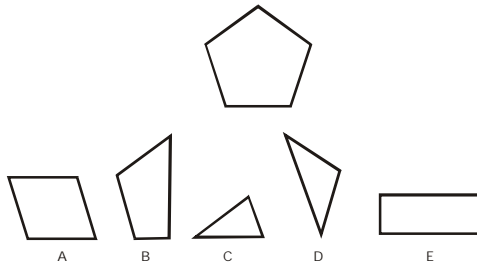


Ans. (4)

Sol. By observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

52. A pentagonal figure is given below. Identify which two of the pieces among A, B, C, D and E given below will NOT be required to complete the pentagonal figure.



(1) Both A and C

(2) Both B and D

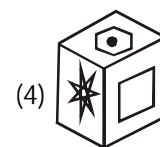
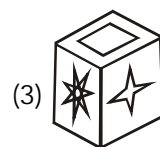
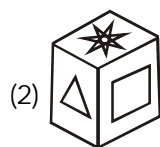
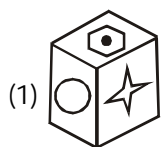
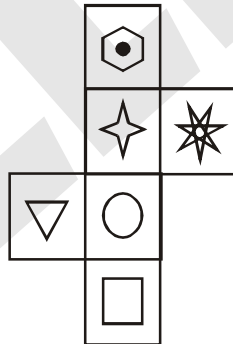
(3) Both A and D

(4) Both B and E

Ans. (4)

Sol. By observation

53. A problem figure is given below. When it is folded into a cube, which one of the cubes will be formed from the given alternatives ?

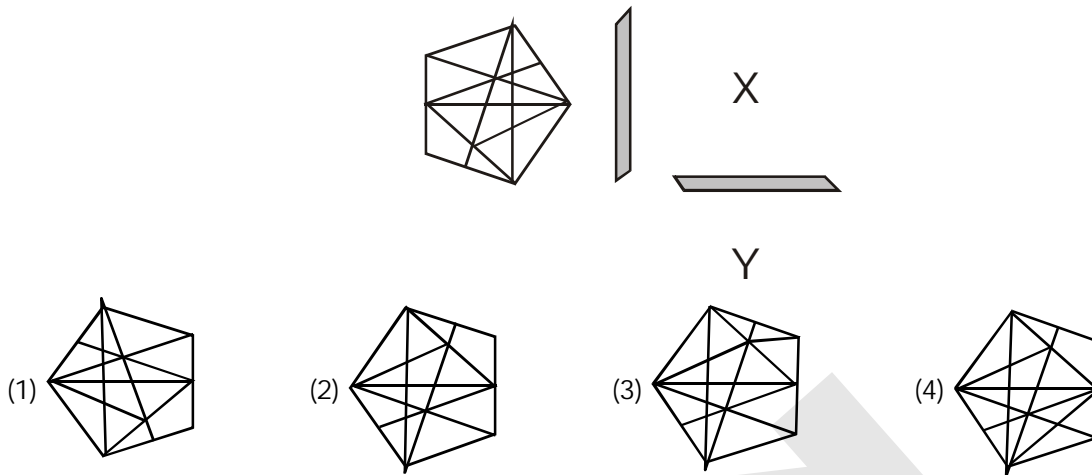


Ans. (4)

Sol. By observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

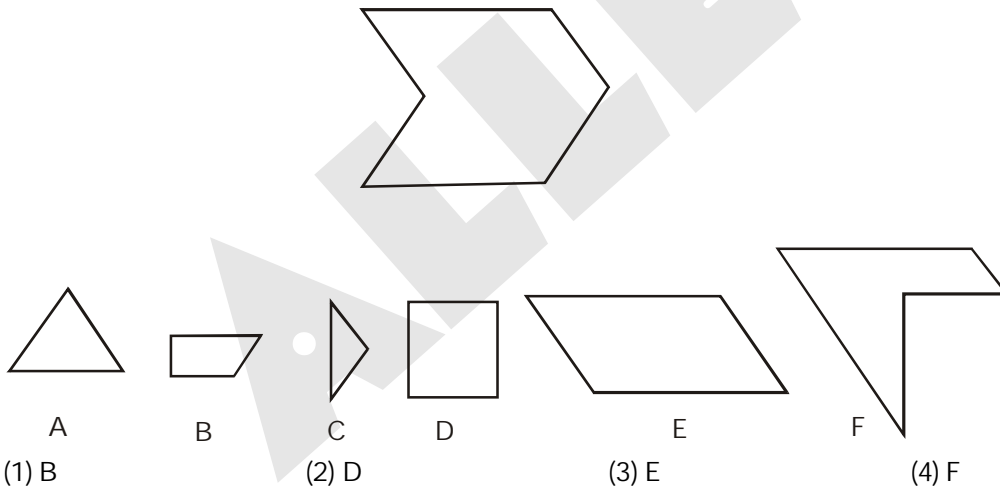
54. A problem figure is given of which the mirror image is X and the water image of X is Y. Identify the appearance of Y from the given alternative figures:



Ans. (2)

Sol. By observation

55. A hexagonal figure is given below. Identify which among the pieces A, B, C, D, E and F given below will NOT be required to complete the hexagonal figure.



Ans. (2)

Sol. By observation

56. Which one of the given rules the number 70 follows ?

- (1) $n^3 + 4n$ (2) $2n^3 + 2n$ (3) $n^3 + 3n/2$ (4) $n^2 + 5n$

Ans. (3)

Sol. $n = 4$, $(4)^3 + 3 \times \frac{4}{2} = 2$
 $= 64 + 6 = 70$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

57. What are the values of x and y in the given matrix ?

	C ₁	C ₂	C ₃
R ₁	9	x	102
R ₂	12	53	140
R ₃	16	63	y
R ₄	13	50	118

(1) 25, 136

(2) 30, 148

(3) 35, 128

(4) 40, 156

Ans. (4)

Sol. $16 + 9 - 12 = 13$,

$$\boxed{x = 40}$$

So, $63 + 40 - 53 = 50$

$$\boxed{y = 156}$$

So, $156 + 102 - 140 = 118$

58. The numbers are arranged in a certain pattern. The values of a, b and c respectively in the pattern are :

		6	17	19	11	4		
		7	a	14	24	10	5	9
1	6	8	18	34	b	9	7	3
		5	2	13	21	15	2	5
		5	16	20	12	c		

(1) 4, 16, 5

(2) 3, 16, 7

(3) 3, 15, 5

(4) 2, 18, 7

Ans. (2)

Sol. Row (1)

$$\Rightarrow 6 + 17 + 11 + 4 = \frac{38}{2} = 19$$

Row (2)

$$\Rightarrow \frac{7 + a + 14 + 10 + 5 + 9}{2} = 24$$

$$\Rightarrow \frac{a + 45}{2} = 24$$

$$\Rightarrow a = 48 - 45 = 3$$

Row (3)

$$\Rightarrow \frac{1 + 6 + 8 + 18 + b + 9 + 7 + 3}{2} = 34$$

$$\frac{b + 52}{2} = 34 \Rightarrow b = 68 - 52$$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

$$b = 16$$

Row (5)

$$\Rightarrow \frac{5 + 16 + 12 + c}{2} = 20$$

$$\Rightarrow \frac{33 + c}{2} = 20$$

$$c = 40 - 33$$

$$c = 7$$

59. Direction : Take the given statements as true though in reality they may not be so and decide which of the conclusions logically follow from the statements ?

Statements :

1. All the cucumbers are carrots.
2. Some carrots are brinjals.
3. All the brinjals are tomatos.

Conclusions :

- I. Some tomatos are carrots.
- II. All the carrots are tomatos.
- III. Some brinjals are cucumbers.
- IV. All the brinjals are cucumbers.

(1) Both the conclusion II and IV follows.

(2) Both the conclusion II and III follows.

(3) Both the conclusion III and IV follows.

(4) Both the conclusion I and III follows.

Ans. (NA)

Sol. No correct option is given.

60. Aman, Ayaz and Ashwinder are members of a joint family. Among them Aman is the eldest of all.

Aman is six years elder than Ayaz.

Ayaz is eight years elder than Ashwinder.

The sum of the present ages of Aman and Ayaz is five times the age of Ashwinder four years ago.

Then the present age of Aman is :

(1) 20 years

(2) 24 years

(3) 28 years

(4) 32 years

Ans. (3)

Sol. Let say ages of Aman, Ayaz and Ashwinder be x, y and z.

$$\text{Given, } x = y + 6 \quad \dots\dots(1)$$

$$y = z + 8 \quad \dots\dots(2)$$

$$x + y = 5(z - 4) \quad \dots\dots(3)$$

$$\text{So, } x + y = 5z - 20$$

Now by putting the value of (2) in (1)

$$\text{We get, } x = (z + 8) + 6$$

$$x = z + 14$$

Now put the value of x and y in (3)

$$z + 14 + z + 8 = 5z - 20$$

$$2z + 22 = 5z - 20$$

$$3z = 42$$

$$z = 14$$

So, y = 22 and x = 28

So Aman age is 28.

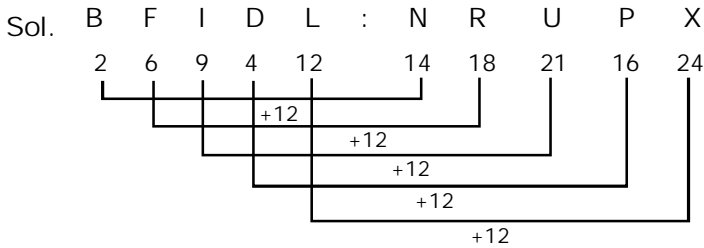
SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

61. Direction : Complete the given analogy by choosing the correct group from the given alternatives

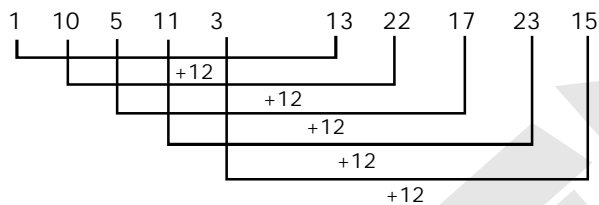
B F I D L : N R U P X :: A J E K C : ?

- (1) G M F I K (2) I G D K F (3) M V Q W O (4) K I F M G

Ans. (3)



Similarly, A J E K C : M V Q W O



Direction : (Question 62)

In an extension of a city, the total population is 3000. The distribution of the population of 3000 people is as follows :

1. Equal number of men and women are there in the age group of above 60 years.
2. Number of male and female below 60 years are 1250 and 1150 respectively.
3. Number of boys and girls below 18 years are 240 and 220 respectively.

62. What is the difference between the female population of above 60 years and the adult female population below 60 years in the extension ?

- (1) 850 (2) 710 (3) 630 (4) 420

Ans. (3)

Sol. No. of Female below 60 years $\rightarrow 1150 - 220 = 930$

No. of Male below 60 years $\rightarrow 1250 - 240 = 1010$

No. of boys below 18 years $\rightarrow 240$

No. of girls below 18 years $\rightarrow 220$

So, No. of males & females above 60 is,

$$3000 - [930 + 1010 + 240 + 220]$$

$$\Rightarrow 3000 - 2400$$

$$= 600$$

Given that, no. of males above 60 years

$$= \text{No. of females above 60 years}$$

So, No. of males above 60 years = 300

$$\text{No. of females 60} = 300$$

$$\text{So, } 930 - 300 = \boxed{630}$$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

63. A set of three numbers is given 484, 529, 961, Choose the set which is similar to the given set from the given alternatives.

- (1) 841, 625, 196 (2) 729, 576, 324 (3) 784, 676, 289 (4) 441, 361, 225

Ans. (3)

Sol. $4 + 8 + 4 \rightarrow 16$

$5 + 2 + 9 \rightarrow 16$

$9 + 6 + 1 \rightarrow 16$

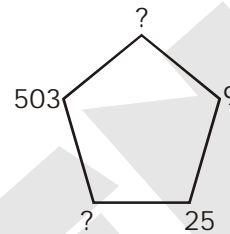
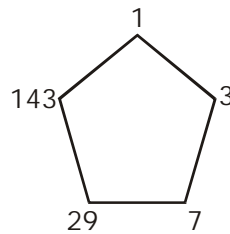
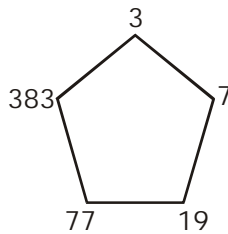
Sum of digits in all numbers is same.

Similarly, $7 + 8 + 4 \rightarrow 19$

$6 + 7 + 6 \rightarrow 19$

$2 + 8 + 9 \rightarrow 19$

64. What are the missing numbers in the third figure?



- (1) 2, 53

- (2) 4, 101

- (3) 5, 166

- (4) 6, 223

Ans. (2)

Sol. $3 \times 2 + 1 \rightarrow 7$

$7 \times 3 - 2 \rightarrow 19$

$19 \times 4 + 1 \rightarrow 77$

$77 \times 5 - 2 \rightarrow 383$

Similarly, $4 \times 2 + 1 \rightarrow 9$

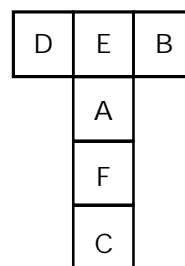
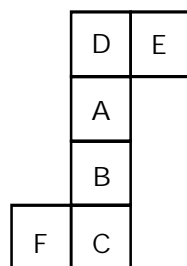
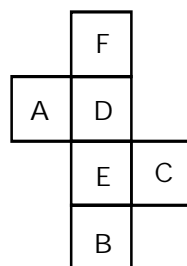
$9 \times 3 - 2 = 25$

$25 \times 4 + 1 = 101$

$101 \times 5 - 2 = 503$

Direction : (Question 65)

The unfolded figures of the same cube are shown with three different figures. The given three figures are folded in the shape of cube.



SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

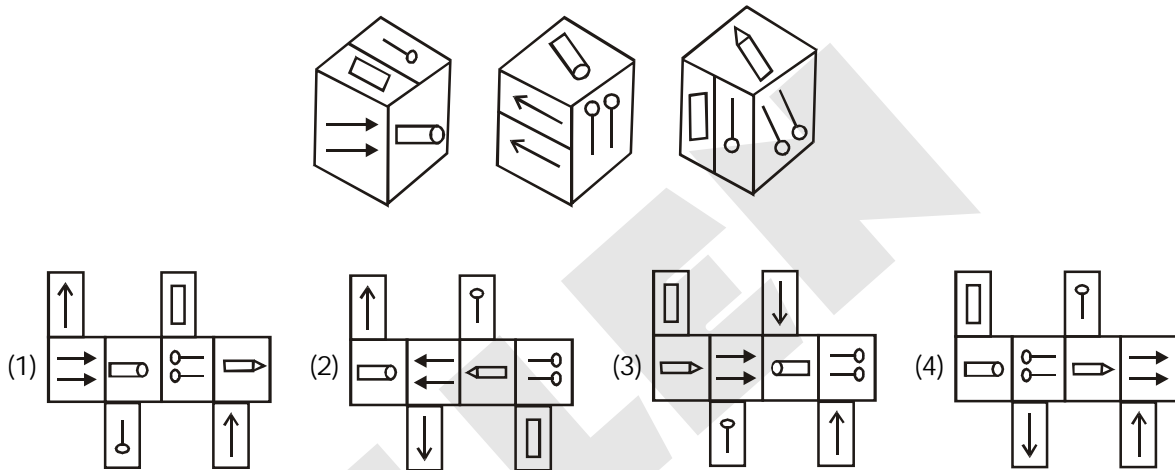
65. In the alternatives, which one does NOT show the correct position of faces ?



Ans. (4)

Sol. By observation

66. Direction : The different faces of a cube are shown through three folded cube shape. Identify which one of the figures given in the alternatives represents the unfolded cube.



Ans. (4)

Sol. By observation

Direction : (Questions 67–68)

Read the information select carefully.

All the students in a school are divided into five houses: Violet, Indigo, Green, Yellow and Red. All houses perform from Monday to Friday in a week, such that only one house performs on one day. Yellow or Red should not be either the first or last to perform. Red house should be immediately followed by Green house. Indigo house should perform immediately after Yellow house. One house will perform between Violet and Indigo house. Based on the above information select the correct option.

67. Which house is the first to perform ?

- (1) Violet (2) Indigo (3) Green (4) Red

Ans. (1)

Sol. Mon – Violet
 Tue – Yellow
 Wed – Indigo
 Thu – Red
 Fri – Green

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

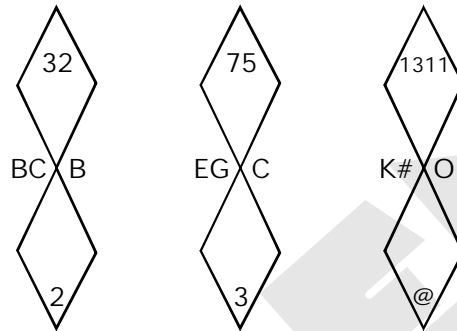
68. Which house performed on Thursday ?

- (1) Red (2) Green (3) Indigo (4) Yellow

Ans. (1)

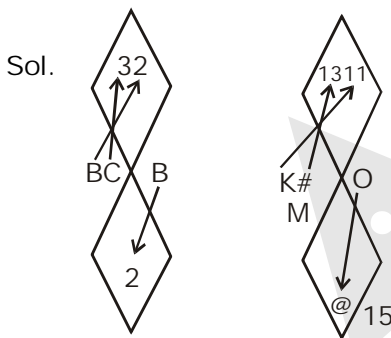
Sol. Mon - Violet
 Tue - Yellow
 Wed - Indigo
 Thu - Red
 Fri - Green

69. What are the values of # and @ in the figure given below ?



- (1) M, 15 (2) M, 60 (3) N, 30 (4) N, 50

Ans. (1)



70. Which one of the following does NOT turn out to be meaningful by substitution of the set of signs (x, —, =, ÷), sequentially in the given alternatives ?

- (1) $24 * 3 * 10 * 120 * 2$ (2) $12 * 4 * 8 * 160 * 4$
 (3) $10 * 8 * 16 * 192 * 3$ (4) $16 * 4 * 14 * 200 * 4$

Ans. (1)

Sol. $24 * 3 * 10 * 120 * 2$
 $24 \times 3 - 10 = 120 \div 2$
 $72 - 10 = 60$
 $62 = 60$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

71. Statements :

A # B means 'A is the daughter of B'

A \$ B means 'B is the brother of A'

A = B means 'B is the sister of A'

A % B means 'A is the son of B'

A * B means 'A is the father of B'

A @ B means 'A is the mother of B'

Assuming that spouse pair is unique, which of the following indicates 'R' is the grand-daughter of M?

(1) M * T # 4 @ Z @ R = P

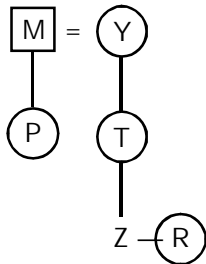
(2) M * P # Y @ T @ Z = R

(3) M = T @ Y @ Z # Z \$ R

(4) M @ T # Y = Z @ R * P

Ans. (2)

Sol. M * P # Y @ T @ Z = R



72. Which of the following pair is different ?

(16, 18); (56, 63); (96, 108); (86, 99)

(1) 16, 18

(2) 96, 108

(3) 56, 63

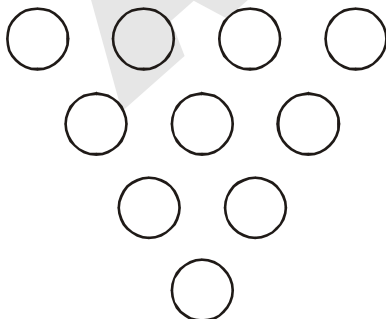
(4) 86, 99

Ans. (4)

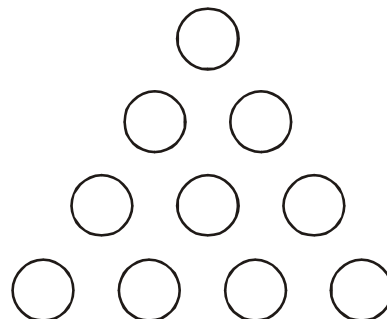
Sol.

16, 18		56, 63		96, 108		86, 99
↓		↓		↓		↓
2 × 8		7 × 8		12 × 8		11 × 8
2 × 9		7 × 9		12 × 9		11 × 9

73. If you have to make the right side ball arrangement look like left side, how many minimum number of balls you would require to move ?



Left side



Right side

(1) 3

(2) 4

(3) 5

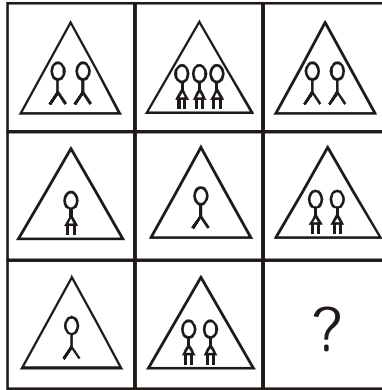
(4) 6

Ans. (1)

Sol. By observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

74. Which figure comes in place of '?' in the figure given below?



Ans. (4)

Sol. By observation

Direction : (Question 75-76)

I. \triangle , \circ , \square , \otimes and cylinder are cousins

II. \triangle is twice as old as \circ

III. \square is half the age of \circ

IV. \triangle is half the age of cylinder

V. \square is twice as old as \otimes

Sol. (75 & 76)

Given that,

$$\text{cylinder} = 2\triangle$$

$$\triangle = 2\circ$$

$$\circ = 2\square$$

$$\square = 2\otimes$$

In descending order,


$$\text{cylinder} > \triangle > \circ > \square > \otimes$$

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

75. Based on the above statements, find who is the second eldest amongst the five cousins?

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

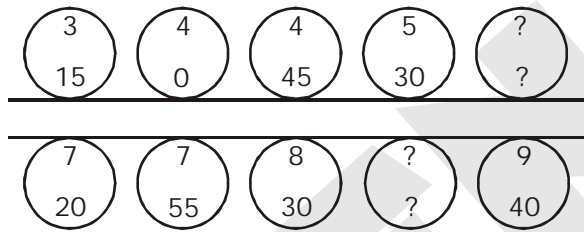
Ans. (2)

76. Who all are younger to  ?

- (1) ,  (2) ,  (3) ,  (4) , 

Ans. (1)

77. Which numbers will replace the question marks if the numbers in the circles have linkages with:



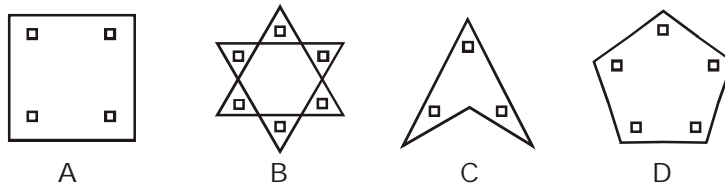
- (1) 5, 15; 8, 5 (2) 5, 0; 8, 20 (3) 6, 15; 9, 5 (4) 6, 20; 9, 35

Ans. (1)

Sol.

$+4 \left[\begin{array}{c} 3 \\ 7 \end{array} \right]$	$+3 \left[\begin{array}{c} 4 \\ 7 \end{array} \right]$	$+4 \left[\begin{array}{c} 4 \\ 8 \end{array} \right]$	$+3 \left[\begin{array}{c} 5 \\ 8 \end{array} \right]$	$+4 \left[\begin{array}{c} 5 \\ 9 \end{array} \right]$	Numbers given in top side of both type of circle.
15	0	45	30	$\boxed{15}$	
$+ \frac{20}{35}$	$+ \frac{55}{55}$	$+ \frac{30}{75}$	$+ \frac{5}{35}$	$\frac{40}{55}$	Numbers given in bottom side of both type of circle.

78. Find out the figure that does not match with the other three figures.



- (1) A (2) B (3) C (4) D

Ans. (3)

Sol. Pattern follows in all except figure (C),
 No of lines = No. of small square inside the figure.

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

79. What are the numbers of blocks to be crossed for covering the shortest path from 'A' to 'B'? One cannot move diagonally and on a block with the number '2'.

A	1	2	1		2	2	2	2
2	1	1	2		3	3	1	2
1	3	2	1		1	2	3	2
1	2	1	1		1	2	3	2
3	2	1	3	1	3	2	3	1
1	2	2	1		2	2	2	1
1	1	2	3		3	1	3	1
2	3	2	1		1	2	2	2
1	1	3	1		3	3	1	B

- (1) 15 (2) 19 (3) 27 (4) 37

Ans. (4)

Sol. By observation

80. On a staircase, Yaima is further up than Aloka but is lower than Srinivas. Ranjan is in the middle. Jeet is between Yaima and Ranjan. Aloka is between Ranjan and Danial. There is none below Barisha. Who is in the fifth position?

- (1) Aloka (2) Danial (3) Jeet (4) Yaima

Ans. (3)

Sol. 7 Srinivas

6 Yaima

5 → Jeet

4 Ranjan

3 Aloka

2 Danial

1 Barisha

Statement : (Question 81)

Yatin and Anandi are a married couple with two children, Krishi and Kaniki. Kaniki is married to Samson who is the son of Nui and Nirmaan. Mishu is the daughter of Samson. Aliza, who is Samson's sister is married to Hatim and has two sons, Kuku and Kiki. Nui is the grandmother of Kiki. Krishi is the maternal aunt of Nishi.

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

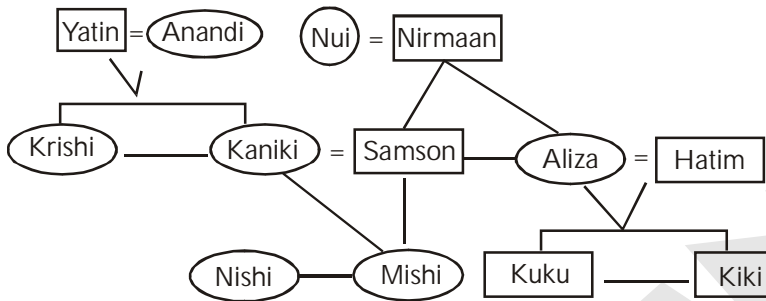
81. What is the difference between number of females and males in the generation to which samson belongs?

- (1) 1 (2) 2 (3) 3 (4) 0

Ans. (1)

Sol. Females → ○

Males → □

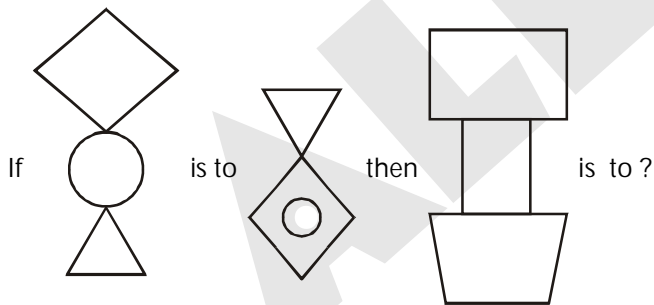


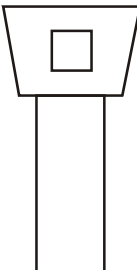
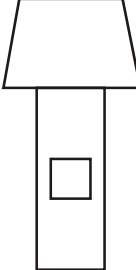
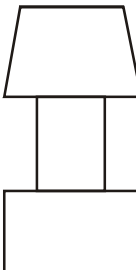
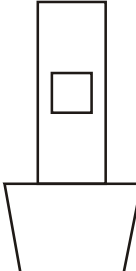
No. of females in samon's generation – 3

No. of males in samson's generation – 2

$3 - 2 = 1$

82. Which figure completes the statement?



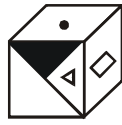
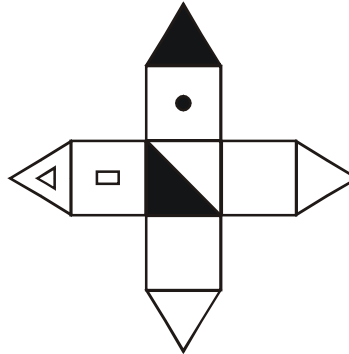
- (1)  (2)  (3)  (4) 

Ans. (2)

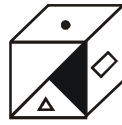
Sol. By observation

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

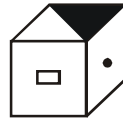
83. Identify the box that can be formed from the sheet of paper given below :



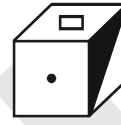
(I)



(II)



(III)



(IV)

(1) Only I

(2) Only II and III

(3) Only III

(4) Only IV

Ans. (1)

Sol. By observation

Direction : (Question 84-86)

Study the following information and answer the given questions.

- I. B and E are good at Fine Arts and Social Sciences.
- II. A and B are good at Social Sciences and Chemistry.
- III. A, D and C are good at Chemistry and Biology.
- IV. C and A are good at Chemistry and Physics.
- V. D and E are good at Biology and Fine Arts.

Sol. (84 to 86)

A	B	C	D	E
Social Science	Fine Arts	Chemistry	Chemistry	Fine Arts
Chemistry	Social Science	Physics	Biology	Social Science
Biology	Chemistry	Biology	Fine Arts	Biology
Physics				

84. Who is good in Chemistry, Biology and Physics but not in Social Sciences?

(1) A

(2) B

(3) C

(4) D

Ans. (3)

85. Who is good in Social Sciences, Biology and Fine Arts?

(1) A

(2) B

(3) D

(4) E

Ans. (4)

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

94. For finding a numeric code of 3 digits, the following information is given :

- A.

6	8	2
---	---	---

 : Only one number is correct and properly placed.
- B.

6	1	4
---	---	---

 : One number is correct but wrongly placed
- C.

2	0	6
---	---	---

 : Two numbers are correct but wrongly placed
- D.

7	1	8
---	---	---

 : Nothing is correct
- E.

7	8	0
---	---	---

 : One number is correct but wrongly placed.

The correct code is

- (1)

0	2	4
---	---	---

 (2)

0	4	2
---	---	---

 (3)

6	4	2
---	---	---

 (4)

6	0	4
---	---	---

Ans. (2)

Sol. Correct code is 042

95. What are the number of triangles that can be formed by connecting the vertices of a regular octagon with the condition that exactly one side of the triangle will be one of the sides of the octagon?

- (1) 18 (2) 32 (3) 48 (4) 56

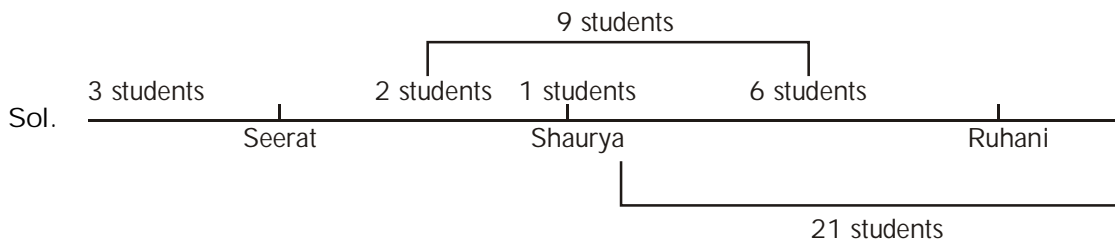
Ans. (2)

Sol. By observation

96. Three students Shaurya, Ruhani and Seerat are standing in a queue. There are six students between Shaurya and Ruhani and nine students between Ruhani and Seerat. If there be exactly three students ahead of Seerat and 21 students behind Shaurya, what could be the minimum number of students in the given queue?

- (1) 22 (2) 28 (3) 29 (4) 30

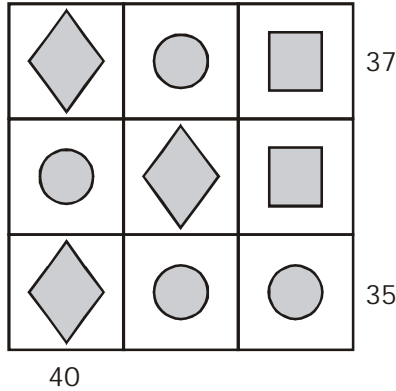
Ans. (2)



So, total = 3 + 1 + 2 + 1 + 21 = 28

SOLUTIONS
NATIONAL TALENT SEARCH EXAMINATION 2020 STAGE-2
MENTAL ABILITY TEST (MAT) (DATE : 14-02-21)

97. Observe the matrix carefully :



The values of , , in the given matrix are respectively :

- (1) 16, 12, 9 (2) 12, 15, 10 (3) 9, 11, 17 (4) 15, 10, 12

Ans. (4)

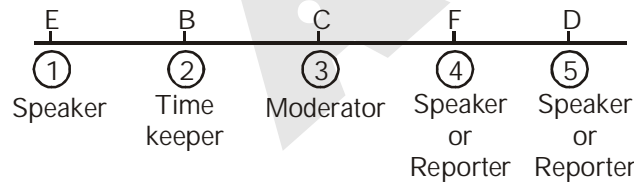
Sol. By observation

Direction : (Questions 98-100)

A is the incharge of setting the speakers for a debate at school. In addition to the moderator, there will be speakers in favour and against the theme. Besides, there will be a person to maintain time and a reporter to record the points. The members involved in this programme are B, C, D, E and F.

- The moderator must sit in the middle in seat number 3.
- The time-keeper cannot sit next to the reporter.
- B and F sit on either side of the moderator.
- B who is not the moderator sits between E and C.
- The moderator does not sit next to D or E.
- B, the time keeper sits on seat number 2.

Sol. (98 to 100)



98. Who is the moderator?

- (1) B (2) D (3) C (4) F

Ans. (3)

99. What is the seat number of E?

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

Ans. (1)

100. Who are the speakers for the debate?

- (1) E & F (2) B & D (3) C & E (4) F & B

Ans. (1)

Sol. As per the option