





**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

4. Which among the following statement is correct in respect of hierarchy?

- (1) EC, APC and PD are at the same level.
- (2) APC, PD and FC are at the same level.
- (3) EC, APC and FC are at the same level.
- (4) APC is above EC which is above FC and PD.

**Ans. (2)**

**Sol.** APC, PD and FC are at same level.

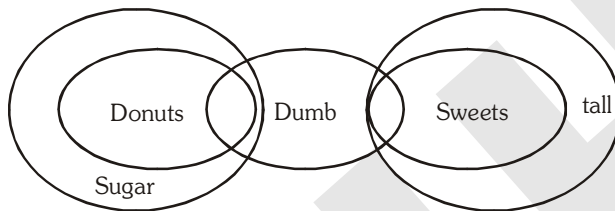
5. In the following question, five statements have been provided which are to be considered as true, even if they do not corroborate our real life experiences. These are followed by four conclusions as the alternatives. Now in the given statements, which one among the four conclusions is definitely false.

**Statements:** Some donuts are dumb. Some dumbs are sweets. All sweets are tall. No tall is a donut. All donuts are sugar.

- (1) Some sweets are sugar
- (2) Some dumbs are tall
- (3) Some sugars are not dumb
- (4) Some tall are dumb

**Ans. (1)**

**Sol.**

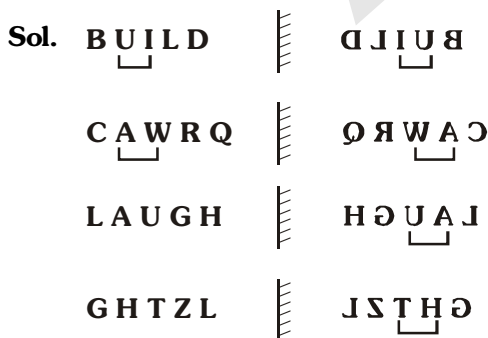


Option (1) is false

6. 'BUILD' is related to 'CAWRQ', such that the letters having reflection symmetry with respect to a mirror placed on the right side at the same positions. Which among the following pairs bears the same relationship?

- (1) EARTH : NPOQX
- (2) CROWN : DABCM
- (3) HOUSE : TRSHE
- (4) LAUGH : GHTZL

**Ans. (4)**



2<sup>nd</sup> and 3<sup>rd</sup> better has same mirror image.

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

7. An old couple with memory issues had forgotten their anniversary and were trying to recollect the date. The lady clearly remembers that they got married in the month of February of the year 1955. The man clearly remembers that he celebrated his 21<sup>st</sup> birthday with same year, and it was Thursday, the 3<sup>rd</sup> of February, as a bachelor. The lady then remembers that they definitely got married before the 13<sup>th</sup> of February. The man knows it had to be a weekend, since he was working on other days from Monday to Friday. The lady and the man then agree that it was a Sunday. Help them find the date of their wedding which was in the year 1955?

- (1) 5<sup>th</sup> of February      (2) 6<sup>th</sup> of February      (3) 8<sup>th</sup> of February      (4) 12<sup>th</sup> of February

**Ans. (2)**

**Sol.** There is only one Sunday before 13 Feb 1955, i.e. 6th Feb 1955.

So option (3) is correct.

**Direction (Questions 8-9):**

Read the following information carefully and answer the questions given below:

(i) A '+' B means 'A' is the mother of 'B'.

(ii) A '-' B means 'A' is the wife of 'B'.

(iii) A 'x' B means 'A' is the brother of 'B'.

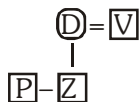
(iv) A '÷' B means 'A' is the son of 'B'.

8. If P 'x' Z '÷' D '-' V, then how is 'V' related to 'P'?

- (1) Mother      (2) Brother      (3) Daughter      (4) Father

**Ans. (4)**

**Sol.**  $P \times Z \div D - V$



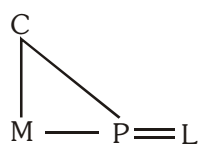
V is the father of P.

9. If M '÷' C '+' P '-' L, then how is 'M' related to 'L'?

- (1) Son-in-law      (2) Brother      (3) Son      (4) Brother-in-law

**Ans. (4)**

**Sol.**



M is brother-in-law of L.

10. The objects or words given below form a certain group. Which one of the following does not belong to the group?

Spectacles, Earrings, Bicycle, Shoes, Bangles

- (1) Bicycle      (2) Shoes      (3) Earrings      (4) Spectacles

**Ans. (1)**

**Sol.** Except bicycle, all are wearing things.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**11.** There is a 3-digit code to open a lock. There are four 3-digit numbers and hints have been provided corresponding to those numbers to crack the code. Crack the code and mark that as your answer.

821 – One digit is correct but wrongly placed.

379 – None of the digit are correct.

486 – Two digit are correct but wrongly placed.

538 – Two digit are correct and rightly placed.

(1) 528

(2) 845

(3) 485

(4) 548

**Ans. (4)**

**Sol.** 8 → Correct

4, 8 → Correct

5 4 8

So, 548 is the correct answer.

**12.** Rohan moves 1 km to East and then turn to South and moves 5 km. He again turns to East and walks 2 km. After this, he turns to North and moves 9 km. What is The distance from his starting point to the present point?

(1) 13 km

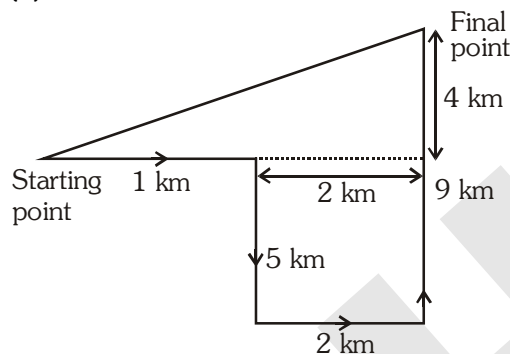
(2) 08 km

(3) 05 km

(4) 16 km

**Ans. (3)**

**Sol.**



$$\text{Distance} = \sqrt{4^2 + 3^2} = \sqrt{25} = 5 \text{ km}$$

**Direction (Questions 13-15):**

In the following questions, the question is followed by two Statements (i) and (ii). You have to determine whether.

Only statement (i) is sufficient to answer the question.

Only statement (ii) is sufficient to answer the question.

Both statement (i) and statement (ii) are needed to answer the question.

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

**13.** What is the date today?

**Statements:**

(i) We are in the second week of March.

(ii) The date today is an odd number.

(1) Only statement (i) is sufficient to answer the question.

(2) Only statement (ii) is sufficient to answer the question.

(3) Both statement (i) and statement (ii) are needed to answer the question.

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

**Ans. (4)**

**Sol.** Option (4) is correct.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

14. What is the two-digit number?

Statements:

(i) Both the digits of the two-digit number are even and the sum of their digits is 12.

(ii) The two digits of the two-digit number are not the same.

(1) Only statement (i) is sufficient to answer the question.

(2) Only statement (ii) is sufficient to answer the question.

(3) Both statement (i) and statement (ii) are needed to answer the question.

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

**Ans. (4)**

**Sol.** Option (4) is correct.

15. Who is the tallest amongst the four friends Kimaya, Aashvi, Vihana and Pari?

Statements:

(i) Aashvi is not the tallest but taller than Vihana and Kimaya.

(ii) Vihana is the shortest amongst the four friends.

(1) Only statement (i) is sufficient to answer the question.

(2) Only statement (ii) is sufficient to answer the question.

(3) Both statement (i) and statement (ii) are needed to answer the question.

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

**Ans. (1)**

**Sol.** Option (1) is correct.

16. In the word 'PACEMAKING', if the first letter is interchanged with the second letter, the third letter is interchanged with the fourth letter and so on till the ninth letter is interchanged with the tenth letter, what would be the seventh letter, from the right after such arrangement?

(1) E

(2) C

(3) K

(4) I

**Ans. (2)**

**Sol.**

P A C E M A K I N G

A P E C A M I K G N

Left

Right

Option (2) is correct.

17. In the following letter series, find the letters to replace the question-mark (?) to complete the series:

ZXW VTS RPO NLK ? FDC

(1) JIH

(2) GHJ

(3) JHG

(4) IHG

**Ans. (3)**

**Sol.**

Z X W  
+2 +1

V T S  
+2 +1

R P O  
+2 +1

N L K  
+2 +1

J H G  
+2 +1

F D C  
+2 +1

Option (3) is correct.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**18.** A museum has an average of 520 visitors on Sunday and an average of 100 visitors on other days. What is the average number of visitors per day in a month of 30 days beginning with a Sunday?

- (1) 220                      (2) 170                      (3) 180                      (4) 300

**Ans. (2)**

**Sol.** Sunday = 520

Monday to Saturday = 100

Total Sunday = 5

Other days = 25

$$\text{So, } \frac{25 \times 100 + 5 \times 520}{30} = 170$$

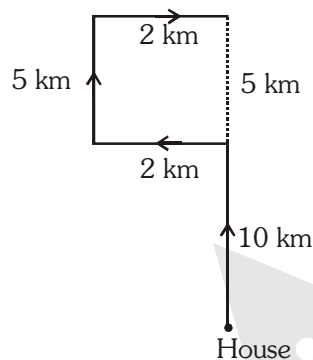
Option (2) is correct.

**19.** Rishi decides to drive to a party. From his house, he drives 10 km North. There he decides to pickup his takes a left turn and drives for another 5 km. On picking-up his friend, he has to take a right turn and drive for another 2 km. Finally he takes another right turn and drives for another 2 km to reach his destination. How many kilometres Rishi would have required to drive, had he drove straight from his ijouse to the party?

- (1) 15 km                      (2) 12 km                      (3) 10 km                      (4) Cannot be determined

**Ans. (1)**

**Sol.**

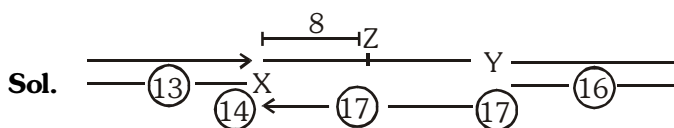


Straight drive from his house = 5 + 10 = 15 km

**20.** In a queue, Mr. X is 14<sup>th</sup> from the start and Mr. Y is 17<sup>th</sup> from the end, while Mr. Z is exactly in the middle of Mr. X and Mr. Y. Mr. X is ahead of Mr. Y and there are 48 persons in the queue. How many persons are there between Mr. X and Mr. Z?

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

**Ans. (3)**



**Sol.**

There are 8 persons between Mrs.X and Mr.Z

So option (3) is correct.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**21.** Find the, next number in the series:

13, 13, 65, 585, 7605, 129285, ?

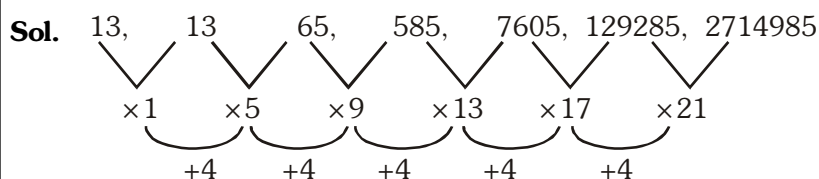
(1) 2231252

(2) 2451326

(3) 242154

(4) 2714985

**Ans. (4)**



So option (4) is correct.

**22.** Find the missing number (?) in the series :

4, 55, 576, ?, 21280, 64083, 64204

(1) 608

(2) 4207

(3) 676

(4) 726

**Ans. (2)**

**Sol.**  $4 \times 11 + 11 \times 1^2 = 55$

$55 \times 9 + 9 \times 3^2 = 576$

$576 \times 7 + 7 \times 5^2 = 4207$

$420 \times 5 + 5 \times 7^2 = 21280$

$21280 \times 3 + 3 \times 9^2 = 64083$

$64083 \times 1 + 1 \times 11^2 = 64204$

So option (2) is correct.

**23.** Complete the series:

Z = 2197, R = 729, P = 512, J = ?

(1) 625

(2) 125

(3) 729

(4) 512

**Ans. (2)**

**Sol.**  $Z = 26 \Rightarrow \frac{26}{2} = 13 \rightarrow (13)^3 = 2197$

$R = 18 \Rightarrow \frac{18}{2} = 9 \rightarrow 9^3 = 729$

$P = 16 \Rightarrow \frac{16}{2} = 8 \rightarrow 8^3 = 512$

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

So option (2) is correct.

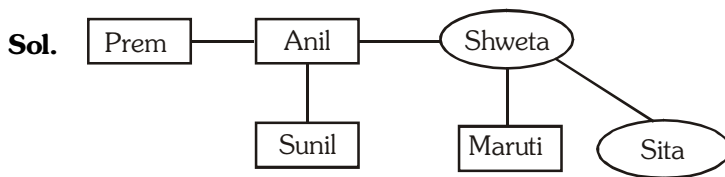


**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**24.** Sunil is the son of Anil. Shweta Anil's sister has a son Maruti and daughter Sita. Prem is the maternal uncle of Maruti. How is Sunil related to Maruti.

- (1) Cousin                      (2) Maternal uncle                      (3) Brother                      (4) Nephew

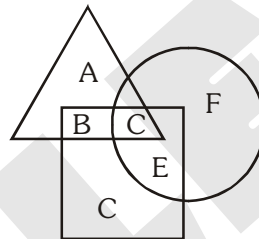
**Ans. (1)**



Sunil is cousin of Maruti.

Option (1) is correct.

**25.** In the given figure, the triangle represents girls, the square represents sports persons, and the circle represents coaches. The portions in the figure which represents girls are sports persons but not coaches is labelled as:



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

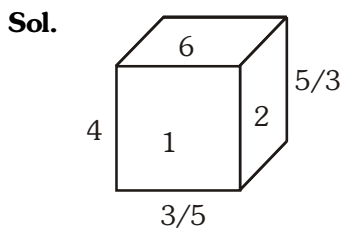
**Ans. (2)**

**Sol.** B represent girls are sportsperson but not coaches.

**26.** A dice is numbered from 1 to 6 in different ways. If 1 is adjacent to 2, 4 and 6, then which of the following statements is necessarily true?

- (1) 2 must be opposite to 6                      (2) 1 must be adjacent to 3  
(3) 3 must be adjacent to 5                      (4) 3 must be opposite to 5

**Ans. (3)**



Clearly 3 must be adjacent to 5.





**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**27.** In certain code language 'sun shines brightly' is written as 'ba lo sul', 'houses are brightly lit' as 'kado ula ari ba' and 'light comes from sun' as 'dopi kup lo nro'. What code words are written for 'sun' and 'brightly' ?

- (1) ba, sul                      (2) sul, lo                      (3) lo, ba                      (4) ba, lo

**Ans. (3)**

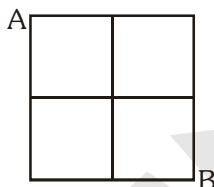
**Sol.** sun shines brightly – ba lo sul

houses are brightly lit – kado ula ari ba

light comes from sun – dopi kup lo nro

sun – lo; brightly – ba

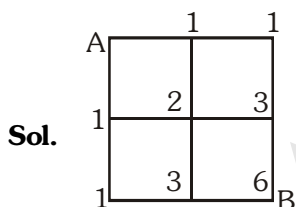
**28.** Study the following figure :



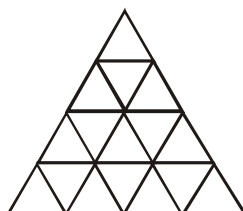
A person goes from A to B always moving to the right or downward along the lines. How many different routes can he adopt ?

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

**Ans. (3)**



**29.** Consider the following figure and answer the items that follows :



What is the total number of triangles in the above gride?

- (1) 27                      (2) 26                      (3) 23                      (4) 22

**Ans. (1)**

**Sol.** By observation



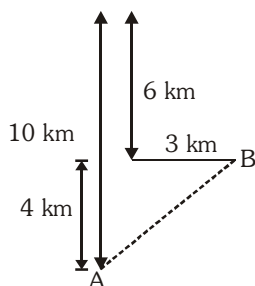
**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**30.** Kunal walks 10 km towards North. From there, he walks 6 km towards South, Then, he walks 3 km towards East. How far and in which direction is he, with reference to his starting point ?

- (1) 5 km West                      (2) 7 km West                      (3) 7 km East                      (4) 5 km North-East

**Ans. (4)**

**Sol.**



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

$$= \sqrt{16 + 9}$$

$$= \sqrt{25} = 5$$

5 km North-East

**31.** In a class 45% students study Mathematics, 55% study Physics, 40% study Chemistry, 30% study Mathematics and Physics, 15% study Physics and Chemistry, 25% study Mathematics and Chemistry and 10% study all three subjects. What percentage do not read any subject?

- (1) 10%\*                      (2) 15%                      (3) 25%                      (4) 20%

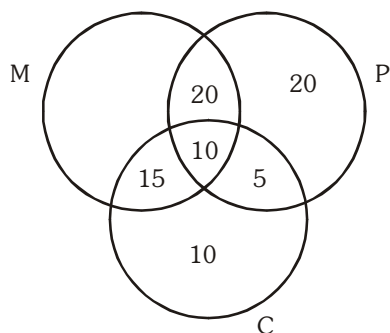
**Ans. (4)**

**Sol.** Do not read any subject %

$$\Rightarrow 100 - (20 + 20 + 10 + 10 + 15 + 5)$$

$$\Rightarrow 100 - 80$$

$$\Rightarrow 20\%$$



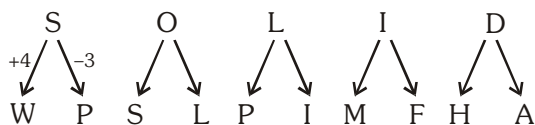
**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**32.** In a code language 'SOLID' is written as 'WPSLPIMFHA'. What does the code 'ATEXXQIBVO' represent?

- (1) EAGER                      (2) WAFER                      (3) WAGER                      (4) WATER

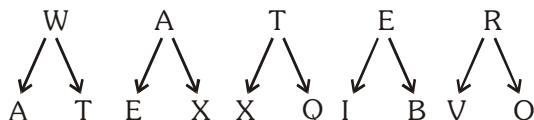
**Ans. (4)**

**Sol.**

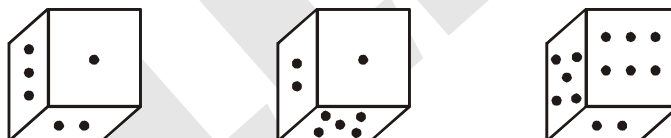


+4, -3 pattern follow in all letters

So,



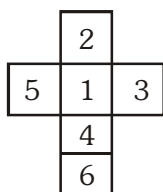
**33.** Below are depicted the three different positions of a dice. Find the number opposite to 1 dot :



- (1) 2                      (2) 3                      (3) 4                      (4) 6

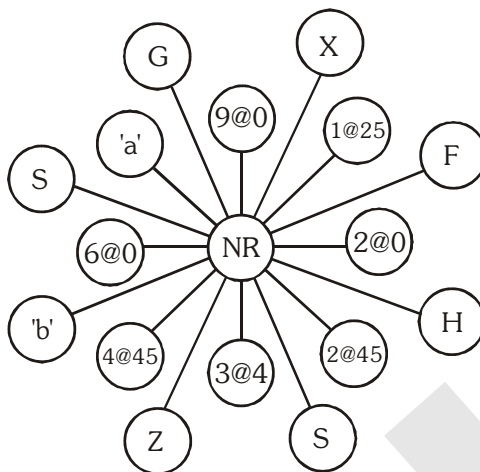
**Ans. (4)**

**Sol.** By open dice



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

34. Find the missing values of 'a' and 'b' ?



(1) 8@3, B

(2) 7@3, G

(3) 7@25, m

(4) 8@25, L

**Ans. (3)**

**Sol.** Moving clockwise

$$X + (1 + 2 + 5) = 32 = F$$

$$F + (2 + 0) = 8 = H$$

$$H + (2 + 4 + 5) = 19 = S$$

$$S + a = G$$

$$a = 33 - 19 = 14$$

So, 7@25, m is correct answer.

**Direction (Questions 35-36) :**

The reasoning power and logical power of six students of a class are as follows :

1. Ruchi is more logical and have higher reasoning power than Puchi but less logical and reasoning power than Sri.
2. Nichi is more logical than Chiki who is not as logical as Puchi.
3. The least logical student has hiehesr reasoning power.
4. The student having least reasoning power would be fourth if they all stood in a queue according to their logical power and quene started from highest logical student.
5. Nichi has lower reasoning power than Riki but higher than Chiki haivng better reasoning power than Sri.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

- 35.** Which of the following statement is correct ?  
 (1) Nichi has highest reasoning power in the group.  
 (2) Puchi is most logical in the group.  
 (3) Ruchi has higher reasoning power than Nichi.  
 (4) Riki has least logical power.

**Ans. (4)**

**Sol.** Reasoning Power : Rikki > Nichi > Chikki > Sri > Ruchi > Puchi  
 Logical power

Sri > Ruchi > Nichi > Ruchi > Chikki > Rikki  
 Nichi > Sri > Ruchi > Puchi > Chikki > Rikki

- 36.** Whose position in the logical power queue cannot be determined from the given statement ?  
 (1) Puchi (2) Nichi (3) Sri (4) Chiki

**Ans. (2,3)**

**Sol.** Reasoning Power : Rikki > Nichi > Chikki > Sri > Ruchi > Puchi  
 Logical power

Sri > Ruchi > Nichi > Ruchi > Chikki > Rikki  
 Nichi > Sri > Ruchi > Puchi > Chikki > Rikki

**Direction (Question 37) :**

In an immunization drive in a hospital, receptionist was asked to allow one male patient when color-code announced in Blue (B), one female patient when color-code announced in Pink (P), two male and three female patients when color-code announced is Green (G). She had been asked to allow exit of one male and two female patients from the doctor's room when announced Red (R). The 1<sup>st</sup> sequence followed by receptionist is :

[BPGBBGPBRPBPBGGRBGBBBGPPRGB]

In the 2<sup>nd</sup> sequence, she replaced 'Green' at odd position with 'Blue' code and 'Pink' at even position with 'Red' code.

- 37.** How many female patients are still left in the hospital for immunization ?  
 (1) 18 (2) 21 (3) 24 (4) 25

**Ans. (1)**

**Sol.** New position :

B R B B B G P B R R B R B G B R B G B B B R P R

$$-2 + 3 + 1 - 2 - 2 - 2 + 3 - 2 + 1 - 2 = -3$$

B P G B B G P B R P B P B G G R B G B B G P P R G B

$$+ 1 + 3 + 3 + 1 - 2 + 1 + 1 + 3 + 3 - 2 + 3 + 3 + 1 + 1 - 2 + 3 = 21$$

$$21 - 3 = 18$$

- 38.** In a certain way.  
 DIAMOND is coded as [2233113352722]  
 BRONZE is coded as [223335272135]  
 the SILVER will be coded as  
 (1) [223322325527] (2) [223311332722] (3) [1933511355213] (4) [1933223211529]

**Ans. (4)**

**Sol.** Code in form of prime factorization  
 So, code for SILVER  
 ⇒ 1933223211529

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**39.** The wall clock at Zebo's house was not working properly. Zebo noticed on Tuesday noon that clock is two minutes slow. He planned to observe the behaviour of clock for a week. On next week same day, he noticed that clock was 4 m in 48 sec fast at 02:00 P.M. When did the clock show the correct time?

- (1) 12:48 P.M. on Wednesday                      (2) 02:12 P.M. on Thursday  
(3) 02:00 P.M. on Thursday                      (4) 03:36 P.M. on Wednesday

**Ans. (3)**

**Sol.** 6 min 48 sec gain  $(24 \times 7) + 2$  Hr

$$\frac{34}{5} \text{ min gain } 170 \text{ Hr}$$

$$1 \text{ gain } 170 \times \frac{5}{34} \text{ Hr}$$

$$2 \text{ mn gain } 170 \times \frac{5}{34} \times 2 \text{ Hr}$$

$$\Rightarrow 50 \text{ Hrs}$$

$$\text{Req. time } \Rightarrow 12 \text{ noon Tuesday} + 50 \text{ Hrs}$$

$$\Rightarrow 2 \text{ pm on Thursday}$$

**Direction (Question 40):**

A clock is so placed that at 12 Noon its minute hand points towards West. The mathematical operators have been placed at the minute hand position at particular time given below :

'<' at fifteen minutes before noon

'=' at ten minutes past two

'>' at half past six

'x' at twenty minutes past seven

'+' at quarter past eight

'-' at nine o'clock

'+' at five minutes to ten

**40.** Which is the correct mathematical expression based on above information ?

- (1) [6N4SW8NE2E9W6NE2SW3E3NE2SW1W5]    (2) [6S4NW8SE2E9W6SE2NW3E3SE2NW1W5]  
(3) [6N4SW8NE2W9E6NE2SW23E3NE2SW1E5]    (4) [6S4SW8NW2W9E6NW2E3W3NE2N1E5]

**Ans. (1)**

**Sol.** After sign substitution

< means S        ;        = means NW

> means E        ;        x means NE

+ means N        ;        - means W

÷ means SW

From option 1

$$6 + 4 \div 8 \times 2 > 9 - 6 \times 2 \div 3 > 3 \times 2 \div 1 - 5$$

$$\Rightarrow 6 + \frac{1}{2} \times 2 > 9 - 6 \times \frac{2}{3} > 3 \times 2 - 5$$

$$\Rightarrow 6 + 1 > 9 - 4 > 6 - 5$$

$$\Rightarrow 7 > 5 > 1$$



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**41.** In a coded language, the mathematical operators have been placed in clock. The position of operator is the position of minute hand. The coding is as follows '+' at 7:25, 'x' at 5:15, '÷' at 9:00, '<' at 10:55, '>' at 3:30, '=' at 1:05, '-' at 11:25.

If positions of '+', '-', 'x', '÷', '<', '>', '=' changed by rotation of angle 30°, 60°, 90°, 120°, 150°, 180°, 210° in the clockwise and anti-clockwise alternatively, then which of the following is correct statement ?

- (1) 6 (11:15) 4 (5:30) 1 (8:40) 2 (7:30) 3 (3:00) 1 (5:30) 8 (8:40) 4  
 (2) 6 (7:30) 4 (11:15) 1 (5:30) 2 (8:40) 3 (3:00) 1 (1:40) 8 (11:20) 4  
 (3) 6 (11:15) 4 (11:20) 1 (8:40) 2 (3:00) 3 (1:40) 1 (7:30) 8 (5:30) 4  
 (4) 6 (8:40) 4 (5:30) 1 (5:30) 2 (7:30) 3 (1:40) 1 (11:15) 8 (3:00) 4

**Ans. (1)**

**Sol.** After sign substitution

- + means 7 : 30
- means 11 : 15
- x means 5 : 30
- ÷ means 8 : 40
- < means 11 : 20
- > means 3 : 00
- = means 1 : 40

from option 1

$$6 - 4 \times 1 \div 2 + 3 > 1 \times \div 4$$

$$\Rightarrow 6 - 4 \times \frac{1}{2} + 3 > 1 \times 2$$

$$\Rightarrow 6 - 2 + 3 > 2$$

$$\Rightarrow 7 > 2$$

**Direction (Question 42):**

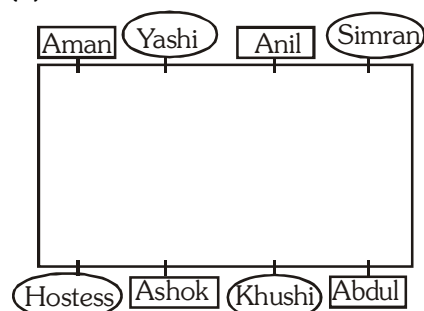
A couple organized a dinner party for the six friends. The host and hostess sat on the opposite sides of rectangular table. All of them were sitting in such format that male have one female on either of his side and vice-versa. Ashok is sitting opposite to Yashi, who is not the hostess. Anil has a female on his right and is sitting opposite to a female. Khushi is sitting to the hostess's right and next to Abdul. One person is sitting between Simran and Yashi who is not the hostess.

**42.** Which of the following statements is/are true about Aman?

- (i) Aman must be host.
- (ii) Seated at Yashi's right
- (iii) Seated diagonally opposite to Khushi.

- (1) Only (i)                      (2) Only (iii)                      (3) Only (i) and (ii)                      (4) ONLY (ii) and (iii)

**Ans. (3)**



**Sol.**



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

43. According to the given matrix if MERCURY is coded as '3379288', JUPITER is coded as '3359468', then NEPTUNE will be coded as?

0	1	2	3	4	5	6	7	8
1	Y	U	F	T	D	Q	E	Q
2	R	A	X	W	M	S	J	D
3	P	D	I	Y	N	C	F	J
4	Z	N	U	B	V	P	C	Q
5	U	M	F	E	H	O	K	G
6	M	A	H	T	N	B	I	V
7	C	L	G	K	H	E	B	W
8	R	S	Y	G	X	T	V	L

- (1) 3354336                      (2) 3357236                      (3) 3554668                      (4) 3594688

**Ans. (3)**

**Sol.** From the given matrix letters code is being consider as either in rows or columns.

So the best answer options (3)

**Direction (Question 44) :**

Study the given information and answer the question bellow :

Kit = Kat means Kat is the father of Kit

Kit @ Kat means Kit is the sister of Kat

Kit Δ Kat means Kat is the mother of Kit

Kit ↑ Kat means Kit is the brother of Kat

Kit @ Kat means Kat is the husband of Kit

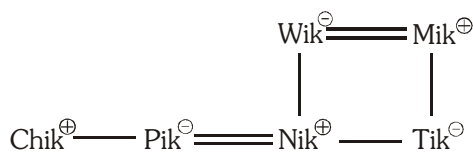
Kit × Kat means kat is the daughter of Kit

44. Which of the following indicates that Pik is the daughter-in-law of Mik?

- (1) Chik @ Pik Δ Nik × Wik = Tik @ Mik                      (2) Chik × Pik @ Nik = Wik @ Tik @ Mik  
(3) Chik ↑ Pik Δ Nik @ Wik ↑ Tik @ Mik                      (4) Chik ↑ Pik @ Nik Δ Wik × Tik = Mik

**Ans. (4)**

**Sol.** By option (4)







**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**45.** The mathematical operators i.e. +, −, ×, ÷, =, < had been placed at the minute hand position of the clock at clockwise angles of 78°, 162°, 210°, 114°, 240° and 312° respectively. The operators position had been rotated by 5 min, 7 min, 9 min, 11 min, 13 min and 15 min respectively clockwise and anticlockwise clockwise and anticlockwise alternatively. Find the correct combinations of operators in the form of time which satisfy the given equation :

$$[8 \ ? \ 20 \ ? \ 5 \ ? \ 9 \ ? \ 3 \ ? \ 38]$$

- (1) 7:08, 9:18, 10:20, 2:53, 6:44
- (2) 7:08, 6:44, 10:20, 9:18, 2:53
- (3) 6:44, 10:20, 9:18, 2:53, 7:08
- (4) 6:44, 7:08, 8:18, 10:20, 2:53

**Ans. (4)**

**Sol.** By combination of operators

+ means 9 : 18

− means 10 : 20

× means 6 : 44

÷ means 7 : 08

= means 2 : 53

Now by option (4)

$$8 \times 20 \div 5 + 9 - 3 = 38$$

$$\Rightarrow 8 \times 4 + 9 - 3 = 38$$

$$\Rightarrow 32 + 9 - 3 = 38$$

$$\Rightarrow 41 - 3 = 38$$

$$\Rightarrow 38 = 38$$

**46.** In the word 'QUARANTINE', which letter comes seven letters before the letter which comes four letters after the second appearance of the first letter to occur twice times in the word?

(1) Q

(2) U

(3) A

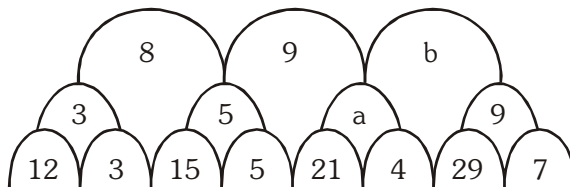
(4) N

**Ans. (2)**

**Sol.** Q U A R A N T I N E

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

47. Find the missing values of 'a' and 'b'.



(1) 4, 5

(2) 5, 7

(3) 7, 10

(4) 7, 5

**Ans. (2)**

$$\frac{12+3}{5} = 3$$

$$\frac{15+5}{4} = 5$$

$$\frac{21+4}{5} = 5$$

$$\frac{29+7}{4} = 9$$

$$12 + 3 + 15 + 5 = 35$$

$$\Rightarrow 3 + 5 = 8$$

$$15 + 5 + 21 + 4 = 45$$

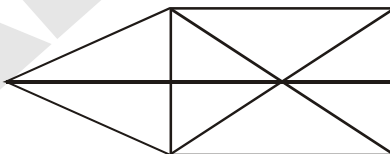
$$\Rightarrow 4 + 5 = 9$$

$$21 + 4 + 29 + 7 = 61$$

$$\Rightarrow 6 + 1 = 7$$

$$a = 5, b = 7$$

48. How many triangles are there in the following diagram?



(1) 15

(2) 16

(3) 17

(4) 18

**Ans. (3)**

**Sol.** By observation

49. There is a certain relationship between words on one side of :: and one word is given on another side of :: while another word is to be found from given options, having the same relation with the word as the words of the given pair. Choose the correct word from the given alternatives:

Lion : Claws :: Eagle : \_\_\_\_\_

(1) Beak

(2) Talon

(3) Feather

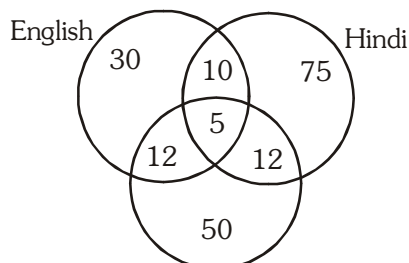
(4) Feet

**Ans. (2)**

**Sol.** Lion is related to claws in the same way eagle is related to talon.

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

50. Study the diagram given below :



500 students appeared in an examination comprising tests in English, Hindi and Urdu. The diagram gives the number of students who failed in different tests. What is the percentage of students who failed in at least two subjects?

- (1) 7.8                                      (2) 6.8                                      (3) 8.7                                      (4) 0.078

**Ans. (1)**

**Sol.**  $\frac{39}{500} \times 100 \Rightarrow 7.8\%$

51. Arrange the following in the right sequence, following the order in which they occur.

Seed	Sprout	Sapling	Plant	Tree
3	2	1	4	5

- (1) 3,2,1,4,5                                      (2) 1,4,5,3,1                                      (3) 2,4,5,3,1                                      (4) 5,4,2,3,1

**Ans. (1)**

**Sol.** 3, 2, 1, 4, 5

Seed → Sprout → Sapling → Plant → Tree

52. The statements below are followed by two conclusions labelled I and II. Assuming that the information in the statement is true, even if it appears at variance from generally established facts, decide which conclusion(s) logically and definitely follows(s) from the information given in the statements.

**Statements:**

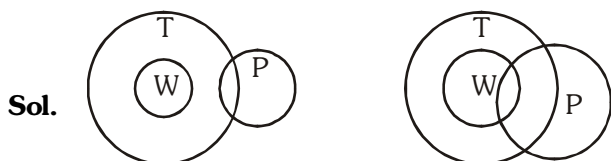
- I. All women are trains.  
II. Some trains are painters.

**Conclusions:**

- I. Some trains are women  
II. Some women are painters.

- (1) Only conclusion I follows                                      (2) Only conclusion II follows  
(3) Both I and II Conclusions follows                                      (4) Either Conclusion I or Conclusion II follows

**Ans. (1)**



- I    ✓    ✓  
II    ×    ✓

Option (1) only Conclusion I follows.

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**53.** In a code language ABACUS is written as CDCEWU then how will you code SUDOKU in the same language?  
(1) WUFQMW                      (2) UWFQMW                      (3) FQUWMW                      (4) MWFQUW

**Ans. (2)**

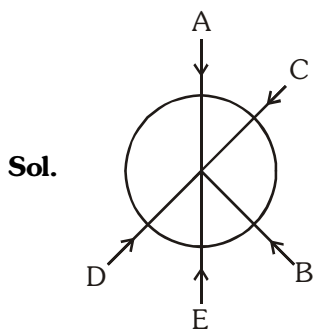
**Sol.**

A	B	A	C	U	S	S	U	D	O	K	U
↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2
C	D	C	E	W	U	U	W	F	Q	M	W

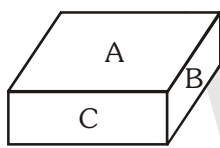
**54.** Five Friends A, B, C, D and E are sitting around circular table facing the centre. A does not sit next to E. B is sitting to E's immediate right. C does not sit next to D. D has E sitting immediately next to her. Therefore C is sitting immediately between.

- (1) D and A                      (2) D and B                      (3) B and A                      (4) E and A

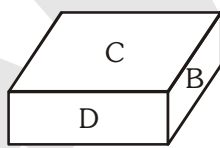
**Ans. (3)**



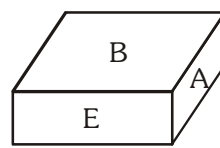
**55.** The following figure shows four positions of a dice. Find out the alphabet which is opposite to face with alphabet B?



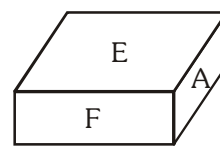
(i)



(ii)



(iii)

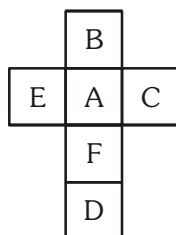


(iv)

- (1) F                      (2) E                      (3) D                      (4) A

**Ans. (1)**

**Sol.** From Figure (i) and (iv)



B ↔ F

A ↔ D

E ↔ C

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**56.** Given below is a question followed by two statements. Which option provides the right condition for answering the question? In which year was Jitan born?

- I. Jitan is 25 years younger to his mother.
- II. Jitan's brother was born in 1994 is 35 years younger to his mother.

- (1) I alone is sufficient while II alone is not sufficient.
- (2) II alone is sufficient while I alone is not sufficient.
- (3) Either I or II is sufficient.
- (4) I and II together are sufficient.

**Ans. (4)**

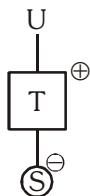
**Sol.** (By observation)

**57.** If  $A - B$  means 'A' is the wife of 'B' and if  $A + B$  'A' is the daughter of 'B' while  $A \div B$  means 'A' is the son of 'B'. What will be the relation of S with U if  $S + T \div U$ ?

- (1) Mother
- (2) Sister
- (3) Daughter
- (4) Grand Daughter

**Ans. (4)**

**Sol.**  $S + T \div U$

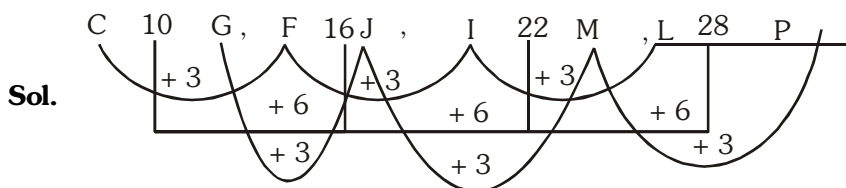


**58.** Select the option that will correctly replace the question mark (?) in the series.

C10G, F16J, I22M, \_\_\_\_\_?

- (1) P28L
- (2) P26L
- (3) L27P
- (4) L28P

**Ans. (4)**



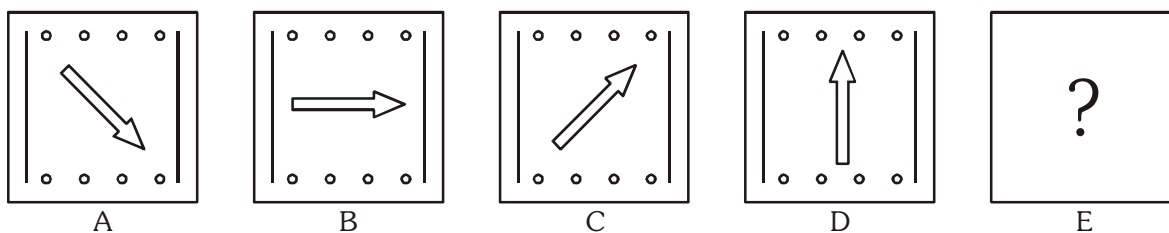
**Sol.**

L28 P

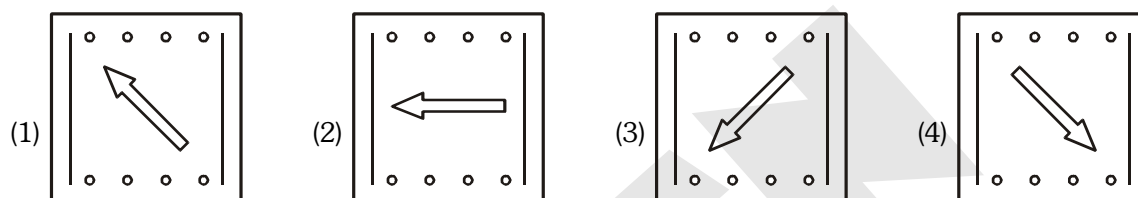
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**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

59. Find the next figure in the given series:

Problem Fig:



Answer Figure



**Ans. (1)**

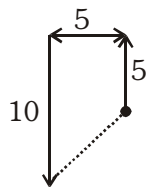
**Sol.** By observation

60. Dhiren walked 5 km towards North. Then he turned left and walked 5 km. Finally, he turns left and walks 10 km. In which direction is he from the starting point?

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

**Ans. (4)**

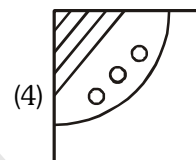
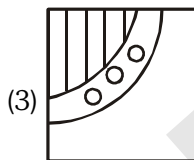
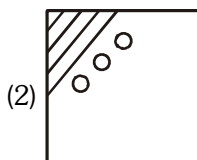
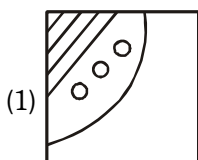
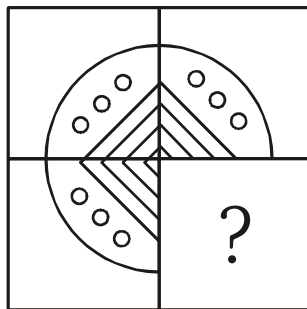
**Sol.** South - west



South-west

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

61. Which figure takes the place of '?' ?



Ans. (4)

Sol. By observation

62. If 7<sup>th</sup> day of the month is 4 days after Friday, what day will it be on the thirty-first day of the month?

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

Ans. (3)

Sol. 4 day after Friday = Tuesday  
so 7<sup>th</sup> day of a month = Tuesday  
So 31<sup>st</sup> day of a month = Friday  
So Ans option (3) Friday

63. Find the missing number.

31425 is to 810

52346 is to 1024

45237 is to 1121

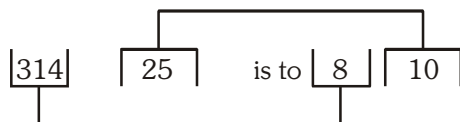
Therefore, 64382 is to?

- (1) 1122                      (2) 1123                      (3) 1315                      (4) 1316

Ans. (4)

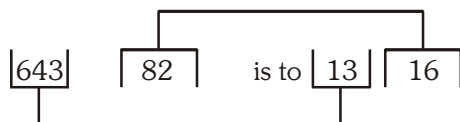
Sol. 31425 is to 810

$3 + 1 + 4 = 8$  and  $2 \times 10 = 20$



34382 is to 13 16

$6 + 4 + 3 = 13$  and  $8 \times 2 = 16$





**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

64. Which number will take the position of '?' ?

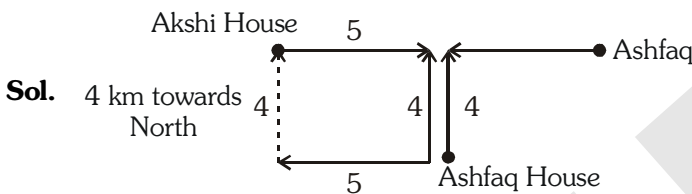
- (1) 4                                      (2) 3                                      (3) 2                                      (4) 1

**Ans. (Bonus)**

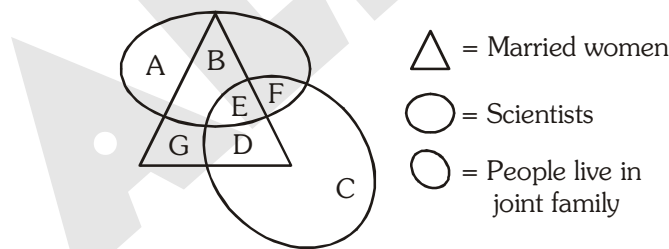
65. Akshi starts from her house and goes towards East. After walking 5 km in the same direction she meets her friend Ashfaq who was coming from the opposite direction. Both of them turn towards to the left of Ashfaq and walk together 4 km to reach his house. From there Akshi walks 5 km towards West. Now how much distance she should walk to reach her house?

- (1) 4 km towards North    (2) 4 km towards South    (3) 4 km towards West    (4) 4 km towards East

**Ans. (1)**



66. Study the following figure and answer the question given below :



Which letter represents married scientists who do not live in a joint family.

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

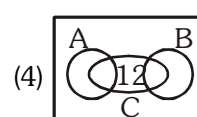
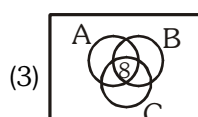
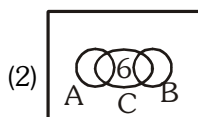
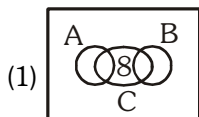
**Ans. (2)**

**Sol.** (∵ Common only in triangle and circle)



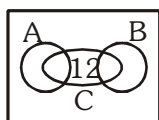
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**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**67.** Detail of a survey conducted among 200 students of a school on a particular day is as follows: 40% of the students came by bicycle, 50% of the students came by walk and the remaining came by bus. 30% of the students who came by bicycle and 40% of the students who came by walk play cricket. 40% of the students who come by bus do not play cricket. If we represent students who came by walk as A, students who came by bicycle by B and students who play cricket by C, then choose the diagram which shows the survey result.



**Ans. (4)**

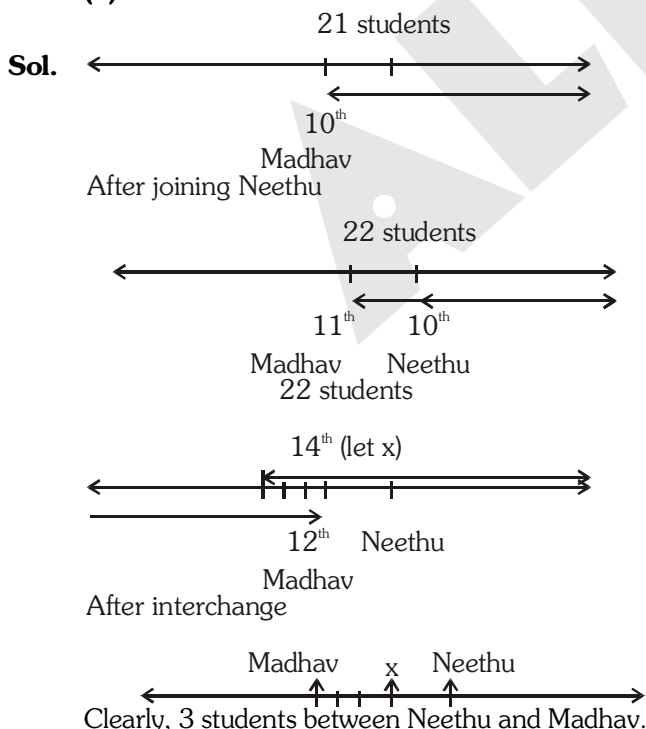
**Sol.** Total students = 200  
 Students come by bicycle = 40% = 80  
 Students came by walk = 50% = 100  
 Students came by bus = 10% = 20  
 Students who came by bicycle and play cricket = 30% = 24  
 Students who came by walk and play cricket 40% = 40  
 Students who came by bus and do not play cricket = 40% = 8  
 So students who came by bus and play cricket = 20 - 8 = 12



**68.** 21 students were standing in a row. Neethu wants to join among them. Teacher asked Neethu to stand behind Madhav who was standing at 10<sup>th</sup> position from back. Looking at the height of the students, teacher interchanged the positions of the students standing 14<sup>th</sup> from back with the student standing at 12<sup>th</sup> from front. Now how many students are standing between Neethu and Madhav?

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

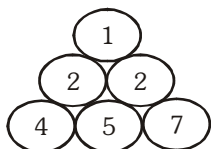
**Ans. (4)**



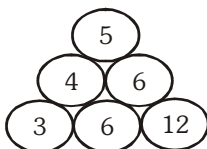


**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

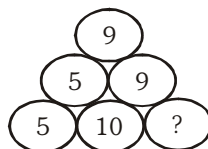
69. Find the missing number



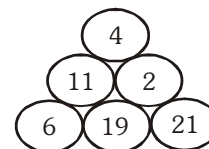
(A)



(B)



(C)



(D)

(1) 19

(2) 20

(3) 7

(4) 6

**Ans. (1)**

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

70. In 2020, January 3<sup>rd</sup> is Friday. Then what will be the day of January 3<sup>rd</sup> in 2021?

(1) Friday

(2) Saturday

(3) Sunday

(4) Tuesday

**Ans. (3)**

**Sol.** 3<sup>rd</sup> Jan 2020 → Friday

3<sup>rd</sup> Jan 2021 → Sunday

Ans (3) Sunday

(∵ 2020 is a leap year so we should add 2 odd days in place of 1 odd day)

71. Find the values of I, II and III in the given figure

□			Δ	∅	@	*		©
©		*	®	\$		Δ	#	@
\$	@	Δ	#		*			
#	*	\$	©	@	∅	®	□	Δ
®	□	@	\$	#	Δ		©	
Δ	©	∅	*		®	\$	@	#
				®	©	#	∅	
@	®	#	∅	Δ	\$			
	\$					@		®

(1) Δ, \*, ®

(2) Δ, □, ∅

(3) ∅, \*, ®

(4) ∅, □, ∅

**Ans. (1)**

**Sol.**

□			Δ	∅	@	*		©
©		*	®	\$		Δ	#	@
\$	@	Δ	#	©	*		®	
#	*	\$	©	@	∅	®	□	Δ
®	□	@	\$	#	Δ		©	
Δ	©	∅	*	□	®	\$	@	#
*	Δ			®	©	#	∅	
@	®	#	∅	Δ	\$			
∅	\$			*		@		®



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**Direction (Question 72) :**

In the coded language, the 12 digits of the clock are represented as 12 symbols as follows

\$, AN #, AT, \*, IN, -, IT, +, IF, Δ, AF. When any two symbols used together, then first symbols represent hour hand and second symbol represent minute hand of the clock.

**72.** The teacher starts his lecture at IT # and teaches for 'AN\*', Then he announced break for '\$ IN' hrs and resumed the class. At what time, he started his lecture?

- (1) ΔIF                                      (2) AF AN                                      (3) ΔAF                                      (4) IF \$

**Ans. (2)**

**Sol.** \$ AN # AT \* IN - IT + IF Δ AF  
1 2 3 4 5 6 7 8 9 10 11 12

So, IT# = 8:15 (Start)

AN\* = 2 hr 25 min (Teach)

⇒ 8 :15 + 2 hr 25 min = 10:40

⇒ 10:40 + 1 hr 30 min (break) = 12:10 (AF AN)

**Direction (Question 73):**

Study the following information carefully and answer the following questions.

A word arrangement machine, when given an input line words, rearranges them following a particular rule in each step. The following is an illustration of the input and the steps of rearrangement.

Input → Ability, Logical Reasoning Competence, Success, Hardwork

Step I → Competence, Reasoning, Hardwork, Logical, Success, Ability.

Step II → Ability, Competence Hardwork, Logical Reasoning, Success.

Step III → Logical, Competence, Reasoning, Hardwork, Success, Ability

Step IV → Hardwork, Ability, Reasoning Competence, Logical success

**73.** Which of the following will be step VI for the input?

- (1) Logical, Success, Ability, Reasoning, Competence, Hardwork  
(2) Reasoning, Success, Logical Ability, Competence, Hardwork  
(3) Logical, Reasoning, Competence, Hardwork, Success, Ability  
(4) Reasoning, Logical, Competence, Hardwork, Success, Ability

**Ans. (2)**

**Sol.** Alphabetical order

Input : Ability, logical, Reasoning, Competence, Success, Hardwork

Step I :- Competence, Reasoning, Hardwork, Logical, Success, Ability

Step II :- Ability, Competence, Hard work, Logical , Reasoning , Success

Step III :- Logical, Competence, Reasoning, Hardwork, Success, Ability

Step IV :- Hardwork, Ability, Reasoning, Competence, Logical, Success.

Step V:- Success, Logical, Ability, Reasoning, Competence, Hardwork.

Step VI :- Reasoning, Success, Logical, Ability, Competence, Hardwork.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**Direction (Question 74)**

Study the following arrangement of symbols, numbers and alphabets and answer the question given below:

E 5 Π R 2 @ 8 # 9 □ M ↓ S J 6 ↑ I L @ F 2 © U A Δ B N 3 \$

**74.** In the given sequence, if vowels are substituted with the next letter of English alphabets and the consonants are substituted with the letter preceding in the English alphabet series and the symbols are substituted with the vowels in the ascending order of English alphabet series, then how many consonants in the series will be preceded by vowels and followed by number?

- (1) 1                                      (2) 2                                      (3) 4                                      (4) 6

**Ans. (2)**

**Sol.** Given sequence

E 5 Π R 2 @ 8 # 9 □ M ↓ S J 6 ↑ I L @ F 2 © U A Δ B N 3 \$

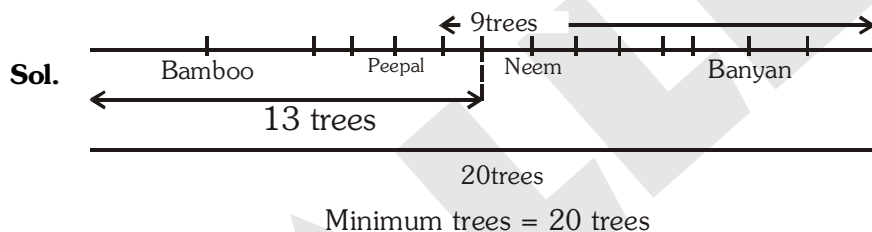
New sequence

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

**75.** In a botanical garden, there are numerous trees, shrubs and plants. The four trees i.e. Neem, Bamboo, Banyan and Peepal are there in a row. There are ten trees between Bamboo tree and Banyan tree and five trees between Neem tree and Bamboo tree. If seven trees are between Banyan tree and Peepal tree, nine trees behind Peepal tree and 13 trees ahead of Neem tree, then what could be the minimum numbers of tree in that row?

- (1) 20                                      (2) 27                                      (3) 32                                      (4) 48

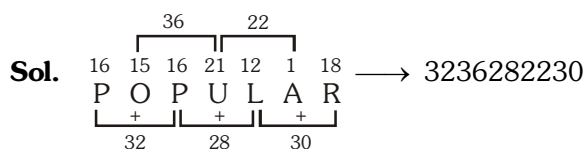
**Ans. (1)**



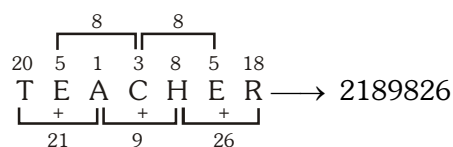
**76.** In certain code language,  
POPULAR is coded as [3236282230]  
VOCALIST is coded as [251615103129]  
then TEACHER will be coded in the language?

- (1) [1928983030]                      (2) [9186821015]                      (3) [2189826]                      (4) [2983160]

**Ans. (3)**



Similarly,





**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**77.** After noting down the odometer reading, that showed smallest four digit square number, Rimzim started driving to school with constant speed at 9 A.M. After one hour, he observed the delay in reaching school and doubled the speed to reach at 11 A.M. In school parking, he again noticed odometer which showed the number that reads same from both sides. What was the speed of Rimzim at 9:50 A.M.? (round to one decimal place)

- (1) 55.5 km/hr                      (2) 60.5 km/hr                      (3) 65.7 km/hr                      (4) 68.6 km/hr

**Ans. (3)**

**Sol.** Smallest 4-digit square = 1024

Next numbers that read same from both sides are 1111, 1221, ---.

Let speed = S

Now speed = 2S

9am ————— 10am ————— 11am

distance=d                      distance=x

$$\text{speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{So } s = \frac{d}{1} \Rightarrow \boxed{S = d} \quad \dots(1)$$

$$2S = \frac{x}{1} \Rightarrow \boxed{2s = x} \quad \dots(2)$$

Total distance covered  $\Rightarrow d + x = 1221 - 1024$

$$\Rightarrow 3s = 197$$

$$s = 65.66$$

$$\text{in round off} = 65.7 \frac{\text{km}}{\text{hr}}$$



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

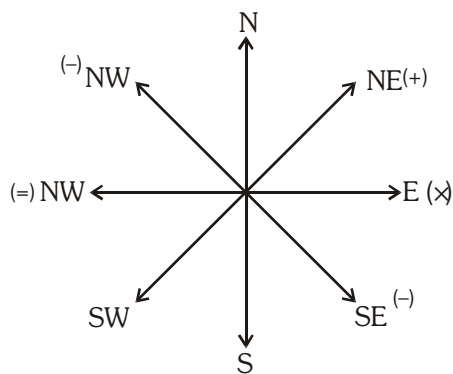
**78.** At a crossing, there was a direction pole which was showing all the 8 correct directions. An engineer wrote the mathematical operators i.e. +, -, × ÷ and = at NE, SE, E, NW and W respectively. But due to heavy wind, direction pole roated by 180°. Without noticing the new orientation of pole, he rotated the operators by 45° clock-wise. What will be the sequence of directions in the given equation?

[33 ? 11 ? 3 ? 6 ? 115]

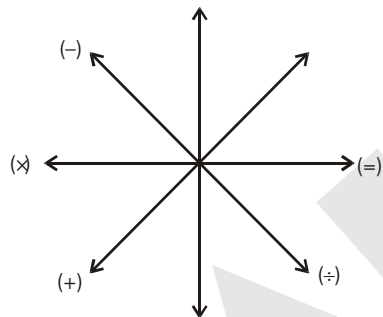
- (1) W, SE, NW, E      (2) SE, N, S, NW      (3) NW, S, N, SE      (4) NW, N, S, SE

**Ans. (3)**

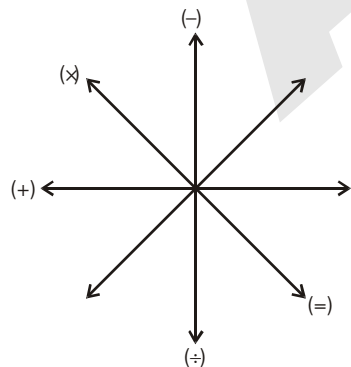
**Sol.**



On rotating above directions 180° we get



On rotating operators by 45° clockwise, we get



Equation :  $33 \times 11 \div 3 - 6 = 115$   
                   NW    S    N    SE



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

79. '+' implies 'go'  
'-' implies 'to'  
'×' implies 'walk'  
'=' implies 'early'  
'<' implies 'before'  
'>' implies 'Sun'  
'÷' implies 'rise'

then, identify the correct expression :

- (1) [5 go 4 to 3 walk 4 early 10 before 2 Sun 3 rise 2 before 3 Sun 4 rise 7 early 1]  
(2) [5 before 4 Sun 3 rise 4 go 10 to 2 walk 3 early 2 go 3 Sun 4 rise 7 walk 1]  
(3) [5 to 4 walk 3 rise 4 before 10 Sun 2 go 3 early 2 to 3 walk 4 rise 7 walk 1]  
(4) [5 to 4 walk 3 before 4 go 10 rise 2 early 3 walk 2 go 3 Sun 4 rise 7 walk 1]

**Ans. (4)**

**Sol.** (1)  $5 + 14 - 3 \times 4 = 10 < 2 > 3 \div 2 < 3 > 4 \div 7 = 1$

$$9 - 12 = 10 < 2 > \frac{3}{2} < 3 > \frac{4}{7} = 1$$

(2)  $5 < 4 > 3 \div 4 + 10 - 2 \times 3 = 2 + 3 > 4 \div 7 \times 1$

$$5 < 4 > \frac{3}{4} + 4 = 5 > \frac{4}{7}$$

(3)  $5 - 4 \times 3 \div 4 < 10 > 2 + 3 = 2 - 3 \times 4 \div 7 \times 1$

$$5 - 4 \times \frac{3}{4} < 10 > 5 = 2 - 3 \times \frac{4}{7} \times 1$$

$$2 < 10 > 5 = 2 - \frac{12}{7} \times 1$$

(4)  $5 - 4 \times 3 < 4 + 10 \div 2 = 3 \times 2 + 3 > 4 \div 7 \times 1$

$$-7 < 9 = 9 > \frac{4}{7}$$



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

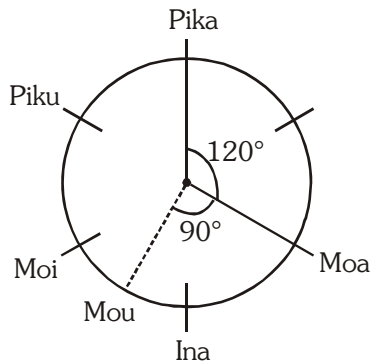
**Direction (Question 80):** The seven students named as Pika, Piku, Moa, Moi, Mau, Ina and Inu are doing class test around a round table by not facing each-other. The teacher shifted the Moa, Moi, Pika, Piku, Ina and Inu at equal distance. After that arrangement, Piku is sitting two place left of Ina who is sitting one place left of Moi. Moa makes an angle of  $90^\circ$  from Mou and at angle of  $120^\circ$  from Pika. Inu is sitting opposite to Pika.

**80.** What is the shortest angle between Moi and Mou?

- (1)  $51.43^\circ$                       (2)  $81.43^\circ$                       (3)  $150^\circ$                       (4)  $90^\circ$

**Ans. (1)**

**Sol.**



Shortest angle is  $51.43^\circ$  between Moi and Mou.

**Direction (Question 81) :** In the following question, the symbols are used with the following meanings as illustrated below :

$\Delta \wedge O$  means 'Δ' is not greater than 'O'.  $\Delta * O$  means 'Δ' is neither greater than nor smaller than 'O'.

$\Delta \# O$  means 'Δ' is not smaller than 'O'.  $\Delta \Pi O$  means 'Δ' is neither smaller than nor equal to 'O'.

$\Delta \square O$  means 'Δ' is neither greater than nor equal to 'O'

**81.** Assuming the statements to be true, find which of the four conclusion given below are definitely true.

**Statements :** (A)  $\leftarrow \wedge \infty$  (B)  $\% \Pi \$$  (C)  $\$ \# \downarrow$  (D)  $\leftarrow \Pi \$$

**Conclusion :** (I)  $\infty \square \$$  (II)  $\$ * \downarrow$  (III)  $\leftarrow \Pi \downarrow$

(1) Only II is true

(2) Only III is true

(3) Only II and III are true

(4) Only I and III are true

**Ans. (2)**

**Sol.** (A)  $\leftarrow \leq \infty$  (B)  $\% > \$$  (C)  $\$ \geq \downarrow$  (D)  $\leftarrow > \$$

$\downarrow \leq \$ < \leftarrow \leq \infty$

$\wedge$

$\%$

(I)  $\infty < \$$                       (II)  $\$ = \downarrow$                       (III)  $\leftarrow > \downarrow$

Hence conclusion III follows



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**82.** A defective watch showed the wired behaviour. it gains 5 seconds per 3 minutes for first hour, loss 10 seconds per 3 minutes in the second hour, again gains 15 seconds per 3 minutes for next one hour and so on. the watch showed the correct time at 7:00 A.M. What time it indicated 7:00 P.M.?

- (1) 6:50 P.M.                      (2) 7:00 P.M.                      (3) 7:10 P.M.                      (4) 7:20 P.M.

**Ans. (1)**

**Sol.** It gains 5 sec in 3 min for first hour means it gain 100 sec.

Next it loses 10 sec in 3 min in second hour means it loses 200 sec.

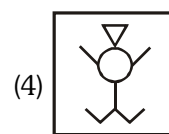
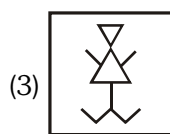
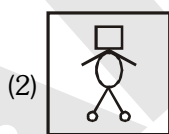
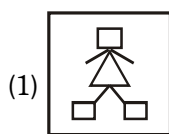
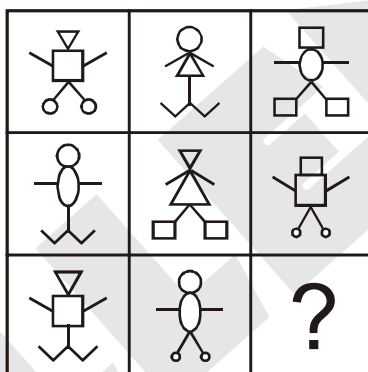
Similarly by following so on upto 12 hrs we get;

$$+100 - 200 + 300 - 400 + 500 - 600 + 700 - 800 + 900 - 1000 + 1100 - 1200 \Rightarrow -600 \text{ sec}$$

Therefore  $\frac{-600}{60} = -10 \text{ min}$

i.e. it lose 10 min, hence time should be 6:50 P.M.

**83.** Select a suitable figure from the four alternatives that would complete the figure matrix :



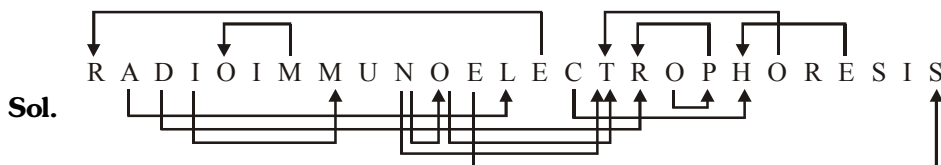
**Ans. (1)**

**Sol.** By observation

**84.** How many pairs of letter are there in the word 'Radioimmuno electrophoresis', which have as many letters between them as in the English alphabet series?

- (1) 10                      (2) 14                      (3) 16                      (4) 18

**Ans. (2)**



AL, DR, IM, NO, NT, OT, ES, CH, OP, EH, OT PR, ER, MO

14 Pairs



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

85. Read the statements carefully and give the answer.

**Statements:**

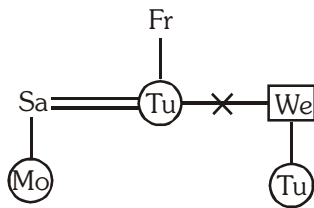
- I. Tues is the wife of Wednes. Tues and Satur are only children of Fri. Thur is only daughter of Wednes. Mon is the grand-daughter of Fri.
- II. Thur is married to Sun. Tues is mother-in-law of Sun. Tues is the only daughter of Fri. Mon is the grand-daughter of Fri.

How is Mon related to Tues?

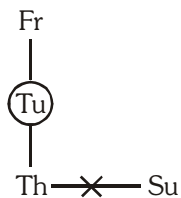
- (1) If the data in statement I alone are sufficient to answer the question, while the data in statement II alone are not sufficient to answer the question.
- (2) If the data in statement II alone are sufficient, while the data in statement I are not sufficient to answer the question.
- (3) If the data either in statement I alone or statement II alone are sufficient to answer the question.
- (4) If the data in both statements I and II together are necessary to answer the question.

**Ans. (1)**

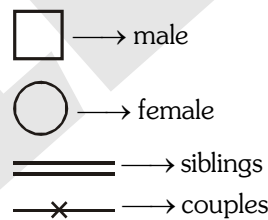
**Sol.** From statement I 'Mon' is niece of 'Tues'.



Statement II :

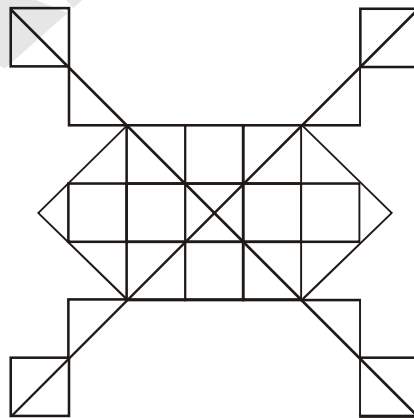


where



Not sufficient as 'Mon' can be son of 'Tue' or 'Mon' can be niece of 'Tues'

86. Find out the number of triangles and squares in given figure :



(1) 44, 20

(2) 44, 22

(3) 46, 20

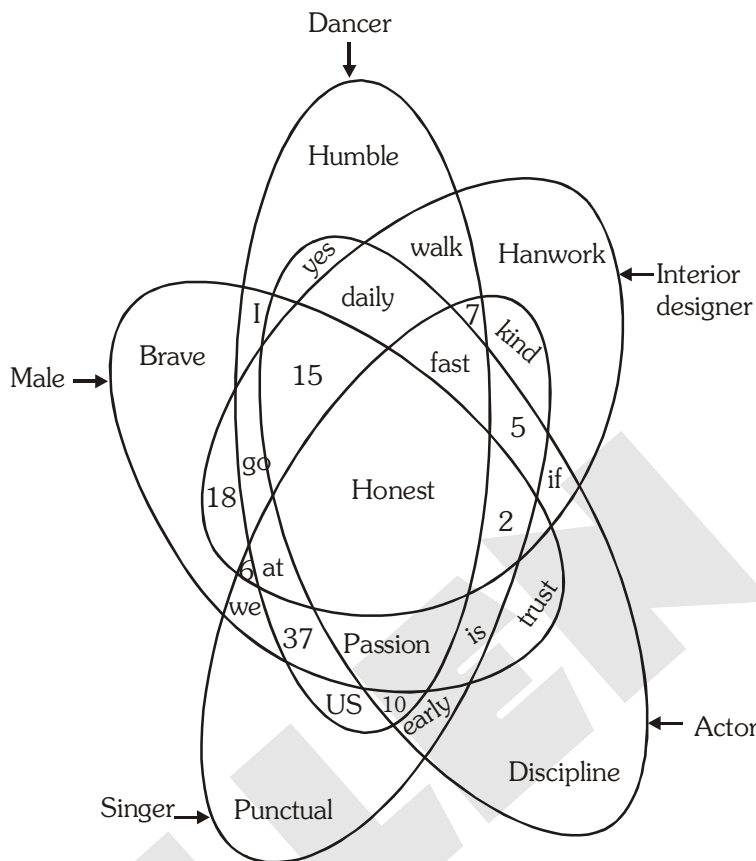
(4) 48, 22

**Ans. (NA)**

**Sol.** By observation

**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

87. Female singer are represented in the figure as:



(1) Past Punctual Early us 5 kind to 7

(3) 7 Fast Kind 5 trust early us to 2 is

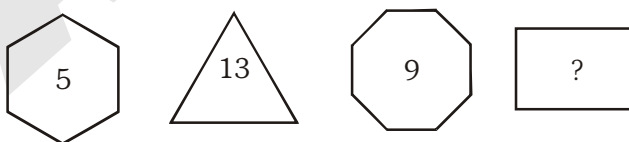
(2) Punctual Early is 2 kind 5 fast 7

(4) We 6 at honest punctual fast 37 us to is

**Ans. (1)**

**Sol.** By observation

88. Find the missing value :



(1) 17

(2) 15

(3) 5

(4) 21

**Ans. (2)**

**Sol.** Number of edges in first figure is 6 and given number in middle in 5 i.e. 56 (multiple of 7)

Number of edges in second figure is 3 and given number in middle is 13 i.e. 133 (multiple of 7).

Similarly, 98 in third fig. (multiple of 7).

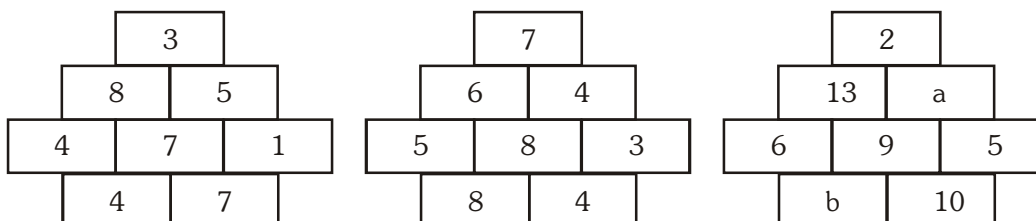
Hence, following similar pattern in last fig.

Figure, we get 154 (multiple of 7).



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

89. Find the values of 'a' and 'b'?



(1) 3, 12

(2) 3, 3

(3) 12, 3

(4) 7, 9

**Ans. (2)**

**Sol.** Fig. 1 :  $4 + 8 + 3 + 4 + 7 + 5 + 7 + 1 = 39$

Fig 2 :  $5 + 6 + 7 + 8 + 8 + 4 + 4 + 3 = 45$

Fig. 3 :  $6 + 13 + 2 + a + 9 + b + 5 + 10 = 45 + a + b$

$39 + 6 = 45$

Similarly,  $45 + 6 = 51$

$\therefore 45 + a + b = 51$

$a + b = 51 - 45 = 6$

Hence,  $a = 3$  and  $b = 3$ .

i.e. option (2) is correct.

90. If under some rule 4231 is transformed to 3087 and 6243 is transformed to 4086. Then to which number 7614 will be transformed to?

(1) 3085

(2) 3088

(3) 6174

(4) 7164

**Ans. (3)**

**Sol.** Transformed numbers some is 18 and from option 3 and 4 are possible but in transformed number ends digits sum and middle digits sum difference is 2. And it is given in only option (3).

91. If  $2833 \rightarrow 213281$  and  $14122 \rightarrow 122241$ , then  $3858 \rightarrow ?$

(1) 305080

(2) 315182

(3) 325283

(4) 335588

**Ans. (2)**

**Sol.** Write the numbers in increasing order then write how many times they are present in the number.

Like in  $2833 = 2$  one time,  $3$  two time,  $8$  one time

$14122 = 1$  two time,  $2$  two time,  $4$  one time

Now  $3858 = 3$  one time,  $5$  one time,  $8$  two time

92. In how many ways a square can be cut into congruent parts (by a single straight cut)?

(1) 2

(2) 4

(3) 6

(4) infinitely many

**Ans. (4)**

**Sol.** Infinite times a square can be cut into two congruent parts.



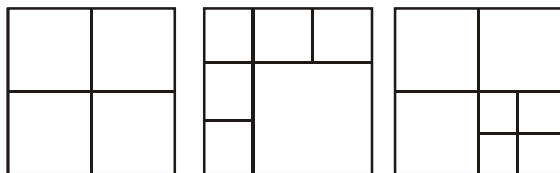
**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**93.** It is impossible to divide a square into (may nt be congruent) n squares, if n = ?

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

**Ans. (2)**

**Sol.**



Option (1)

Option (3)

Option (4)

Hence, it is impossible to divide a square into 5 squares.

**94.** A is a number of the type 1223334444..... What will be the 198th digit from left?

- (1) 1                                      (2) 5                                      (3) 6                                      (4) 8

**Ans. (1)**

**Sol.**

- 1 → 1 times
- 2 → 2 times
- 3 → 3 times
- 4 → 4 times
- 5 → 5 times
- 6 → 6 times
- 7 → 7 times
- 8 → 8 times
- 9 → 9 times

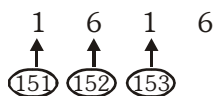
45th digit

Now similarly we need 153<sup>rd</sup> digit after 45<sup>th</sup> digit to get 198<sup>th</sup> digit.

- 10 → 10 times → 20 digit
- 11 → 11 times → 22 digit
- 12 → 12 times → 24 digit
- 13 → 13 times → 26 digit
- 14 → 14 times → 28 digit
- 15 → 15 times → 30 digit

150th digit

Therefore 153<sup>rd</sup> digit after 15 is



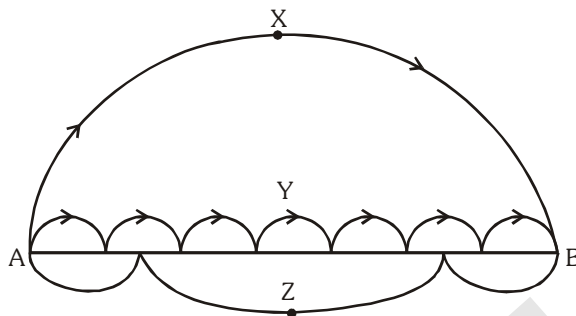
Therefore 198<sup>th</sup> digit is 1.



**SOLUTIONS**

**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2  
MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

95. There are three paths from A to B each consists of one or more semi-circles of unknown radii. The path AXB, AYB, AZB are called I, II and III respectively. Which of the following is true?



- (1) The longest path is I. (2) The longest path is II.  
(3) The smallest path is III. (4) Path III is mean of the path I and II (as per the distance).

**Ans. (4)**

**Sol.** Let radius be 'x' of smaller semicircle in route AYB

Therefore Now in route A x B

$$\frac{2\pi(14x)}{2} = 7\pi x.$$

In route AYB.

$$\frac{2\pi(x)}{2} \times 7 = 7\pi x$$

In route A Z B

$$\left[ \frac{2\pi\left(\frac{3x}{2}\right)}{2} \right] \times 2 + \frac{2\pi\left(\frac{8x}{2}\right)}{2} = 3\pi x + 4\pi x = 7\pi x$$

Hence, Path III is mean of the path I and II (as per the distance).

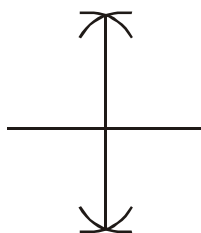


**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**96.** You have got a compass and straight-edge (un-marked ruler). Each time you use compass (to draw an arc) you have to pay ₹20 and for using ruler (to draw line) you have to pay ₹1. If you have got ₹1000 to spend (on these) what is the maximum number of pairs to perpendicular lines you can construct?

- (1) 12                                      (2) 24                                      (3) 489                                      (4) 491

**Ans. (1)**



**Sol.**

Total 4 curve =  $4 \times 20 = 80$

$$2 \text{ lines} = 1 \times 2 = \frac{2}{82}$$

Maxi. pair of perpendicular lines

$$= \frac{1000}{82} = 12.19$$

$$= 12$$

**97.** If  $6 \rightarrow 4$ ,  $12 \rightarrow 6$ ,  $18 \rightarrow 6$ ,  $24 \rightarrow 8$ ,  $30 \rightarrow 8$  and  $36 \rightarrow 9$ , then  $42 \rightarrow ?$

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

**Ans. (3)**

**Sol.** Number of factors

$6 \rightarrow 1, 2, 3, 6 = 4$  factors

$12 \rightarrow 1, 2, 3, 4, 6, 12 = 6$  factors

$18 \rightarrow 1, 2, 3, 6, 9, 18 = 6$  factors

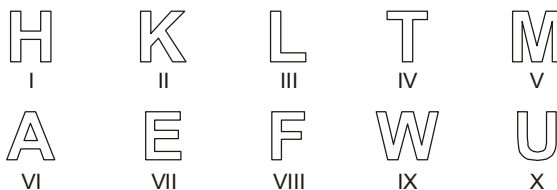
$24 \rightarrow 1, 2, 3, 4, 6, 8, 12, 24 = 8$  factors

$30 \rightarrow 1, 2, 3, 5, 6, 10, 15, 30 = 8$  factors

$36 \rightarrow 1, 2, 3, 4, 6, 9, 12, 18, 36 = 9$  factors

$42 \rightarrow 1, 2, 3, 6, 7, 14, 21, 42 = 8$  factors

**98.** Find the odd man out :



- (1) VI and VII                                      (2) VI and X but not VII                                      (3) VI only                                      (4) V

**Ans. (2)**

**Sol.** A, E and U are vowels where. A and U have same mirror image i.e. VI and X but not VII.



**SOLUTIONS**  
**NATIONAL TALENT SEARCH EXAMINATION 2021 STAGE-2**  
**MENTAL ABILITY TEST (MAT) (DATE : 24-10-21)**

**99.** What are the next two elements in the sequence?

2, 3, 5, 7, 13, 23, ?, ?

(1) 29 and 31

(2) 43 and 47

(3) 43 and 83

(4) 79 and 83

**Ans. (3)**

**Sol.** To get the next term which is a prime, we have to 1 or 3 from the twice of previous term.

**100.** If  $13 \rightarrow 5$ ,  $17 \rightarrow 5$ ,  $29 \rightarrow 7$ ,  $41 \rightarrow 11$  then  $73 \rightarrow ?$

(1) 11

(2) 13

(3) 15

(4) 17

**Ans. (4)**

**Sol.** Using the previous series {2,3,5,7,13....}

13,5 have 2 prime between them

similarly 17,5 have 3 prime between them

similarly 29,7 have 5 prime between them

similarly 41,11 have 7 prime between them

so 73 & x should have 13 prime between them

so  $x = 17$