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NATIONAL TALENT SEARCH EXAMINATION - 2016 (NTSE - STAGE- II)

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

MENTAL APTITUDE TEST (MAT)

General Instructions :
1. The question paper contains 50 questions. Each carries one mark.
2. There will be negative marking. For each wrong answer 1/3 marks will be deducted. No marks will be deducted for unattempted questions.

Q.1 Complete the series :
D3Y104, G9U91, J27Q78, M81M65
(1) P243139 (2) Q243152 (3) P243152 (4) Q162J39

Sol. **(3)**

D	3	Y	104
+3 ↓	↓ 3^2	↓ –4	↓ –13
G	9	U	91
+3 ↓	↓ 3^3	↓ –4	↓ –13
J	27	Q	78
+3 ↓	↓ 3^4	↓ –4	↓ –13
M	81	M	65
+3 ↓	↓ 3^5	↓ –4	↓ –13
P	243	I	52

Q.2 Which of the following can replace the question mark?'

0.8	0.512
0.04	?

(1) 0.0064 (2) 0.0016 (3) 0.000064 (4) 0.000016

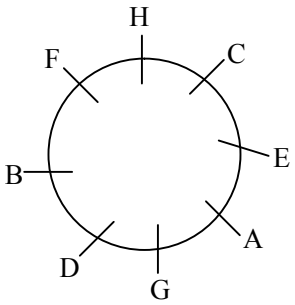
Sol. **(3)**

0.8	$(.8)^3 = .512$
0.04	$(.04)^3 = .000064$

Direction : (Q.3 to Q.5) There are eight people A, B, C, D, E, F, G and H sitting around a circular table facing centre. B is sitting second to the left of G who is sitting third to the right of F. Only E is sitting between A and C. C is sitting third to the left of B. Only one person is sitting between E and H.

Q.3 Which of the following is correct?
(1) D is sitting third to the left of H (2) F is sitting third to the left of G
(3) C is sitting to the left of D (4) H is sitting second to the right of C

Sol. **(2)**



Q.4 Based on the given information, which of the following is the correct position?

(1) A and C are sitting next to each other (2) F and G are sitting next to each other

(3) H and F are sitting third next to each other (4) D is sitting next to H

Sol. **(3)**

Q.5 Which of the following is the correct order of sitting of persons right of A?

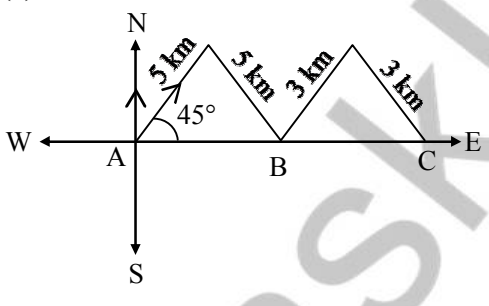
(1) E C H D G B F (2) E C H F B D G (3) E B H D C F G (4) C H B E D G F

Sol. **(2)**

Q.6 Amita is standing at Point A facing north direction. She walks for 5 kilometers In the north-east direction. Then she turns at an angle of 90° at her right and once again travels the same distance. She reaches at Point B. Now she takes a turn at 90° to her left and walks for 3 kilometres and once again takes right turn at 90° and travels 3 kilometres and reaches at Point C. What is the direction of Point B and C respectively with respect to point A?

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

Sol. **(1)**



Q.7 In the question given below, there are three statements followed by three conclusions numbered I, II and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions, and then decide which of the given conclusion(s) logically follows from the given statements disregarding commonly known facts.

Statements : All teachers are professors
No professor is male
Some males are designers

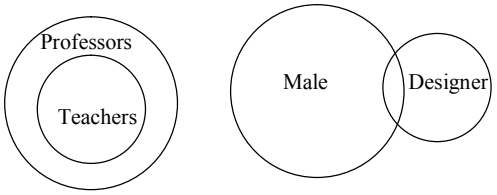
Conclusion : I No designer is professor
II Some designers are professors
III No male is teacher

(1) Only III follows (2) Both I and II follows

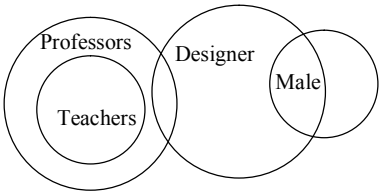
(3) Either I or II follows (4) Either I and III follows; or II and III follows

Sol. **(4)**

Case I :

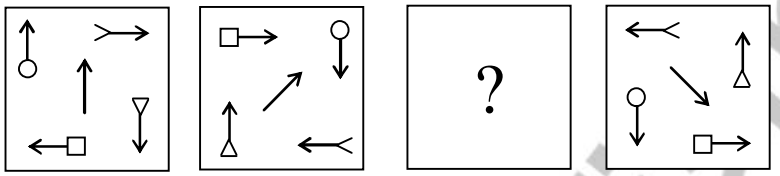


Case II :

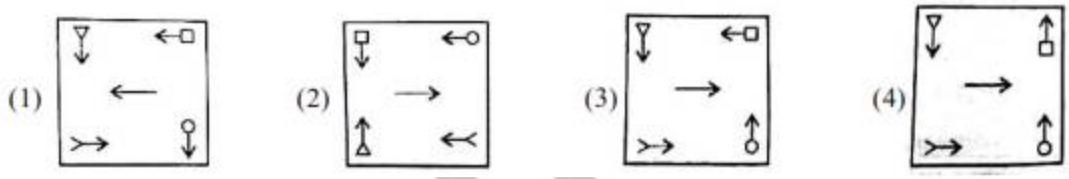


Clearly in both case Conclusion III is follow and either I follows or II follows.

Q.8 In the following questions, there are four figures A, B, C and D called problem figures. A and b are related in the same way as C and D are related. Which figure out of four given options will come in place of figure C?

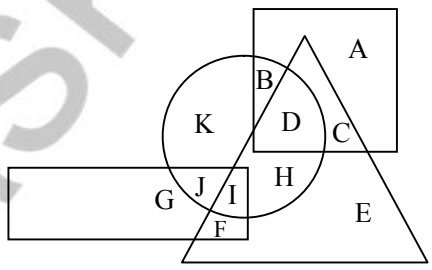


(A) (B) (C) (D)



Sol. **(3)**

Q.9 In the following figure, square represents professors, circle represents males, triangle represents cricketers and rectangle represents trainers.



On the basis of information given in the above diagram, which of the following is correct?

(1) C represent male professors who are cricketers (2) I represents male trainers who play cricket

(3) B represent males professors who are trainers (4) F represents male trainers who are not cricketers

Sol. **(2)**

(1) C is representing professors only, not necessary that they are male, therefore (1) is not an ans.

(2) I is representing trainers, and they are lying in a circle also which represent male, ∴ I represents male trainers, ∵ , they also comes in a category who plays cricket . ∴ , I represents male trainers who play cricket.

(3) B doesn't lie in a category of trainers therefore, it is not an ans.

(4) F doesn't lie in a category of male's therefore it is not our ans.

Direction : (Q.10 to Q.12) Five periods of Hindi. English, Science. Mathematics and Sanskrit are to be taken by five different teachers A, B, C, D and E in five different periods. 1, 2, 3, 4, and 5. Each teacher will teach only one subject and takes only one period.

Science is not the 3rd period 5th period is taken by D who doest not teach Hindi or Sanskrit A takes 3rd period. The one who teaches Sanskrit takes 4th period. There are two periods after and two periods before Mathematics period. Hindi period is between Science and Mathematics period. B teachers Science. E takes period just before D's period.

After reading the above information, answer the following questions.

Q.10 Who teaches Hindi and in which period?

(1) C teaches Hind in 2nd period (2) E teaches Hindi in 1st period

(3) C teaches Hindi in 4th period (4) Data is inadequate

Sol. **(1)**

B → 1 (Science)

C → 2 (Hindi)

A → 3 (Mathematics)

E → 4 (Sanskrit)

D → 5 (English)

└→ (Hindi or Sanskrit)

Q.11 Which of the following is the correct sequence of subject-period-teacher ?

(1) Mathematics-3-D (2) Sanskrit-4-E (3) Mathematics-2-A (4) Hindi-2-E

Sol. **(2)**

Q.12 The subject taught by teachers A, B, C, D and E respectively are

(1) Mathematics, Science, Hindi, Sanskrit, English

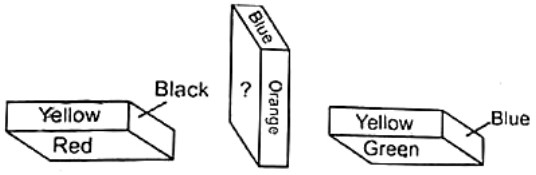
(2) Mathematics, Science, English, Hindi, Sanskrit

(3) Mathematics, Hindi, English, Sanskrit, Science

(4) Mathematics, Science, Hindi, English, Sanskrit

Sol. **(4)**

Q.13 A cuboid is painted in 6 colours, i.e. red, green, blue, yellow, orange and black, one colour on each side. Three position are shown below :

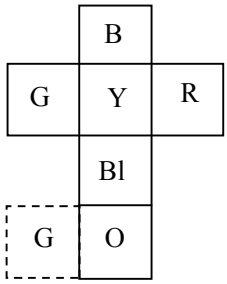


What is the colour of the side having question mark?

(1) Red (2) Yellow (3) Green (4) Blue

Sol. **(3)**

From 1st and 3rd diagram :



Q.14 If × stands for +, ÷ stands for –, + stands for ÷ and – stands for ×, then what is the value of the following expression?

÷ 33 × 11 ÷ 9 × 28 + 4 – 5

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

Sol. **(3)**

– 33 + 11 – 9 + (28 ÷ 4) × 5

= – 33 + 11 – 9 + 7 × 5

= – 33 + 11 – 9 + 35 = – 42 + 46 $\Rightarrow$ = 4

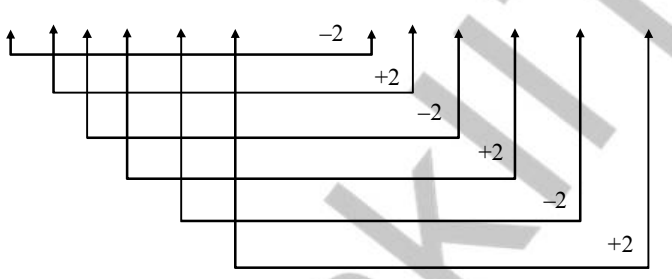
Q.15 If REASON is coded as PGYUMP, then DIRECT will be coded as?

(1) BKPGAV (2) FKTGEV (3) FGTCER (4) BGPCAR

Sol. **(1)**

REASON $\rightarrow$ PGYUMP

18 5 1 19 15 14 $\longrightarrow$ 16 7 25 21 13 16



$\Rightarrow$	D	I	R	E	C	T
	4	9	18	5	3	20
	– 2	+ 2	– 2	+ 2	– 2	+ 2
	2	11	16	7	1	22
	$\Downarrow$	$\Downarrow$	$\Downarrow$	$\Downarrow$	$\Downarrow$	$\Downarrow$
	B	K	P	G	A	V

Q.16 Read the information carefully and answer the following question:

A family has husband, wife and three children A, B and C. The present age of husband is 5 years more than the wife's present age. Wife's present age is twice the present age of A. The present age of A is 12 years more than the present age of B. B's present age is $1\frac{1}{2}$ time the present age of C. If C is 12 years old at present, what is the present age of husband's friend Ram who is 15 years younger than husband (him)?

(1) 30 years (2) 50 years (3) 60 years (4) 80 years

Sol. **(2)**

Given C's age = 12 yrs

$\Rightarrow$ B's age = $\frac{3}{2} \times 12 = 18$ yrs.

We know, A is 12 years older than B

$\Rightarrow$ A's age = 18 + 12 = 30 yrs

$\Rightarrow$ Mother's age = 2(30) = 60 yrs.

$\Rightarrow$ Husband's age = 60 + 5 = 65 yrs

$\Rightarrow$ Ram's age who is 15 yrs younger than him = (65 – 15) yrs = 50 yrs

Direction : (Q.17 to Q.18) Pritam, Zeba, Joy and Anu were assigned duties in the English language alphabetical order of their names. Only one of them is assigned a duty on a day. This assignment is repeated in the same sequence. Working week starts from Monday and ends of Friday. Answer the following:

Q.17 Who worked for least number of days and for how many days if the duties are assigned for 3 weeks?

(1) Anu, 3 days (2) Anu, 4 days (3) Zeba, 3 days (4) Zeba, 4 days

Sol. **(3)**

Alphabetical order :

Anu (A), Joy(J), Pritam (P), Zeba (Z)

Working days are :	M	T	W	Th	F
For 3 weeks :	A	J	P	Z	A
	J	P	Z	A	J
	P	Z	A	J	P

Only Zeba work for 3 days.

Q.18 Who were assigned duties on Wednesday in 1st, 2nd and 3rd weeks respectively?

(1) Pritam,. Zeba, Anu (2) Pritam, Anu, Zeba (3) Pritam, Joy, Anu (4) Joy, Zeba, Anu

Sol. **(1)**

Clearly, its Pritam who workded on 1st Wednesday then its Zeba and after her Anu.

Q.19 In a showroom, 60 per cent discount is given to everybody on all the articles. The successive discount of 40 per cent is offered to female students. If printed price of an article of Rs 1000/- is bought by a female student, how much she will have to pay for that article?

(1) Inconclusive (2) Zero (3) Rs 160/- (4) Rs 240/-

Sol. **(4)**

Printed Price = Rs 1000/-

After discount of 60% , price will be :

$$\text{Rs}\left(1000 - 1000 \times \frac{60}{100}\right) = \text{Rs } 400/-$$

Now, after this their is discount of 40% also :

$\therefore$ the price will be:

$$\text{Rs}\left(400 - 400 \times \frac{40}{100}\right) = \text{Rs } 240/-$$

Q.20 From among the four alternatives given below, which number replaces the question mark?

4	5	= 13
2	5	

6	4	= 15
7	2	

9	3	= 18
4	5	

8	3	= ?
4	6	

(1) 11 (2) 14 (3) 16 (4)17

Sol. **(2)**

4	5	= 13 $\Rightarrow (4 \times 5) - (2 + 5)$
2	3	

$= 20 - 7 = 13$

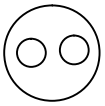
$\Rightarrow$ Multiplying above two and subtracting sum of 2 number lying in lower row.

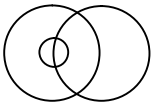
6	4	= 15 $\Rightarrow (6 \times 4) - (7 + 2) = 15$
7	2	

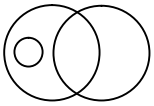
9	3	= 18 $\Rightarrow (9 \times 3) - (4 + 5) \Rightarrow 27 - 9 = 18$
4	5	

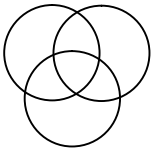
8	3	= ? $\Rightarrow (8 \times 3) - (4 + 6) \Rightarrow 24 - 10 = 14$
4	6	

Q.21 Which of the following diagrams indicates the best relation among men, father and teachers?

(1) 

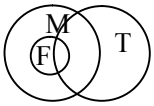
(2) 

(3) 

(4) 

Sol. **(2)**

Cleary, all fathers are men and some of them can be teacher's also, Therefore, it will be like this :



Q.22 Guitar : Music : : Book : ?

(1) Pages (2) Writer (3) Publisher (4) Knowledge

Sol. **(4)**

Q.23 Reena, Rita and Zoha are three friends. Reena is the eldest followed by Rita and Zoha. Reena is 2 years elder to Rita and 5 years elder to Zoha. The sum of the present age of Reena and Zoha is 3 times the age of Rita 5 years ago. What is the current age of Rita?

(1) 12 years (2) 14 years (3) 16 years (4) 18 yeras

Sol. **(2)**

Reena > Rita > Zoha

and Reena = Reeta + 2 = Zoha + 5 ... (i)

Also Reena + Zoha = 3(Rita – 5)

by equation (i)

(Rita + 2) + (Rita – 3) = 3(Rita – 5)

2Rita – 1 = 3Rita – 15 $\Rightarrow$ Rita = 14 years

Direction (Q.24 to Q.26) : Lata was cutting a cuboid –shaped cake at her birthday party which has 12 inches length, 8 inches breadth and 2 inches height.

Two faces measuring 8 inches length × 2 inches are coated with chocolate cream.

Two faces measuring 12 inches × 2 inches are coated with vanilla cream.

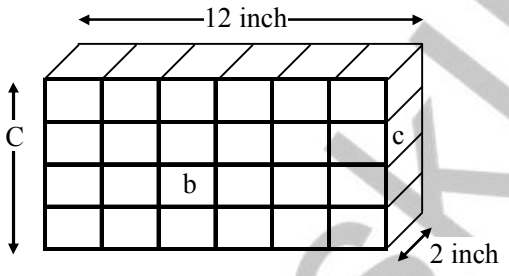
Two faces measuring 12 inches × 8 inches are coated with butter scotch cream.

The cake is cut into 24 cubes of size, 2 inches each side.

Q.24 How many cake pieces are there which have only two types of coatings of cream (any two out of chocolate, vanilla and butter scotch)?

(1) 4 (2) 8 (3) 12 (4) 16

Sol. **(3)**



Pieces which have only two types of coatings are at edges, so

no. of pieces = 2[(4 – 2) + (6 – 2)]

= 2[2 + 4]

= 12

Q.25 How many cake pieces will have only one type of coating of cream?

(1)s 4 (2) 8 (3) 12 (4) 20

Sol. **(2)**

Pieces which have only one type of coating are at top surface of cake, so

no. of pieces = [(6 – 2) × (4 – 2)]

= 4 × 2 = 8

Q.26 Kasim, Rajni, Pema and Gurpreet loved the chocolate cream and they decided to take all pieces with chocolate coating for them. How many cake pieces will be available for others?

(1) 8 (2) 12 (3) 16 (4) 20

Sol. **(3)**

As there are only 8 pieces of cake having chocolate cream and total pieces are 24

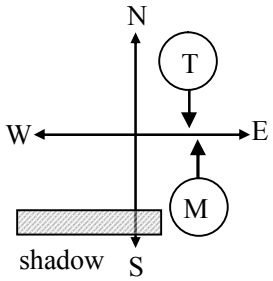
$\therefore$ Remaining pieces = $24 - 8 = 16$

Q.27 During her morning walk in the park, Tanya saw Monica coming from the opposite direction. They greeted each other and had a face-to-face chatting. If Monica's shadow was to the right of Tanya, then which direction was Monica facing?

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

Sol. **(1)**

In morning Su is in the East so Monika's face will be in North,



Q.28 Given below is a question and two statements I and II. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements carefully and give the answer.

Question : A, B, C, D and E are sitting in a row, not in that order. A is sitting next to E. Is E sitting between A and C?

Statements :

I. B and D are sitting at the two ends of the row.

II. C is not sitting next to A.

(1) I along is sufficient (2) II alone is sufficient

(3) Both I and II together are sufficient (4) Both I and II together are not sufficient

Sol. **(3)**

Clearly – Both the statements are sufficien. So answer is 3

Q.29 A person need to find the fastest two horses from 16 horses. Only a race of 4 horses can be conducted at a time. What is the minimum number of races to be conducted to determine the fastest two? Assume that horses will not get tired at all, and time cannot be measured.

(1) 6 (2) 7 (3) 8 (4) 15

Sol. **(1)**

First we conduct 4 Races of 4 sets of horses taking 4 horses in each set.

Let F_1, F_2, F_3 and F_4 and S_1, S_2, S_3 and S_4 are first 4 and second 4 horses respectively.

Then 5^{th} Race will be conducted with all top 4 (F_1, F_2, F_3, F_4). So we will get 2 top rankers. For ex. Take F_1 and F_2.

So the final 6^{th} race will be conducted with F_1, F_2 and second rankers of their groups means S_1, S_2. So total races conducted are 6.

Q.30 Which letter replaces the question mark?

b c e g k ? q s

(1) l (2) m (3) n (4) o

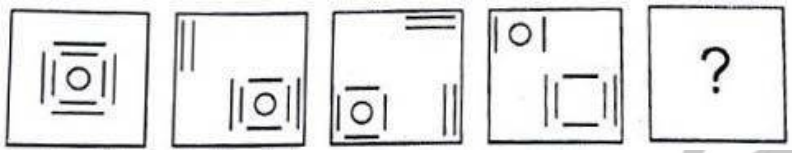
Sol. **(2)**

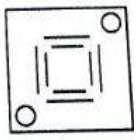
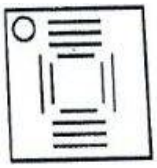
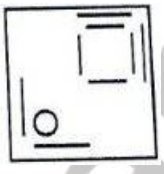
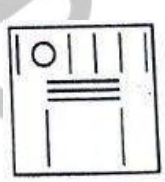
b , c , e , g , k , ? , q , s

2 , 3 , 5 , 7 , 11 , 13 , 17 , 19

All consecutive prime numbers so alphabet correspond to 13 is m.

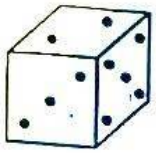
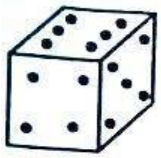
Q.31 From among the four alternative given below, which figure replaces the question mark?



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

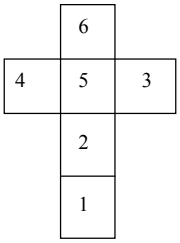
Sol. **(3)**

Q.32 How many points will be on the face opposite to the face which contains 2 points.

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

Sol. **(4)**



Points opposite to 2 is 6.

Q.33 Identify the missing number in the following sequence

2, 10, 30, 68, _____,

(1) 120 (2) 130 (3) 134 (4) 150

Sol. **(2)**

2, 10, 30, 68, _____, 222

$2' = 1^3 + 1$

$10 = 2^3 + 2$

$30 = 3^3 + 3$

$64 = 4^3 + 4$

$130 = 5^3 + 5$

$222 = 6^3 + 6$

Q.34 A + B means A is the daughter of B, A × B means A is the son of B and A – B means A is the wife of B. If T–S × B – M, which of the following is **NOT** true?

(1) M is the husband of B (2) B is the mother of S

(3) S is the daughter of B (4) T is the wife of S

Sol. **(3)**

T – S × B – M

B is wife of M

T is wife of S

S is son of B

From these not true statement is S is the daughter of B

Q.35 In the question below, there are three statements followed by four conclusions numbered I, II, III and IV. You have to consider every given statements as true, even if it does not conform to the well-known facts. Read all the conclusions and then decide which of the conclusions can be logically derived from the given statement.

Statements :

All frogs are snakes

Some snakes are birds

All birds are apples

Conclusions :

I Some apples are frog

II No apple is a frog

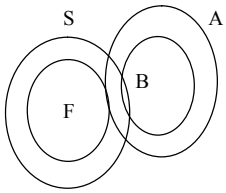
III Some snakes are apples

IV All birds are snakes

(1) Either I or II ; and III follows (2) III and IV follows

(3) Either I or II follows (4) Either I or II; and either III or IV follows

Sol. **(1)** Either I or II ; and III follows



Q.36 In the following sequence, one number is wrong. Find the wrong number.

9, 23, 51, 106, 219, 643

(1) 23 (2) 51 (3) 106 (4) 219

Sol. **(3)**

9, 23, 51, 106, 219, 643

14 28 55 113 424

9 + 14 = 23

23 + (2 × 14 =28) = 51

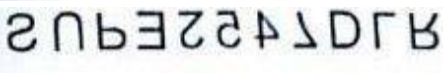
51 + (2 × 28 = 56) = 107

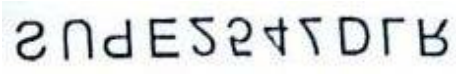
107 + (2 × 56 = 112) = 219

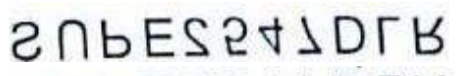
219 + (2 × 112 = 224) = 643

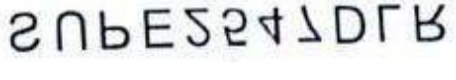
Q.37 Which option shows the correct water image of the characters given below.

SUPE2547DLR

(1) 

(2) 

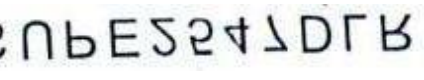
(3) 

(4) 

Sol. **(4)**

What image is upside down

SUPE2547DLR



Q.38 Ronald is elder to Veena while Amilia and Shree are elder to Parul who lies between Ronald and Amilia. If Amilia is elder to Veena, then which one of the following statements is necessarily true?

(1) Ronald is elder to Amilia (2) Amilia is elder to Shree

(3) Parul is elder to Shree (4) Parul is elder to Veena

Sol. **(4)**

Age order

Ronald > Veena

Amilia
Shree $>$ Parul > Ronal > Veena

From this Parul is elder to Veena

Q.39 In the following question, a matrix of certain numbers is given. These numbers follow a certain trend, either row-wise or column-wise. Find this trend and choose the missing number from the given alternatives

1	5	7	75
8	3	4	?
9	7	8	194

(1) 20 (2) 43 (3) 89 (4) 96

Sol. **(3)**

Logic

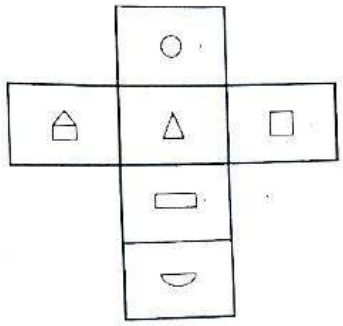
$1^2 + 5^2 + 7^2 = 75$

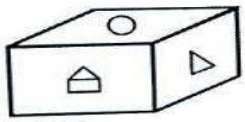
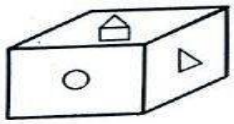
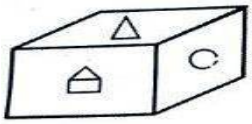
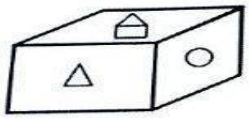
$9^2 + 7^2 + 8^2 = 194$

$8^2 + 3^2 + 4^2 = 64 + 9 + 16$

$= 64 + 25 = 89$

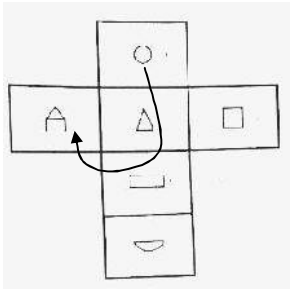
Q.40 The figure given below is the unfolded position of a cubical dice. Select the option figure which is same as the figure, when it is folded.



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

Sol. **(1)**

Using Net



Q.41 A wall clock is placed in a room. It chimes 8 times at 8 o'clock. A person "X" present outside the room listens the 8 beats of chimes in 8 seconds. Assume that each chime of the wall clock takes equal time. To listen 11 chimes at 11 o' clock how much time will be required by person "X"

(1) 11 seconds (2) 11.43 seconds (3) 12 seconds (4) 12.43 seconds

Sol. **(2)**

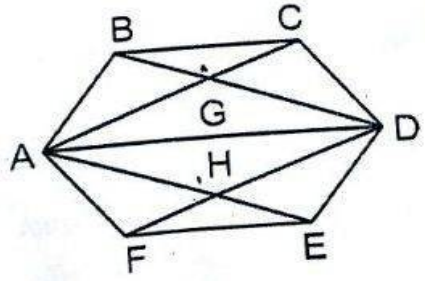
First bell will ring at exact 8 O'clock, in next 8 seconds 7 bells will ring.

$\therefore$ time taken for 1 ring $= \frac{8}{7}$ sec.

$\therefore$ time taken for 10 ring $= \frac{8}{7} \times 10 = 11.43$ sec.

($\because$ 1 bell will ring at exact 11 O'clock)

Q.42 A geometrical design has been drawn below. Find out the total number of quadrilaterals.



(1) 8 (2) 10 (3) 11 (4) 12

Sol. **(3)**

1. ADEF
2. AGHD
3. ABCD
4. ABDH
5. ACDH
6. AFDG
7. AGDE
8. ACDF
9. ABED
10. AFBD
11. ACDE

Direction (Questions 43-45) Study the following information and answer the questions given below it :

Six boy Prem, Kamal, Ramesh, Shyam, Tarun and Umesh go to University Sports Centre and play a different game of football, cricket, tennis, kabaddi, squash and volleyball.

A. Tarun is taller than Prem and Shyam

B. The tallest among them plays kabaddi

C. The shortest one plays volleyball

D. Kamal and Shyam neither play volleyball nor kabaddi

E. Ramesh plays volleyball

F. If all six boys stand in order of their height then Tarun is in between Kamal and Prem ; and Tarun plays football

Q.43 Who among them play kabaddi?

(1) Kamal (2) Ramesh (3) Shyam (4) Umesh

Q.44 Who will be at fourth place if they are arranged in the descending order of their heights?

(1) Prem (2) Kamal (3) Tarun (4) Shyam

Q.45 Who plays tennis?

(1) Kamal (2) Prem (3) Tarun (4) Information insufficient

Sol. 43-45

According to given information

(Tallest) (Shortest)

Kabaddi Football Volley

↓ ↓ ↓

Umesh > Kamal > Tarun > Prem > Shyam > Ramesh

43. **(4)** Umesh

44. **(1)** Prem

45. **(4)** Information inssufficient

Q.46 What comes next in the following sequence of codes?

1218199, 1006480, 814963, 643648 _____

(1) 366478 (2) 1442560 (3) 492535 (4) 253634

Sol. (3)

Given codes

$1218199 \Rightarrow \underset{\downarrow}{121}\ \underset{\downarrow}{81}\ \underset{\downarrow}{99}$

$(11)^2\ \ (9)^2\ \ 11\times9$

$1006480 \Rightarrow \underset{\downarrow}{100}\ \underset{\downarrow}{64}\ \underset{\downarrow}{80}$

$(10)^2\ \ (8)^2\ \ 10\times8$

$814963 \Rightarrow \underset{\downarrow}{81}\ \underset{\downarrow}{49}\ \underset{\downarrow}{63}$

$(9)^2\ \ (7)^2\ \ 9\times7$

$643648 \Rightarrow \underset{\downarrow}{64}\ \underset{\downarrow}{36}\ \underset{\downarrow}{48}$

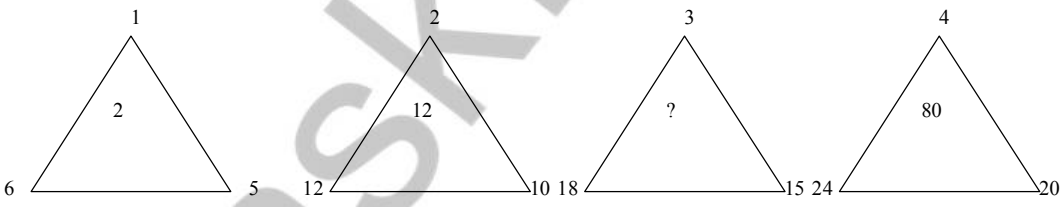
$(8)^2\ \ (6)^2\ \ 8\times6$

Son next code would be

$492535 \Rightarrow \underset{\downarrow}{49}\ \underset{\downarrow}{25}\ \underset{\downarrow}{35}$

$(7)^2\ \ (5)^2\ \ 7\times5$

Q.47 What value replaces the question mark?



(1) 18 (2) 24 (3) 36 (4) 45

Sol. (3)

$(6-5)^3 + (1)^2 \Rightarrow (1)^3 + (1)^2 = 1$

$(12-10)^3 + (2)^2 \Rightarrow (2)^3 + (2)^2 = 8 + 4 = 12$

$(18-15)^3 + (3)^2 \Rightarrow (3)^3 + (2)^2 = 27 + 9 = 36$

$(24-20)^3 + (4)^2 \Rightarrow (4)^3 + (4)^2 = 64 + 16 = 80$

Q. 48 A coding language writes English words in the coded form as :

STAT
RAT
SAY

The code does not appear in the same order of the letters in the English words. On this basis, which of the following will be the code of the word T R A Y?

(1) ε β θ γ (2) β γ δ ε (3) β θ δ ε (4) θ δ γ ε

Sol. **(3)**

S T A R Y

↓ ↓ ↓ ↓ ↓

γ θ δ β ε

So tray $\Rightarrow \theta\ \beta\ \delta\ \varepsilon$ or $\beta\ \theta\ \delta\ \varepsilon$

Q.49 A work is expected to be completed by 20 workers in 25 days. The work is started by 10 workers. Then, after every 5 days, 5 more workers join the work. In how many days the work will be completed?

(1) 20 (2) 25 (3) 30 (4) 35

Sol. **(2)**

Work = Man × days

$\therefore\ 20 \times 25 = 10 \times 5 + (10 + 5) \times 5 + (10 + 5 \times 2) \times 5 + \ldots\ldots\ldots$

$20 \times 25 = 5[10 + (10 + 5) + (10 + 5) \times 2 + \ldots\ldots (10 + 5 + n)]$

$$500 = 5 \times \left(10n + \frac{5(n-1)n}{2}\right)$$

$200 = 20n + 5n\ (n - 1)$

$200 = n(15 + 5n)$

$40 \times 5 = n(15 + 5n)$

$\therefore\ n = 5$

Days $= 5 \times 5 = 25$

Q.50 Find the maximum length of a rod with negligible thickness which can be fitted into a cubical box of 1 meter length of each side.

(1) $\sqrt{2}$ (2) $\sqrt{2.25}$ (3) $\sqrt{3}$ (4) 2

Sol. **(3)**

Cubical box each side length = 1 meter

Means side of cube a = 1 meter

Rod is fixed in the each side so length or Rod = $\sqrt{3}$ a = $\sqrt{3} \times 1 = \sqrt{3}$ metre