SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
MENTAL ABILITY TEST (MAT)

1. Complete the series
D3Y104, G9U91, J27Q78, M8IM65, _____
(1) P243I39 (2) Q243I52 (3) P243I52 (4) Q162J39

Ans. (3)

Sol. D,G,J,M : +3 each
3,9,27,81 : ×3 each
Y,U,Q,M : – 4 each
104,91,78,65 : –13 each
So the correct answer is P243I52

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

0.8	0.512
0.04	?

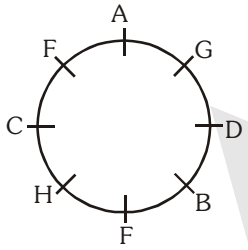
(1) 0.0064 (2) 0.0016 (3) 0.000064 (4) 0.000016

Ans. (3)

Sol. Cube of .8 is .512
Cube of .04 is .000064

Direction (Questions 3 – 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.

Sol.



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 third to the left of D (4) H is sitting second to the right of C

Ans. (2)

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 next to each other (4) D is sitting next to H

Ans. (3)

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

Ans. (2)

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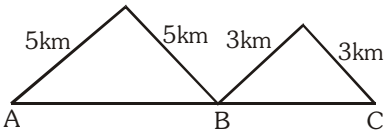
6. Amita is standing at Point A facing north direction. She walks for 5 kilometres in the north-east direction. Then she turns at an angle of 90° at her right and once again travels the same distance. She reaches at Point B. Now she takes a turn at 90° to her left and walks for 3 kilometres and once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

Ans. (1)

Sol.



B and C both are towards East of A.

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.

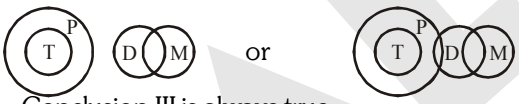
Statements : All teachers are professors
No professor is male
Some males are designers

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

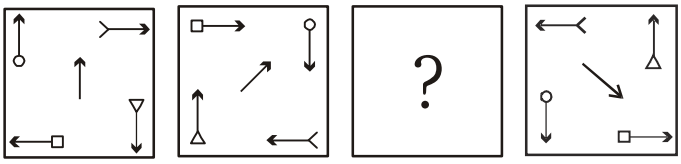
Ans. (4)

Sol.

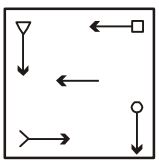
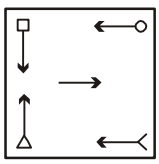
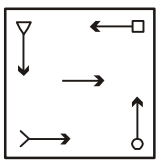
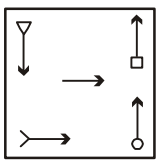


Conclusion III is always true.
Conclusion I or II follows.
Hence, option (4) Says either I and III follows: or Option II or III follows.

8. In the following question, there are four figure 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)

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

SOLUTION

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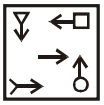
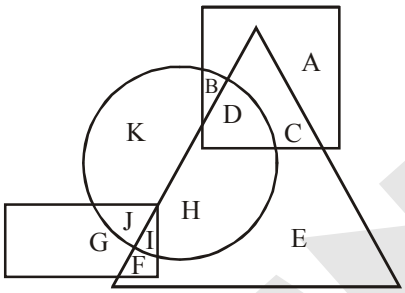
MENTAL ABILITY TEST (MAT)

Ans. Option (4)

Sol. Every arrow is moving one arm and rotating 180°.



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 represents male professors who are cricketers too

(2) I represents male trainers who play cricket

(3) B represents male professors who are trainers

(4) F represents male trainers who are not cricketers

Ans. (2)

Sol. I comes in common area of Circle (males) , Triangle (cricketers) and Rectangle (Trainers).

Direction (Question 10 – 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 does 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.

Sol.

B	C	A	E	D
Science	Hindi	Maths	Sanskrit	English
1	2	3	4	5

10. Who teachers Hindi and in which period?

(1) C teachers Hindi in 2nd period

(2) E teachers Hindi in 1st period

(3) C teachers Hindi in 4th period

(4) Data is inadequate

Ans. (1)

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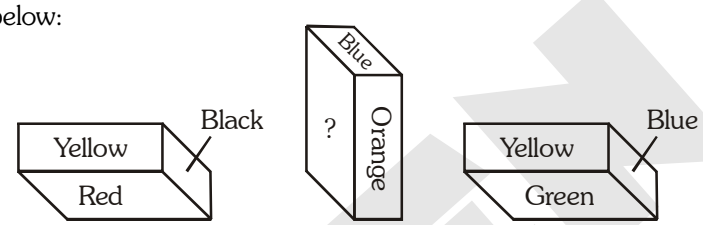
11. Which of the following is the correct sequence of subject-period-teacher?
(1) Mathematics – 3 – D (2) Sanskrit – 4 – E (3) Mathematics – 2 – A (4) Hindi – 2 – E

Ans. (2)

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

Ans. (4)

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

Ans. (3)

14. If $\times$ stants for +, $\div$ stands for –, + stands for $\div$ and – stands for $\times$, then what is the value of the following expression ?

$\div 33 \times 11 \div 9 \times 28 + 4 - 5$
(1) 16 (2) 8 (3) 4 (4) 2

Ans. (3)

Sol. $-33 + 11 - 9 + 28 \div 4 \times 5 = 4$ on solving this equation by BODMAS rule.

15. If REASON is coded as PGYUMP, then DIRECT will be coded as?
(1) BKPGAV (2) FKTGEV (3) FGTCER (4) BGPCAR

Ans. (1)

Sol. Alternatively : –2 and +2 and so on.

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

SOLUTION

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MENTAL ABILITY TEST (MAT)

Ans. (2)

Sol. C= 12 yrs

B= 18 yrs

A = 30 yrs

Wife= 60 yrs

Husband= 65 yrs

Therefore : Ram= 50years

Direction (Questions 17-18): 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 on Friday. Answer the following:

Sol.

Anuj	Joy	Pritam	Zeba
Monday	Tuesday	Wednesday	Thursday
Friday	Monday	Tuesday	Wednesday
Thursday	Friday	Monday	Tuesday
Wednesday	Thursday	Friday	

And the pattern follows.....

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

Ans. (3) Zeba works for 3 days only.

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

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

Ans. (1) Pritam, Zeba, Anu are works on wednesday.

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 a article of ₹ 1000/- is bought by a female student, how much she will have to pay for that article?

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

Ans. (4)

Sol. She will have to pay: 1000(1-0.6)(1-0.4)= 240

SOLUTION

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MENTAL ABILITY TEST (MAT)

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

4	5
2	5

= 13

6	4
7	2

= 15

9	3
4	5

= 18

8	3
4	6

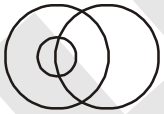
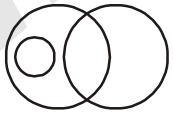
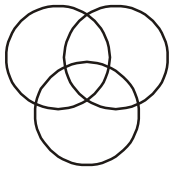
= ?

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

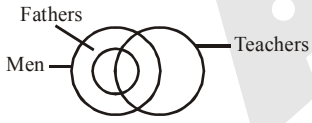
Ans. (2)

Sol. $8 \times 3 - (4 + 6) = 14$

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

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

Ans. (2)

Sol. 

22. Guitar : Music : : Book : ?

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

Ans. (4)

Sol. Guitar : Music :: Book : Knowledge

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 years

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MENTAL ABILITY TEST (MAT)

Ans. (2)

Sol. Let Zohas Age: x

Rita's Age = x+3

Reena's Age = x+5

According to question:

x + 5 + x = 3(x+3-5)

x = 11

Therefore rita's Age = 14 yrs

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

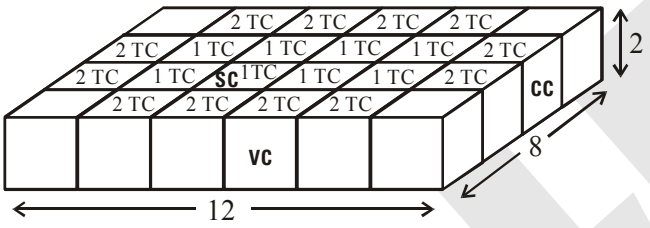
Two faces measuring 8 inches ×2 inches are coated with chocolate cream.

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 sides.

Sol.



2 TC = 2 Types of coating of cream

1 TC = 1 Types of coating of cream

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

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

Ans. (3)

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

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

Ans. (2)

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. 24 – 8 = 16 (Available for others)

Ans. (3)

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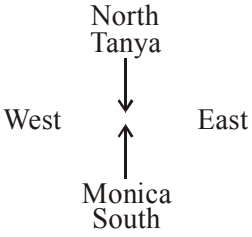
27. During her morning walk in the park, Tanya saw Monica coming from the oposite direction. they greeted each other and had a face-to-face chatting. If Monica's shadow was to the right of Tanya, then which direction was Monica facing?

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

Ans. (1)

Sol.



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 alone is sufficient

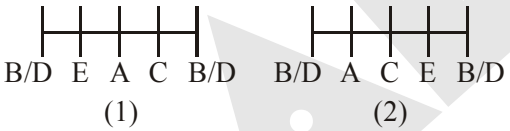
(2) II alone is sufficient

(3) Both I and II together are sufficient

(4) Both I and II together are not sufficient

Ans. (3)

Sol.



With the help of statement I two possiblities (1) and (2) are there

With help of statement II in combination with statement I we have unique solution and E is sitting between A and C.

29. A person needs 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

Ans. (1 or 2)

Sol. **By English language of question (Only a race of 4 horses can be conducted at a time.)**

16 Horses will run in 4 races- we select first 2 of each race(remaining horses 8)

8 Horses will run in 2 races - we select first 2 of each race(remaining horses 4)

4 Horses will run in 1 race - we select first 2 horses

Total number of races required = 7

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By Hindi language of question (Maximum a race of 4 horses can be conducted at a time.)

A_1 B_1 C_1 D_1
A_2 B_2 C_2 D_2
A_3 B_3 C_3 D_3
A_4 B_4 C_4 D_4

Race between

A's , B's , C's , D's group [4 races]

Let Say A_1 , B_1 , C_1 , D_1 are fastest in the group. [1 race]

Let Say A_1 – 1st fastest

$B_1 \rightarrow 2^{nd}$

Then A_3 , A_4 , B_2 , B_3 , B_4

C_2 , C_3 , C_4 , D_2 , D_3 , D_4 Can not be first fast runner.

only possbility for second fast runner be A_2 , B_1 [1 race]

Total races = 4 + 1 + 1 = 6

30. Which letter replaces the question mark?

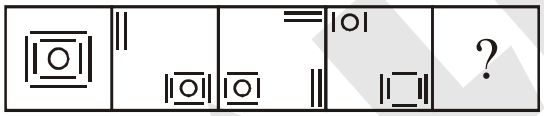
b, c, e, g, k, ?, q, s

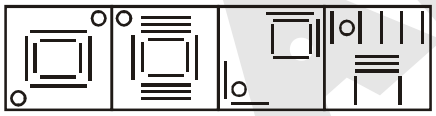
(1) l (2) m (3) n (4) o

Ans. (2)

Sol. Letters are prime position letters, hence answer is m.

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



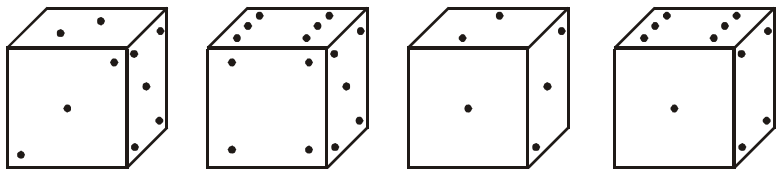


(1) (2) (3) (4)

Ans. (3)

Sol. By observation

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

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Ans. (4)

Sol. By observation 5 is common in dice first and second
By observation from first dice in clockwise direction 5 3 2
By observation from second dice in clockwise direction 5 4 6
so opposite of 2 is 6

33. Identify the missing number in the following sequence
2, 10, 30, 68, ..., 222
(1) 120 (2) 130 (3) 134 (4) 150

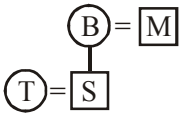
Ans. (2)

Sol. 1^3+1, 2^3+2, 3^3+3, 4^3+4, 5^3+5
Therefore answer is 130

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

Ans. (3)

Sol.



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 statement 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 statements.

Statements :

All frogs are snakes
Some snakes are birds
All birds are apples

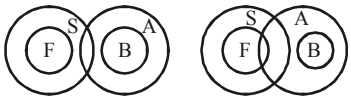
Conclusions :

I Some apples are frogs
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

Ans. (1)

Sol.



Conclusion I or II follows.
Conclusion III is definately true.
Hence, option (1) is true.

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MENTAL ABILITY TEST (MAT)

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

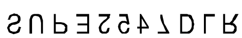
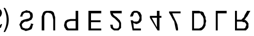
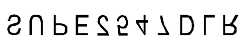
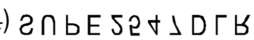
Ans. (3)

Sol. Given series is following ×2 +5 pattern.

Hence, by options, 106 is the wrong term. (3)

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

S U P E 2 5 4 7 D L R

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

Ans. (4)

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

Ans. (4)

Sol. Shree>Amilia>Parul> Ronald>Veena

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

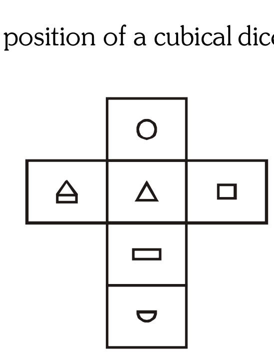
Ans. (3)

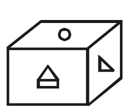
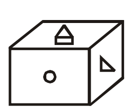
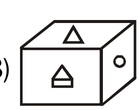
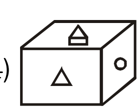
Sol. $1^2 + 5^2 + 7^2 = 75$,

$8^2 + 3^2 + 4^2 = 89$,

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

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) 

SOLUTION

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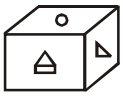
Ans. (1)

Sol. 

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

Ans. (2)

Sol. 8 Beats = 7 intervals,

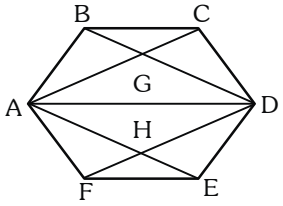
7 Intervals cover in 8 seconds,

1 interval cover in 8/7 seconds,

So, 11 Beats = 10 Intervals are covered in $(8/7) \times 10 = 11.428$ seconds

Approx. 11.43 seconds.

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



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

Ans. (3)

Sol. ABCD, ADEF, AGDH, ABDF, ACDH, AGDF, ABDF, ACDE, ABDH, ABDE, AFCD

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

Six boys 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.

Sol. Umesh > Kamal >Tarun >Prem > Shyam > Ramesh

Umesh $\rightarrow$ Kabaddi

Ramesh $\rightarrow$ Volley ball

Tarun $\rightarrow$ Foot ball

SOLUTION

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43. Who among them plays kabaddi?

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

Ans. (4)

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

Ans. (1)

45. Who plays tennis?

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

Ans. (4)

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

1218199, 1006480, 814963, 643648, _____

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

Ans. (3)

Sol. 121/81/99, 100/64/80, 81/49/63, 64/36/48, 49/25/35

(I) TERMS 121, 100, 81, 64, 49

11^2, 10^2, 9^2, 8^2, 7^2

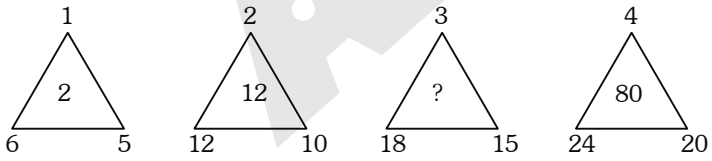
(II) TERMS 81, 64, 49, 36, 25

9^2, 8^2, 7^2, 6^2, 5^2

(III) TERMS 99, 80, 63, 48, 35

$(10^2- 1)$, (9^2-1), (8^2-1), (7^2-1), (6^2-1)

47. What value replaces the question mark?



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

Ans. (3)

Sol. $6 - 5 = 1$, $1^2 + 1^3 = 2$,

$12 - 10 = 2$, $2^2 + 2^3 = 12$,

$24 - 20 = 4$, $4^2 + 4^3 = 80$,

$18 - 15 = 3$, $3^2 + 3^3 = 36$

SOLUTION

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

S T A T θ δ θ γ

R A T δ θ β

S A Y ε γ δ

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

Ans. (3)

Sol. T = θ, R = β, A = δ, Y = ε

49. A work is expected to the 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. The how many days the work will be completed?

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

Ans. (2)

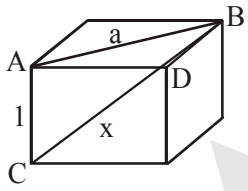
Sol. Total work = $20 \times 25 = 10 \times 5 + 15 \times 5 + 20 \times 5 + 25 \times 5 + 30 \times 5$

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

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

Ans. (3)

Sol.



maximum length of rod which can be fitted in cubical box is Diagonal of cubical box.

$\therefore$ Let the diagonal of cubical box is = x

To find value x, first we have to calculate diagonal length of any face of box.

In ΔABD $a = \sqrt{1^2 + 1^2}$

$a = \sqrt{2}$ m

In ΔABC $a^2 + 1^2 = x^2$ $\therefore x = \sqrt{(\sqrt{2})^2 + (1)^2}$

$x = \sqrt{3}$ m

* * * * *