NATIONAL TALENT SEARCH EXAMINATION (NTSE–2018) STAGE–1 'MAHARASHTRA' STATE

PAPER : MAT

Date: 12/11/2017

Max. Marks: 50 **SOLUTIONS** **Time allowed: 45 mins**

Q.1 – Q.2: Directions – In each of the following questions write which term in sequence replaces the questions mark ?

1. BJ, DL, HP, PX ?

(1) FN (2) FX (3) TB (4) VD

Ans. (1)

Sol. $\overset{+2\ \ +4\ \ +8\ \ +16}{\overbrace{\text{BJ, DL, HP, PX, ?, FN}}}$

$\underbrace{}_{+2\ \ +4\ \ +8\ \ +16}$

2. AYCD, EUGH, IQKL, ?

(1) AYCD (2) BXDE (3) MNAB (4) MZBC

Ans. (4)

Sol. A B C D E F G H I J K L M A B C D

Z Y X W V U T S R Q P O N Z Y X W

Q.3 – Q.5: Directions – Find the odd term

3. (1)141 (2) 101 (3) 107 (4) 131

Ans. (1)

Sol. 141 is the only composite number

4. (1) 6131 (2) 2191 (3) 3312 (4) 3164

Ans. (4)

Sol. Sum of digits is even in 3164. Rest of the options have odd sum.

5. (1) DHLP (2) FNUB (3) BDFH (4) KVGR

Ans. (2)

Sol. Difference between the letters are same, but in FNUB, it does not follow.

6. In the following question a specific group of numbers is given. From the given alternatives, find out of the right number which matches the given group.

341, 572, 781

(1)634 (2) 891 (3) 909 (4) 990

Ans. (2, 4)

Sol. $341 \rightarrow 3+1=4$

$572 \rightarrow 5+2=7$

Similarly, $\left.\begin{matrix} 891 \rightarrow 8+1=9 \\ 990 \rightarrow 9+0=9 \end{matrix}\right]$

7. In a mathematical language if + means $\div$, – means $\times$, $\div$ means + and $\times$ means – are used them,

$(200+5)\div 25\div(20-5)\times 10=?$

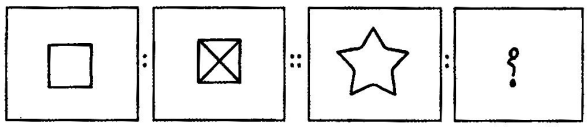
(1) 125 (2) 100 (3) 155 (4) 40

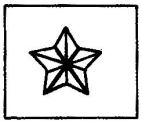
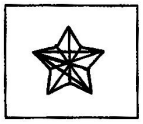
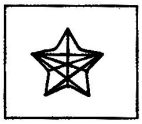
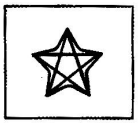
Ans. (3)

Sol. $(200\div 5)+25+(20\times 5)-10$

$40+25+100-10=155$

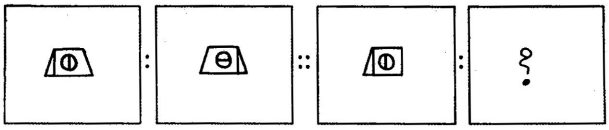
Q.8 – Q.9: Directions – In each of the following question there is a specific relationship between the first and second figure. The same relationship exists between the third and the fourth figure which will replace the question mark. Select the correct term from the given alternatives.

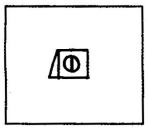
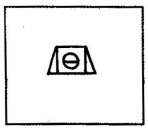
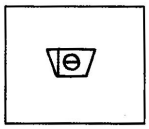
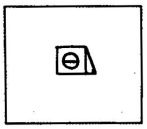
8. 

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

Ans. (1)

Sol. Opposite vertices are met.

9. 

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

Ans. (4)

Sol. Circle is rotated 90° & the mirror image of the outer figure.

10. Six teachers if a workshop have sat down for a photo session as shown below. A is sitting in between K and S. M is at a corner. There is no one sitting in between N and S. Then where is the person 'J' sitting ?

(1) At the central position between K and M

(2) At the central position between N and A

(3) At the central position between S and K.

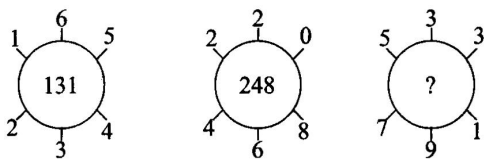
(4) At the central position between M and A.

Ans. (1)

Sol. The arrangement is

M J K A S N

11. Find out the correct number from the given alternatives to replace the question mark.

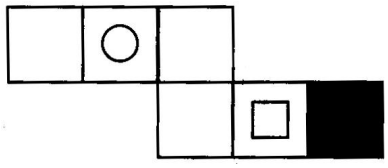


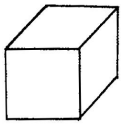
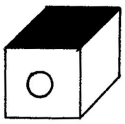
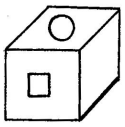
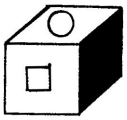
(1) 132 (2) 262 (3) 274 (4) 320

Ans. (2)

Sol. Subtract smaller number from the bigger number just opposite to it.

12. If the figure given along side is folded to construct a cube, find out the correct cubical figure from the given alternative figures.



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

Ans. (2)

Sol. Option (1) can't be as three blank faces can't be adjacent. Two of them are opposite.

Option (2) it is the correct option.

Option (3) & (4) square is opposite to circle & hence these options are incorrect.

13. In a certain code language ZEAL = 11, written then in that language BEAT = ?

(1) 7 (2) 13 (3) 14 (4) 19

Ans. (1)

Sol. ZEAL = 11

Put the values of all the alphanets when they are numbered.

Z = 26, E = 5, A = 1, L = 12, now sum of the numbers of the letters in 44. Now divide it by 4 (the numbers of letters) & we get 11.

Similarly 'BEAT'

B = 2, E = 5, A = 1, T = 20

Sum = 28

$$\frac{28}{4} = 7$$

14. On a playground J, K, L, M, N, O, P, Q, R are sitting in one row to watch a cricket match. L is at the right side of M and is occupying third place from N at the right side. K is sitting either at first or last position. Q is in between O and P. O is sitting at the third position at the left side of K. O is sitting next to 'J' at the right side. Who is sitting at the centre among them ?

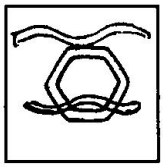
(1) L (2) O (3) J (4) Q

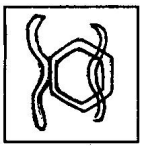
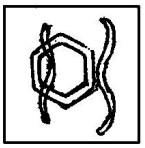
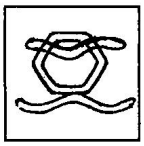
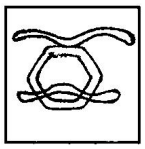
Ans. (3)

Sol. The arrangement is as follow –

N R M L J O Q P K

15. The following figure is rotated in anticlockwise direction and its mirror image is obtained. Select the correct mirror image from four alternative given.



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

Ans. (2)

Sol. Rotating anticlockwise & then placing the mirror vertically to the right, we get option (2).

Q.16 – Q.17: Directions – In a certain code language the word EXPAND has been written in four different code languages. Understanding the code, find out the correct code language for the word given in each of the following questions.

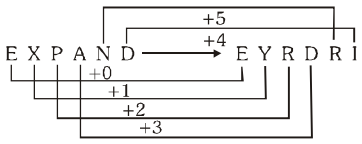
EXPAND =

(1) FYQBOE (2) EYRDRI (3) EPNXAD (4) DWOZMC

16. (1) SOLVE = SPNYI

Ans. (2)

Sol.

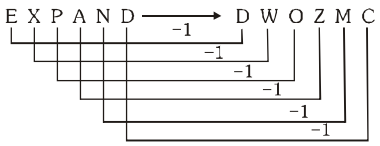


Similarly, SOLVE = SPNYI

17. (2) LARGE = KZQFD

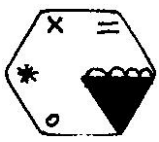
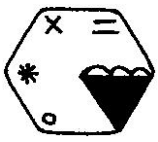
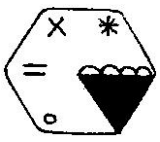
Ans. (4)

Sol.



Similarly, LARGE = KZQED

Q.18 – Q.19: Directions – Find the odd figure and

18. (1) 
(2) 
(3) 
(4) 

Ans. (3)

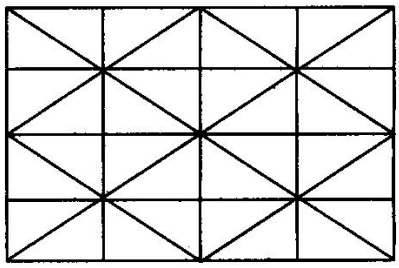
Sol. No. of balls on the shaded cone are three only but in other option they are four.

19. (1) 
(2) 
(3) 
(4) 

Ans. (4)

Sol. In option (1), (2) & (3) the water images are same, but 'm' option (4) its water image does not match with others.

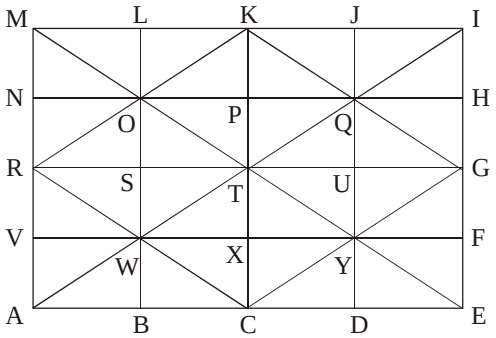
20. Observe the adjoining figure and answer the following question. Choosing the correct alternative.
How many isosceles trapezium are in the figure?



(1) 16 (2) 10 (3) 8 (4) 14

Ans. (3)

Sol.



MOPQI, MOSWA, AWXYE, EYUQI, RWXYG, CYUQK, ROPQG, KOSWC

Q.21–Q.22 : **Directions - Observe the following pyramid of numericals and decide which alternative will be in place of question mark in each of the following question.**

8

9 36 35

10 37 56 55 34

11 38 57 68 67 54 33

12 39 58 69 70 71 66 53 32

13 40 59 60 61 62 63 64 65 52 31

14 41 42 43 44 45 46 47 48 49 50 51 30

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

21. 95761 : 105844 :: ? : 346648

(1) 377149 (2) 353331 (3) 356763 (4) 363840

Ans. (3)

Sol. 95761 – we skip one number in between vertically & then 105844 follows the same.
Similarly 356763 establishes the same relationship with 346648.

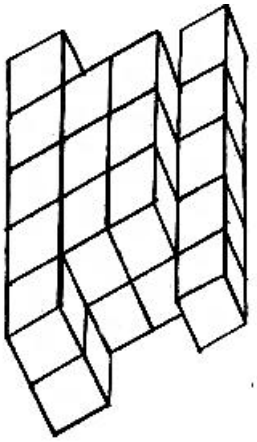
22. 95670 : 70579 :: 356766 : ?

(1) 663435 (2) 677063 (3) 634623 (4) 587061

Ans. (1)

Sol. 95670 & 70579 forms a parallelogram & similarly 356766 & 663435 follow.

Q.23–Q.24 : **Directions - In the following figure the arrange of small blocks is given observe it and answer the following questions**



23. What is the total number of small blocks ?

(1) 17 (2) 24 (3) 27 (4) 30

Ans. (3)

Sol. No. of blocks = 27 ; going from left to right

$2\times5+2\times3+2\times3+1\times5$ = 27

24. Find the total number of blocks whose two surfaces are seen.

(1) 11 (2) 13 (3) 15 (4) 17

Ans. (2)

Sol. Two surfaces seen : Again from left to right '3' middle ones [top & bottom] 3 + 3 = 6. 4 corner blocks in the second left layers. In the third layer, 1 in the middle of the top layer & two corners at the bottom.

$6+4+2+1=13$

Q.25 – Q.26: **Directions - In the following square numbers are written with a specific rule. Find and rule and decide which alternative will be in place of question mark.**

25.

13	61	2
?	5	29
10	122	26

(1) 49 (2) 58 (3) 71 (4) 102

Ans. (2)

Sol. $13=2^2+3^2,\ 61=6^2+5^2,\ 2=1^2+1^2$

$?=,\ 5=2^2+1^2, 29=5^2+2^2$

$10=3^2+1^2, 122=11^2+1^2,\ 26=5^2+1^2$

So, in place of ? we have $7^2+3^2=58$.

26.

–7	1	28
–4	17	8
?	56	73

(1) –1 (2) 12 (3) 41 (4) 63

Ans. (3)

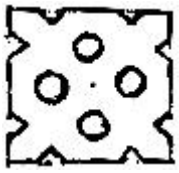
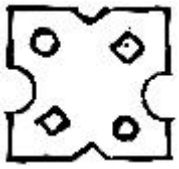
Sol. Every number is of the form $n^2 - 8$

$1^2 - 8 = -7,\ 2^2 - 8 = -4,\ 3^2 - 8 = 1,\ 4^2 - 8 = 8$

$5^2 - 8 = 17,\ 6^2 - 8 = 28,\ 7^2 - 8 = 41,\ 8^2 - 8 = 56$

$9^2 - 8 = 73$

27. A square piece of paper is folded and cut at specific spots as shown in the figure. The paper when unfolded will look like as shown in area of the alternatives. Select the correct alternative.

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

Ans. (1)

Sol. Unfolding it gives option (1)

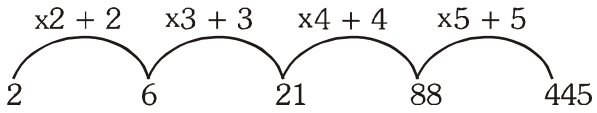
Q.28 – Q.29 : **Directions - In each of the following questions. Write which term in sequence replaces the question mark.**

28. 2, 6, 21, 88, ?

(1) 440 (2) 356 (3) 445 (4) 352

Ans. (3)

Sol.



29. 6, 30, 18, 128, ?

(1) 36 (2) 38 (3) 98 (4) 90

Ans. (2)

Sol. $6 = 2^2 + 2,\ 30 = 3^3 + 3,\ 18 = 4^2 + 2,\ 128 = 5^3 + 3$

similarly $6^2 + 2 = 38$

Q.30 – Q.31 : **Directions - Two charts are given below :**

Containing two groups of letters. In chart one the rows and columns are labelled with 0 to 4 numbers. In chart two rows and columns are labelled with the numbers 5 to 9. The letter in the chart is identified firstly by its row number and then by its column number. For example S is denoted by 22, 41 number.

Chart I

	0	1	2	3	4
0	F	O	M	S	R
1	S	R	F	O	M
2	O	M	S	R	F
3	R	F	O	M	S
4	M	S	R	F	O

Chart II

	5	6	7	8	9
5	A	T	D	I	P
6	I	P	A	T	D
7	T	D	I	P	A
8	P	A	T	D	I
9	D	I	P	A	T

30. Which group of words represent the word MOST ?

(1) 40, 44, 22, 89 (2) 33,20, 11, 79

(3) 21,00,03,88 (4) 02,13,34,56

Ans. (4)

Sol. MOST = 02, 13, 34, 56

Clearly, matching with chart I & chart II. Starting with '0' we move row wise & then from 2 going down, it intersets at M. Similarly we can find others

31. Which group of words represent the word ROAD ?

(1) 42, 32, 79, 58 (2) 23, 32, 98, 99

(3) 11, 13, 67, 69 (4) 04, 20, 55, 78

Ans. (3)

Sol. Same as Q.30

32. A school boy was having Deepavali vacation from 11 October to 28 October 2012. It was Monday on the 10th Day before the start of the vacation. After the vacation, the school excursion was arranged on the 7th day from the reopening of the school on which day was the school excursion arranged.

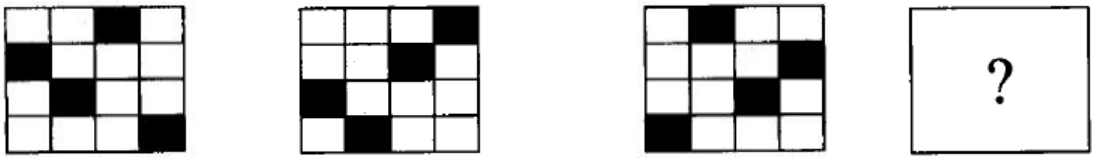
(1) Sunday (2) Friday (3) Thursday (4) Tuesday

Ans. (1)

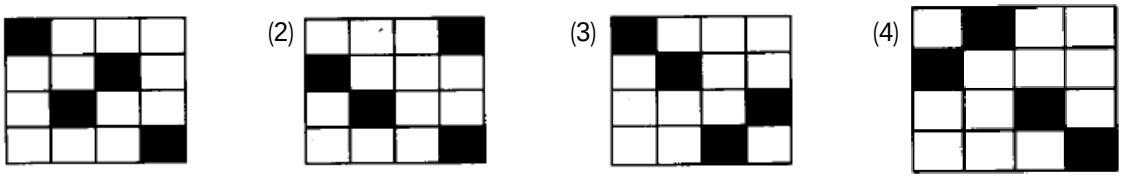
Sol. 10 days before 11 Oct is 1 October. So, 1 Oct is Monday (given). 7th day after reopening i.e. 29 Oct, it is 4th Nov. now from 1st Oct till 4th Nov. we have 34 days so on 4th Nov. it will be Sunday.

Q.33 and 34 : Directions In each of the following, the question figures change in a particular order. Decide which figure from the alternatives will replace the question mark.

33.



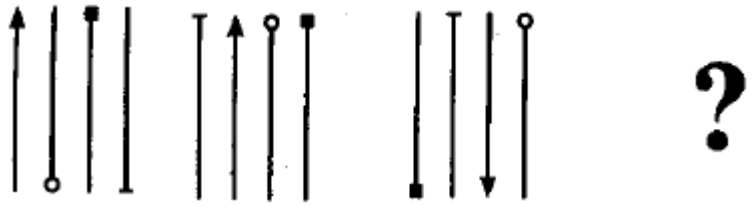
(1) (2) (3) (4)



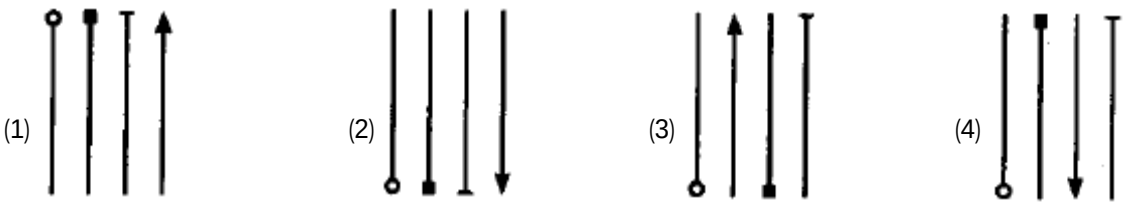
Ans. (3)

Sol. Shaded block goes down & when reaches to the last row, goes to first row of the same column in the next figure.

34.



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



Ans. (2)

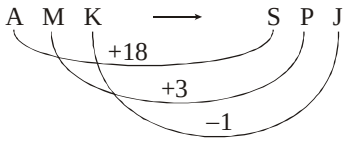
Sol. We observe that last one of the set of '4' lines goes to first & reverses its position & similarly second one also reverses in the next figure.

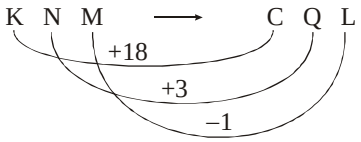
Q.35 and 36 : Directions In each of the following questions there is a specific relationship between the first and second term. The same relationship exists between third and fourth term. Understanding this relationship, Find out the correct alternative to replace the question mark.

35. AMK : SPJ :: KNM : ?

(1) CQN (2) BQL (3) CQL (4) BLQ

Ans. (3)

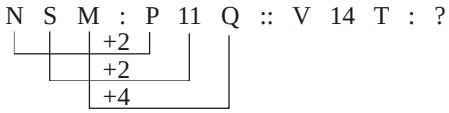
Sol. 

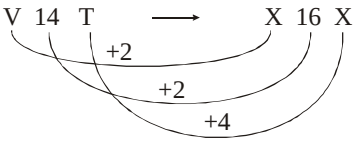


36. N9M : Pl1Q :: V14T ?

(1) X17Z (2) X16W (3) X15Y (4) XI6X

Ans. (4)

Sol. 

Similarly, 

37. Seema went 9 km to west. She turned to right and went 7 km. She turned to left and went 8 km. From there she turned back and went 11 km. The she turned to right and went 7 km.

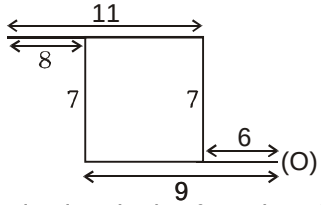
How much distance is she from origin ?

(Seema turns every time in 90° angle)

(1) 9 km (2) 6 km (3) 3 km (4) 7 km

Ans. (2)

Sol. Let 'O' be the origin



Clearly, S is 6km from the origin.

38. A rhythmic arrangement of numbers given. The missing numbers appear in the same order in One of the alternative answer. Find the correct alternative.

0—0100—10—1111— —

(1) 01011 (2) 01101 (3) 01111 (4) 01110

Ans. (3)

Sol. 0001 | 0011 | 0111 | 1111

Taking the group of 4, 'O' decreases & replaced by 1 (one at a time)

Q.39 and 40: Directions— Madhav and Govind play Hockey and Volleyball. Hemant and Madhav play Hockey and Baseball. Ramesh and Govind play Cricket and Volleyball. Hemant, Ramesh and Anant play Football and Baseball. Then, answer the following questions.

39. Who plays Hockey, Cricket and Volleyball?

(1) Madhav (2) Govind (3) Hemant (4) Anant

Ans. (2)

40. Who does not play Baseball? Choose the correct alternative.

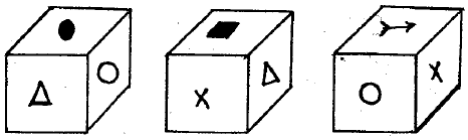
(1) Govind (2) Hemant (3) Madhav (4) Ramesh

Ans. (1)

Sol. 39-40

Player	
Madhav	Hockey, Volleyball, Baseball
Govind	Hockey, Volleyball, Cricket
Hemant	Hockey, Baseball, Football
Ramesh	Cricket, Volleyball, Football, Baseball
Anant	Football, baseball

Q.41–42: Directions In the following figures, three different position of a cube has been shown. Observe the figures and answer the questions that follow.



41. Which sign will be on the surface opposite to surface having X sign?

(1) ○ (2) ● (3) △ (4) ⟶

Ans. (2)

Sol. Signs which are adjacent to x can't be oppsite.

42. Which sign will be on surface opposite to surface having ▰ sign

(1) ○ (2) ● (3) △ (4) X

Ans. (1)

Sol. X ● are opposite to each other

○ is adjacent to △, ⟶, X, ●

so answer is ■

43. In the figure given below, a transparent square shaped paper is folded along the dotted lines. What figure will be obtained? Find the figure from the alternative figures given.

(1) 

(2) 

(3) 

(4) 

Ans. (4)

Sol. Clearly, when folded & super imposing in the right figure, we get option (4)

Q.44 – 45 : Directions— In each of the following questions there is a specific relationship between the first and second number. The same relationship exists between the third and fourth number which will replace the question mark. Select the correct term from the alternatives given.

44. 583 : ? :: 488 : 378

(1) 291 (2) 293 (3) 487 (4) 581

Ans. (2, 4)

Sol. 583 : ? :: 488 : 378

sum of the digits

$\underset{-2}{16 : ?} :: \underset{-2}{20 : 18}$

So, answer should have sum of the digits 14

Two option fulfils the criteria 293 and 581.

45. 13 : 19 :: 31 : ?

(1) 41 (2) 37 (3) 33 (4) 47

Ans. (1, 2)

Sol. Between 13 & 19 one prime number (17) is skipped.

Similarly, after 31, prime number 37 is skipped.

so, 41 is the answer.

Also, 13 + 6 = 19

31 + 6 = 37

so, 37 is also the answer.

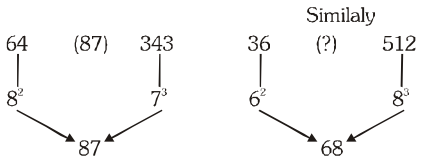
46. In the following question in every row the numbers outside the bracket are related to number inside the bracket in a specific manner. From the given alternatives find the right number which matches and will replace the question mark.

64 (87) 343 49 (76) 216 36 (?) 512

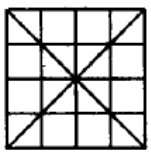
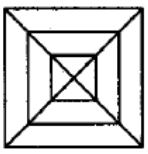
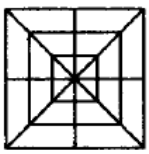
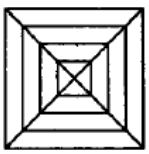
(1) 68 (2) 59 (3) 52 (4) 48

Ans. (1)

Sol.



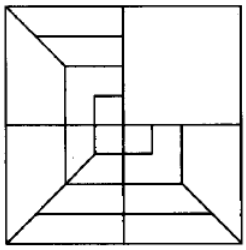
47. After folding a square piece of paper, it appears as shown in the left side question figure. The paper when unfolded will look like as shown in one of the alternatives. Select the correct alternative.

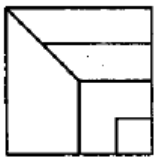
(1)  (2)  (3)  (4) 

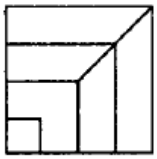
Ans. (Bonus)

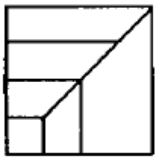
Sol. Options don't match

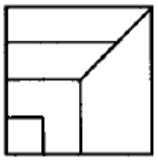
48. The following question figure given at left side is incomplete. Select the correct alternative which can complete the figure.



(1) 

(2) 

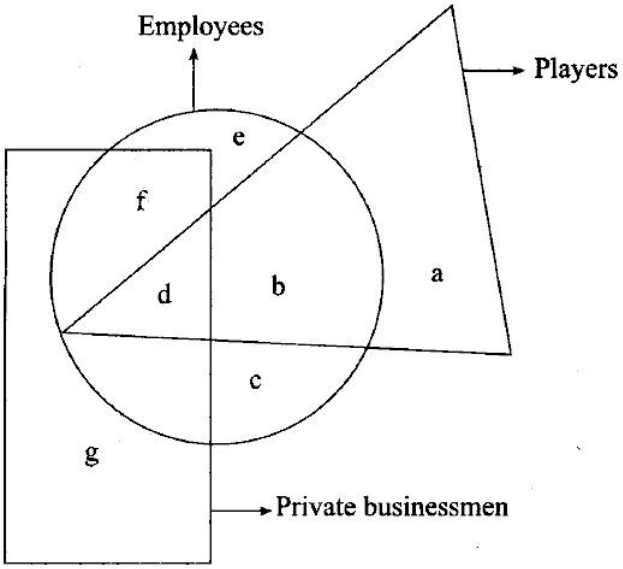
(3) 

(4) 

Ans. (3)

Sol. Each smaller square is indential to diagonally opposite square.

Q.49 and 50 : Directions - In the following diagram, three geometrical figures have bee drawn intersecting each other. The labels have been given to different parts. Each figure represent a specific group of people. Observe the figure closely and answer the questions that follow.



49. How many employee players do private business ?

(1) b (2) a (3) c (4) d

Ans. (4)

Sol. 'd' comprises employees, Players who do Private business.

50. How many players are unemployed?

(1) b (2) d (3) a (4) c

Ans. (3)

Sol. 'a' players are neither employed nor doing business.