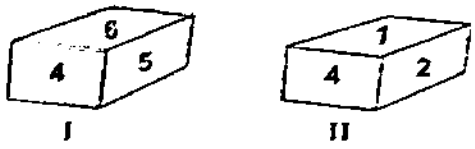
21 DICE

Dice is a 3 dimensional object, which when seen from any direction shows its 3 surfaces to us. It's length, breadth and height all are equal. It has six surfaces. Each surface has 4 adjacent surface and no two opposite surfaces can be seen at a single time. On its 6 surfaces, numbers from 1 to 6 are written or there could be figures, indications or different colours shown on them. Dice are of two types -

(a) Standard dice

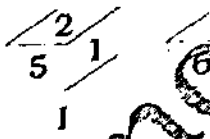
(b) Ordinary dice

(a) **Standard dice:** In a standard dice, sum of its any two opposite sides is 7, and no two adjacent sides can give sum of 7. Such dice is known as standard dice. Like-



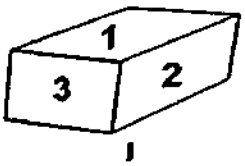
6 + 5 = 11	1 + 2 = 3
5 + 4 = 9	4 + 2 = 6
6 + 4 = 10	1 + 4 = 5

(b) **Ordinary dice:** In an ordinary dice, any two opposite surfaces can't give sum of 7, but it's adjacent sides may sum to 7, such dice is known as ordinary dice.



Important facts:

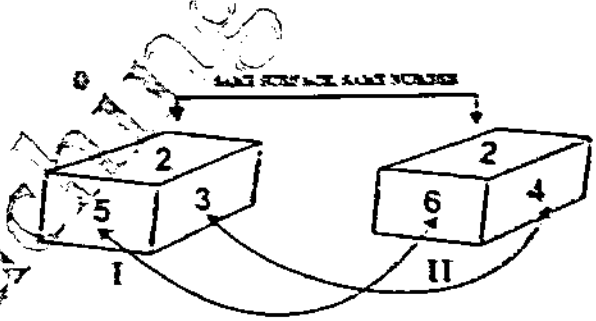
1. Any dice can't be categorized as standard or ordinary if we know only one face each of three pair surfaces. In such case it is impossible to determine any two opposite sides of that dice.



In above dice, which number will be opposite to 1?

Sol. As we have 2 and 3 adjacent to 1, so both of them can never be opposite to 1. But the number 4, 5 or 6 which we can't see, can come opposite to 1, and as we don't know anything except this, we can't determine the exact number. So either of 4, 5 or 6 can come opposite to 1.

2. If any dice is represented in 2 ways and in both situations only one digit symbol/ colour is common and is represented on the same surface, then the surface opposite to the common digit/ symbol/ colour is the digit/ symbol/ colour missing.



Means:

5 is opposite to 6

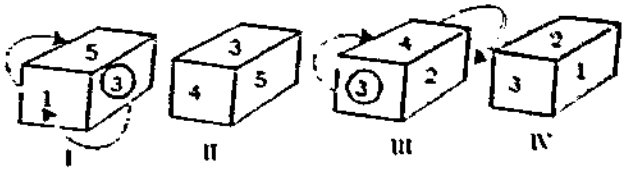
3 is opposite to 4

And

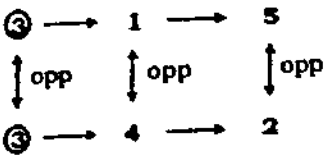
2 is opposite to 1 (As we can see 2, 3, 4, 5 and 6 in figure and the number missing is 1, hence number opposite to 2 is 1.)

3. **Universal Rule:** This rule can be applied to any dice (standard or ordinary). It is applicable when we have been given 2, 3 or 4 situations of a dice. To understand this rule, let us see an example,

We have been provided with 4 situations of a dice.



By Fig I and Fig III;



After studying this figure we have to predict which number is opposite to which number, or we have to decipher value of each face of the dice shown. Now, according to the rule, identify any two situations in which we have only one digit common. See fig. (1) and (3). In both of them we have only one digit in common i.e. 3. Now look at the fig. (1) and write the numbers as you see clockwise, starting from the common number. Here we have 3 – 1 – 5

Now look at the second selected figure which has only 3 in common and write its number, as we see clockwise starting from the common number. Here we have

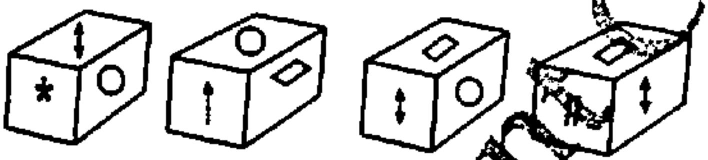
3 – 4 – 2

Now write both of them, one above the other as

3 – 1 – 5
3 – 4 – 2

This implies 1 is opposite to 4, 5 is opposite to 2. Now, only digit left is 6, and that would be opposite to our common number 3. By this method we can reveal all the numbers within few seconds.

Ex. 2.



I II III IV

Which symbol will be opposite to (↕)?

Sol. From universal rule we will take fig (i) and (iv) because only (↕) symbols is common in them. After taking two figures write the symbol appearing clockwise from our common symbol (↕).

We will have:-

Fig (i) (↕) – O – *

Fig (ii) (↕) – # – □

Hence, O is opposite to #, * is opposite to □ and the only symbol left is ↕ which will be opposite to our common symbol ↕.

4. Sometimes we are provided with an explanatory diagram and after folding it in a proper manner it forms a dice. Which of the following dice will be formed from the explanatory diagram given?

(X) (I) (II) (III) (IV)

Sol. From the given figure, first we will find numbers on opposite faces. Like:

1 opposite 6
2 opposite 4
5 opposite 3

To find out opposite faces, take alternate numbers vertically i.e. Take 2, then leave its adjacent face (i.e. 1) and then take 4. So, 2 is opposite to 4, similarly 1 is opposite to 6 and remaining numbers 5 and 3 are opposite to each other.

In dice I, we can see 1 and 6 which cannot be possible as two opposite faces cannot be seen at the adjacent side. Hence this dice cannot be obtained by folding the explanatory diagram.

In dice II, we can see 5 and 3 which cannot be possible as two opposite faces cannot be seen at the adjacent side. Hence this dice cannot be obtained by folding the explanatory diagram.

In dice III, we can see 2 and 4 which cannot be possible as two opposite faces cannot be seen at the adjacent side. Hence this dice cannot be obtained by folding the explanatory diagram.

In dice IV, 6, 5 and 2 cannot be seen which are the opposite faces of 1, 3 and 4 respectively. Hence our dice is dice IV.

Exercise:

Directions (1 - 4): In the questions given below one dice has been shown in different positions, whose sides have 1 to 6 digits printed on them. Study the following positions and answer the following.

1. In the dice given below which number will be on the opposite side to 3?

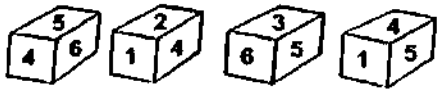
I II III

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

2. In the dice given below which number will be on the opposite side to 6?

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

3. In the dice given below which number will be on the opposite side to 3?



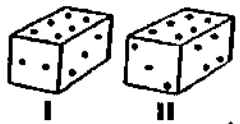
(1) 1 (2) 2 (3) 4 (4) 6

4. In the given dice which number will be on the opposite side to 3?

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

Directions (5 - 7): In the pictures given below two positions of a single dice is shown. Each side of the dice has dots (.) printed on it, which vary from one to six. Study the positions and answer the following questions accordingly.

5. If there are three dots at the bottom, then how many dots will be on top?

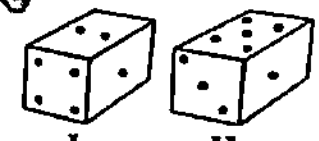


(1) 1 or 5 (2) 2 (3) 4 (4) 5

6. If the number of dots is three on top then how many will be at bottom?

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

7. If 4 dots are at bottom then what will be the number of dots on top?



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

Directions (8 - 21): A dice has been shown in more than one positions. On their faces there can be digits/symbols/dots etc. Study carefully the different positions given and answer the following questions.

8. What will be the digit opposite to 2?

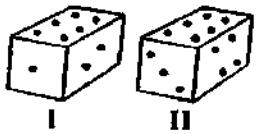
(1) 1 (2) 4 (3) 5

(4) Can't be determined.

9. Dice given below has been shown in four positions on which digit 1 to 6 has been shown. What will be opposite to digit 2 on this dice?

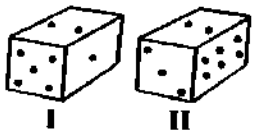
(1) 3 (2) 4 (3) 5 (4) 6

10. A dice has been shown in two positions as given below. If the number of dots is 6 at bottom, Then what will be the number of dots on top of it?



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

11. A dice has been given below in two positions. If number of dots on top is 1 then what will be the number of dots at bottom?



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

12. In question 11, which number will be on the opposite face to 6?

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

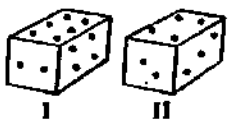
(4) Can't be determined.

13. In question 11, what will be at the bottom face in position I?

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

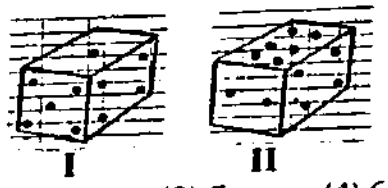
(4) None of these

14. If the number of dots is 3 at bottom then what will be the number of dots on top?



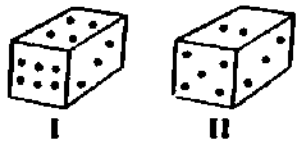
(1) 2 (2) 1 (3) 4 (4) 6

15. A dice has been shown below in two positions. If the number of dots on top is 4 then what will be the number of dots at bottom?



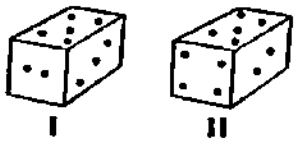
(1) 2 (2) 3 (3) 5 (4) 6

16. A dice has been shown below in two positions. If the number of dots at bottom is 2 then what will be the number of dots on top?



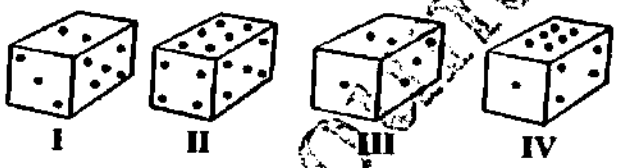
(1) 1 (2) 4 (3) 5 (4) 6

17. A dice has been given below in two positions. If the number of dots at bottom is three then what will be the number of dots on top?



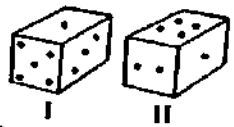
(1) 2 (2) 3 (3) 4 (4) 6

18. What will be the number of dots opposite to the surface of 2 dots?



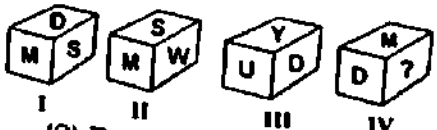
(1) 1 (2) 4 (3) 5 (4) 6

19. If the bottom of the dice shows 2 dots, then what would be the number of dots on its top?



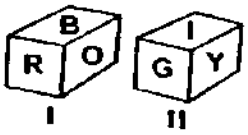
(1) 2 (2) 3 (3) 5 (4) 6

20. Which alphabet will come in place of question mark?



(1) S (2) D (3) U (4) W

21. Four colours are shown on the faces of a dice. Which colour among the seven colours is left?

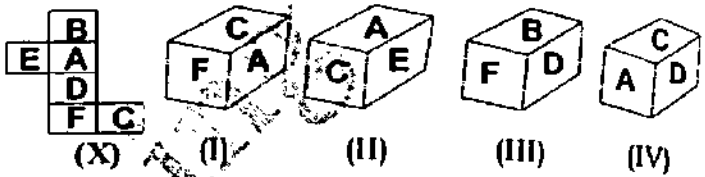


(1) blue (2) green

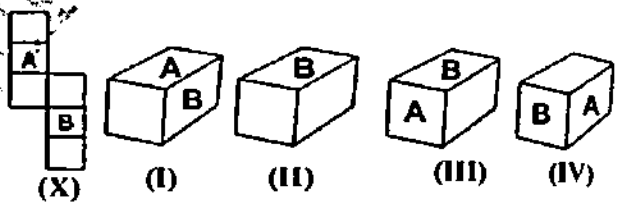
(3) yellow (4) violet

Directions (22 - 29): In each question an explanatory figure of dice is given. Study the figure and identify the correct dice formed by that figure.

22.



23.



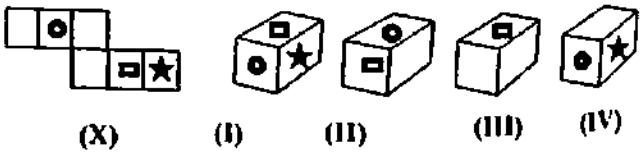
(1) I, II and IV only

(2) I, II and III only

(3) II only

(4) II and IV only

24.



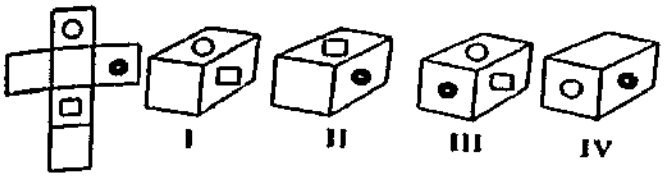
(1) I, and II only

(2) II, III and IV only

(3) IV only

(4) III and IV only

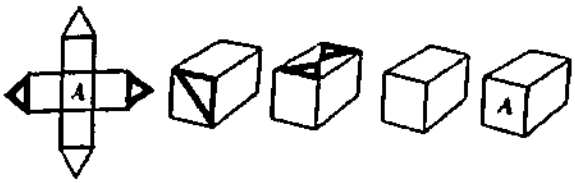
25.



(x)

(1) I and III only
(2) II, III and IV only
(3) II and IV only
(4) III and IV only

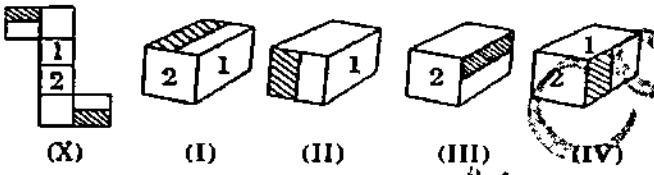
26.



(X) (a) (b) (c) (d)

(1) a and c only
(2) b and d only
(3) b and c only
(4) b, c and d only

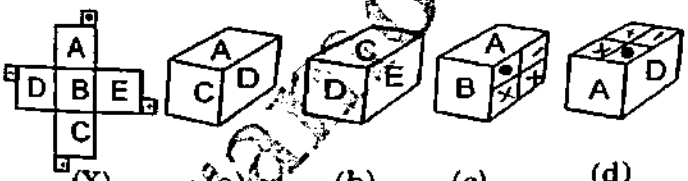
27.



(X) (I) (II) (III) (IV)

(1) I, II, III and IV
(2) only I and II
(3) only II and III
(4) only I, II, and III

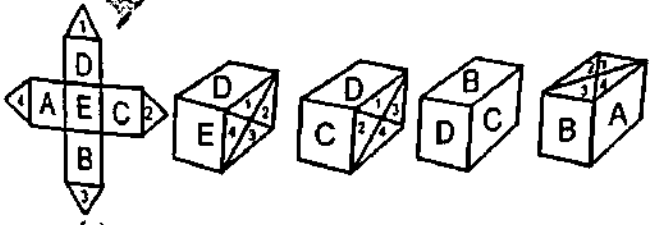
28.



(X) (a) (b) (c) (d)

(1) (a) and (b) only
(2) only (a)
(3) (c) and (d) only
(4) None of these

29.



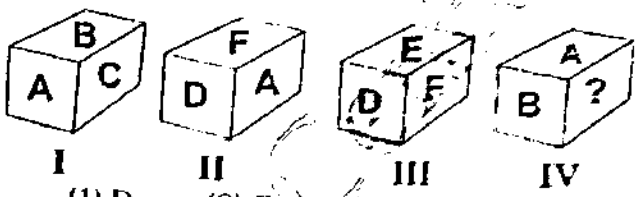
(x) (a) (b) (c) (d)

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

30. How many minimum number of colours would be used to colour each surface of a dice so that no two adjacent surfaces have the same colour?

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

31. Which alphabet can come in place of question mark?

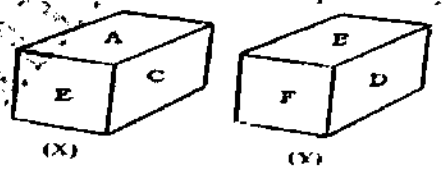


I II III IV

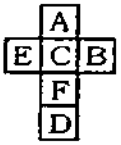
(1) D (2) F (3) E

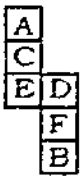
(4) can't be determined.

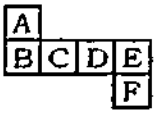
32. Below are given explanatory figures of a single dice shown in two positions, determine the correct explanatory figure.

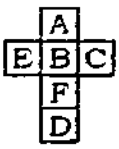


(X) (Y)

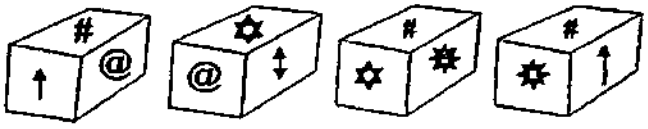
(1) 

(2) 

(3) 

(4) 

Directions (33 - 35): Study all the positions of a dice and answer the following:



I II III IV

33. Which symbol will be opposite to #?

(1) ↕ (2) ↑ (3) ✡ (4) ✡

34. Which symbol will be opposite to ↕?

(1) @ (2) ↑ (3) ✡ (4) #

35. Which symbol will be in opposite to ✡

(1) @ (2) ↑ (3) ↕ (4) ✡

Answer with Explanation:

1. 4; According to the universal rule, if we identify two positions in which we have only one number in common then, we will write their sequence in clockwise manner . After studying we come to know that position I and III have only one digit in common which is 2. Writing the sequence in clockwise direction writing our common number first gives - 2 - 3 - 1. And in position III we get – 2 - 4 - 5. So according to the rule 4 is opposite to 3.
2. 1; Look at the positions I and IV of the given dice. We get only number 2 as common. write down the numbers in clockwise direction starting from 2, we get
   2 - 3 - 6
   2 - 4 - 1
   Obviously, 6 is opposite to 1, 3 is opposite to 4 whereas 2 is opposite to 5.
3. 3; Look at the positions III and IV of the given dice. We get only number 5 as common. Write down the numbers in clockwise direction starting from 5, we get
   5 - 6 - 3
   5 - 1 - 4
   Obviously, 3 is opposite to 4, 6 is opposite to 1, whereas 5 is opposite to 2.
4. 3; Look at the positions II and III of the given dice. We get only number 5 is common. Write down the numbers in clockwise direction starting from 5, we get
   5 - 4 - 2
   5 - 3 - 1
   obviously, 3 is opposite to 4, 2 is opposite to 1 whereas 5 is opposite to 6.
5. 1; Look at the two positions of the dice carefully. The adjacent surfaces of three dots surface are two, four and six dots surfaces. Therefore, these three surfaces can't be opposite to the surface having three dots.
   Thus, the surface opposite to three dots surface is either one dot surface or five dots surface.
6. 3; Here, 2 is common surface,
   2 - 1 - 5
   2 - 6 - 3
   Obviously, 5 is opposite to 3. 1 is opposite to 6, whereas 2 is opposite to 4.
7. 1; Here, 1 is comman surface.
   1 - 4 - 2
   1 - 3 - 5
   Obviously, 4 is opposite to 3, 2 is opposite to 5, whereas 1 is opposite to 6
8. 3; From positions I and III, we get,
   3 - 2 - 6
   3 - 5 - 4
   Obviously, 2 is opposite to 5, 6 is opposite to 4, whereas 3 is opposite to 1.
9. 3; Look at the positions I and III of the given dice. Two numbers 3 & 4 are common. In this case the third number visible in position I will be opposite to the third number visible in position III.
   Thus, we can conclude that 2 is opposite to 5.
10. 4; Here, 6 is comman surface.
    6 - 2 - 1
    6 - 4 - 3
    Obviously, 2 is opposite to 4, 1 is opposite to 3, whereas 6 is opposite to 5.
11. 4; Here, 2 is common surface.
    2 - 1 - 5
    2 - 6 - 3
    Obviously, 1 is opposite to 6, 5 is opposite to 3,
    whereas 2 is opposite to 4.
12. 1; Look at the explanation of the 11th question.
13. 2
14. 4; Look at the two positions of the dice. Two surfaces (4 dots and 2 dots) are common. Hence, we can conclude that 6 dots surface is opposite to 3 dots surface.
15. 2; Here, 4 is common surface.
    4 - 5 - 1
    4 - 2 - 6
    Obviously, 5 is opposite to 2, 1 is opposite to 6,
    whereas 4 is opposite to 3.
16. 2; Here, 3 is common surface.
    3 - 6 - 4
    3 - 5 - 2
    Obviously, 6 is opposite to 5, 4 is opposite to 2, whereas 3 is opposite to 1.
17. 3; In the given positions two surfaces (2 dots and 5 dots) are common.
    Therefore, the third suface remaining in both the positions must be opposites to each other. Hence, 3 dots surface is opposite to 4 dots surface.
18. 4; Look at the positions I and II of the given dice.
    Here, we get