

CUBES & DICE

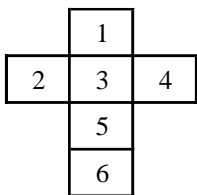
Type 1: Dice

Dice is a three dimensional figure with all of its surfaces numbered.

Important points about Dice :

- (i) A dice has six surfaces and all of them are numbered from 1 to 6.
- (ii) If the surfaces of dice are unfolded and placed on a plane, the figure of dice so obtained will look like one of the following figures.

Here, in the figure 1 we find that

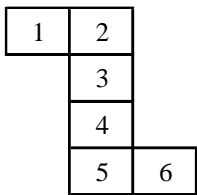


Number 1 is opposite to 5

Number 2 is opposite to 4

Number 3 is opposite to 6.

Here in the figure 2 we find that

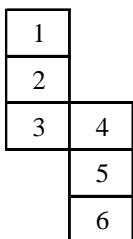


Number 1 is opposite to 6

Number 2 is opposite to 4

Number 3 is opposite to 5.

Here in the figure 3 we find that



Number 1 is opposite to 3

Number 2 is opposite to 5

Number 4 is opposite to 6.

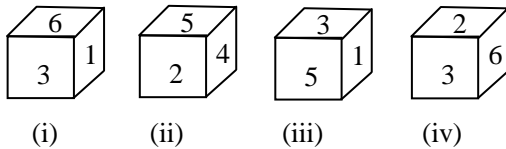
(iii) A number on one surface of dice has one numbers opposite to it and four different numbers on its adjacent surfaces.

Question on dice have been classified under three different categories. In the following paragraphs different types of questions have been discussed with the help of examples under different categories.

Examples:

Category I

Ex.1 A dice has been thrown four times and produces following results.



Which number will appear opposite to the number 3 ?

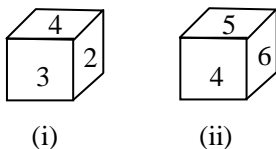
- (A) 4 (B) 5 (C) 6 (D) 1

Sol. From the figures (i), (ii) and (iv) we find that numbers 6, 1, 5 and 2 appear on the adjacent surfaces to the number 3. Therefore, number 4 will be opposite to number 3. Hence option (A) is the answer.

Category II

Ex. 2 The figures given below show the two different positions of a dice. Which number will appear to number 2.

- (A) 3 (B) 4 (C) 5 (D) 6

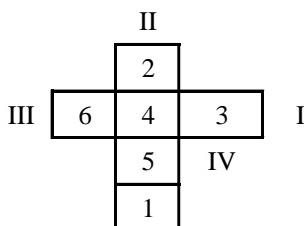


Sol. The above question, where only two positions of a dice are given, can easily be solved with the following method.

Step I : The dice, when unfolded, will appear as shown in the figure given on the right side.

Step II : Write the common number to both the dice in the middle block. Since common number is 4, hence number 4 will appear in the central block.

Step III : Consider the figure (i) and write the first number in the anti-clockwise direction of number 4, (common number) in block I and second number in block II. Therefore, numbers 3 and 2 being the first and second number to 4 in anticlockwise directions respectively, will appear in block I & II respectively.



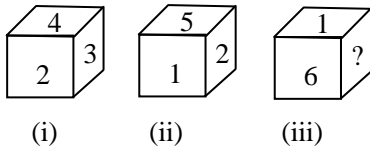
Step IV: Consider fig (ii) and write first and second number in the anticlockwise direction to number 4, (common number) in block (iii) & (iv). Hence number 6 and 5 will appear in the blocks III and IV respectively.

Step V : Write remaining number in the remaining block. Therefore, number 1 will come in the remaining block.

Now, from the unfolded figures we find that number opposite to 6 is 3, number opposite to 2 is 5 and number opposite to 4 is 1. Therefore, option (C) is our answer.

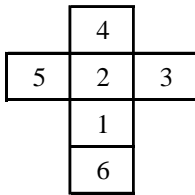
Category III

Ex.3 From the following figures of dice. Find which number will come in place of ?



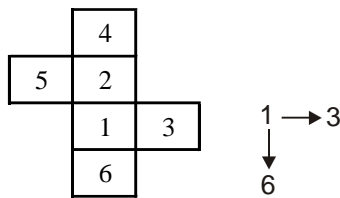
- (A) 4 (B) 5 (C) 2 (D) 3

Sol. If the above dice is unfolded, it will look like as the fig given below. (Student should follow the methods as explained in the previous example to find the appropriate place of the numbers appearing on the different surfaces of the dice in the figure).



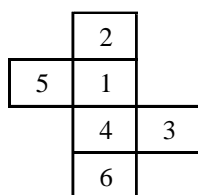
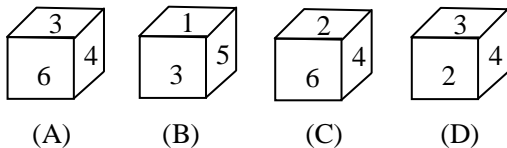
Now the number in place of '?' can be obtained by making a slight change in the figure as given here.

Now comparing fig (iii) as above, we get that number in place of ? is 3



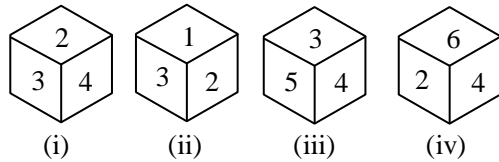
Category IV

Ex.4 Which of the following dices is identical to the unfolded figure as shows here ?



Sol. From the unfolded figure of dice, we find that number opposite to 2 is 4, for 5 it is 3 and for 1 it is 6. From this result we can definitely say that figure (B), (C) and (D) can not be the answer figure as number lying on the opposite pair of surface are present on the adjacent surfaces. Hence fig (A) is our answer.

Ex.5 A die is thrown four times and its four different positions are given below. Find the number on the face opposite the face showing 2.

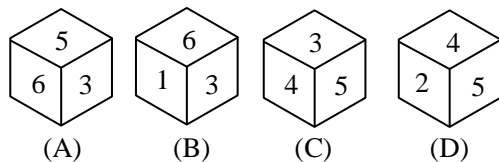


(A) 3 (B) 4 (C) 5 (D) 6

Sol. Here, the number 2 appears in three dice, namely (i), (ii) and (iv). In these dice, we observe that the numbers 2, 4, 1 and 6 appear adjacent to 3. So, none of these numbers can be present opposite 2. The only number left is 5.

Hence, 5 is present on the face opposite 2.

Ex.6 Shown below are, four different positions of the same dice. Find the number on the face opposite the face showing 6.



(A) 1 (B) 2 (C) 4 (D) 5

Sol. In this case, the number 6 appears in only two dice from which we observe that the numbers 1, 3 and 5 appear adjacent to 6, so that 2 or 4 can appear opposite 6.

So, we begin finding a number which appears at least in three of the given dice. 3 is such a number, which appears in (i), (ii) and (iii). We observe in these dice that, the numbers 1, 4, 5 and 6 appear adjacent to 3. So, they cannot appear opposite 3. The only number that can appear opposite 3 is 2.

So, 2 cannot appear opposite 6.

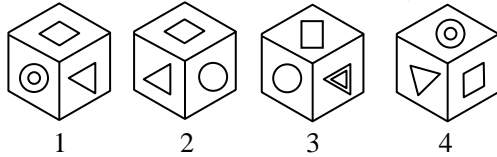
Hence, 4 appears opposite 6, so that (C) is the answer.





















We are now in a position to solve the following exercise.

Exercise

Directions (Q. 1-4)

Given below are four views of a cube. Each face is marked with certain symbols. The different views of the cubes are numbered 1 to 4. Carefully examine each view and answer the questions that follow.



- Q.1** In figure 1, which symbol will appear opposite to the square  ?
- (A)  (B) 
 (C)  (D) 
- Q.2** In figure 2, which symbol will appear on the face opposite to the face containing a circle  ?
- (A)  (B) 
 (C)  (D) 
- Q.3** In figure 3, which symbol will appear on the face opposite to the face containing a double square  ?
- (A)  (B) 
 (C)  (D) 
- Q.4** In figure 4, which symbol will appear on the face opposite to the face containing a triangle  ?
- (A)  (B) 
 (C)  (D) 

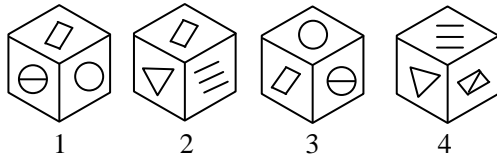
Directions (Q. 5-6)

A cube painted yellow on all faces is cut into 27 small cubes of equal sizes. Answer the questions that follow :

- Q.5** How many cubes are painted on one face only ?
- (A) 1 (B) 6
 (C) 8 (D) 12
- Q.6** How many cubes are not painted on any face ?
- (A) 1 (B) 4
 (C) 6 (D) 8

Directions (Q. 7-10)

Four views of a cube are given below. Study each view and answer the questions given below them :



Q.7 In figure 1, which symbol is below the square \square ?

- (A) \bigcirc (B) \square
(C) \ominus (D) \equiv

Q.8 In figure 2, which symbol is opposite triangle \triangle ?

- (A) \equiv (B) \bigcirc
(C) \square (D) \ominus

Q.9 In figure 3, which symbol will be opposite to the circle \bigcirc ?

- (A) \equiv (B) \diamond
(C) \diamond (D) \ominus

Q.10 In figure 4, which symbol will appear opposite to the crossed square \square ?

- (A) \square (B) \square
(C) \equiv (D) \bigcirc

Q.11 The sides of a cube are painted in different colours. Black side is opposite to red. White side is between black and red. Green side is adjacent to grey and blue side is adjacent to green. What colour will be on the side opposite to the white side of the cube ?

- (A) Blue (B) Green
(C) Grey (D) Data is insufficient

Directions (12-16)

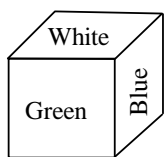
A painter is given a task to paint a cubical box with six different colours for different faces of the cube. The detailed account of it was given as -

- Red face should lie between Yellow and Brown faces
- Green face should be adjacent to the Silver face.
- Pink face should lie adjacent to the Green face.
- Yellow face should lie opposite to the Brown one.
- Brown face should face down.
- Silver and Pink faces should lie opposite to each other

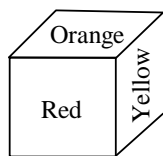
- Q.12** The face opposite to Red is -
 (A) Yellow (B) Green
 (C) Pink (D) Silver
- Q.13** The upper face is -
 (A) Red (B) Pink
 (C) Yellow (D) Silver
- Q.14** The faces adjacent to Green are -
 (A) Yellow, Pink, Red, Silver
 (B) Brown, Pink, Red, Silver
 (C) Red, Silver, Yellow, Brown
 (D) Pink, Silver, Yellow, Brown
- Q.15** The face opposite to Silver is -
 (A) Pink (B) Brown
 (C) Red (D) Green
- Q.16** Three of the faces adjacent to Red face are -
 (A) Silver, Green, Brown
 (B) Silver, Brown, Pink
 (C) Silver, Pink, Green
 (D) Yellow, Pink, Green

Directions :

In the following figures, two six-sided blocks are given. Each side of the block is painted as shown in Figures 1 and 2. The sides are white, yellow, orange, green, red and blue. The arrangement of colours is shown on the blocks.



1



2

- Q.17** When blue colour is on top, which colour will be at the bottom ?
 (A) Red (B) Green
 (C) Blue (D) Yellow

Directions : (Q. 18-20)

The six face of a cube are coloured black, brown, green, red, white and blue, such that :

- (i) Red is opposite black
- (ii) Green is between red and black
- (iii) Blue is adjacent to white
- (iv) Brown is adjacent to blue
- (v) Red is at the bottom

Q.18 Which colour is opposite brown ?

- (A) White (B) Red
- (C) Green (D) Blue

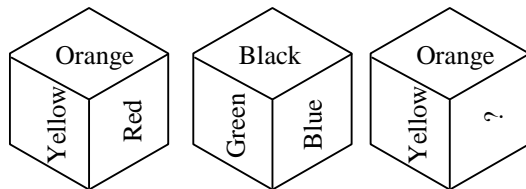
Q.19 The four adjacent colours are -

- (A) Black, Blue, Brown, Red
- (B) Black, Blue, Brown, White
- (C) Black, Blue, Red, White
- (D) Black, Brown, Red, White

Q.20 Which of the following can be deduced from (i) and (v) ?

- (A) Black is on the top
- (B) Blue is on the top
- (C) Brown is on the top
- (D) Brown is opposite Black

Q.21 In the following figures, different views of a six-sided block are shown. The faces of the block are painted orange, black, red, blue, green and yellow. Using the colours shown in the views 1, 2 and 3, identify the colour of the face with the question mark.



- (A) Green (B) Red
- (C) Yellow (D) Blue

Directions : (22-26)

The length of each side of a cube is 5 cms. The outer border of the width of 1 cm is painted yellow on each side and the remaining space enclosed by this 1 cm. path, is painted pink, This cube is cut into 125 smaller cubes of each side 1 cm. When these smaller cubes are separated.

Q.22 How many cubes have all the face uncoloured ?
 (A) 0 (B) 9 (C) 18 (D) 27

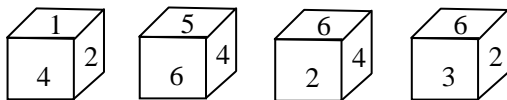
Q.23 How many cubes have three faces coloured yellow ?
 (A) 2 (B) 4 (C) 8 (D) 10

Q.24 How many cubes have at least two faces coloured yellow ?
 (A) 24 (B) 44
 (C) 48 (D) 96

Q.25 How many cubes have one face pink and an adjacent face yellow ?
 (A) 0 (B) 1
 (C) 2 (D) 4

Q.26 How many cubes have at least one face coloured ?
 (A) 27 (B) 48
 (C) 98 (D) 121

Q.27 What number in the dice, given below, will be on the side opposite to 6

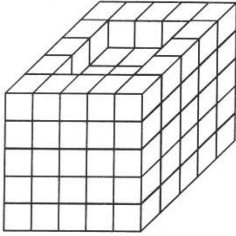


(A) 2 (B) 3 (C) 1 (D) 5

Q.28 A six centimeter cube is painted green on all sides. It is cut into two centimetre cubes. How many cubes will be there with two sides painted ?

(A) 12 (B) 8
 (C) 24 (D) 4

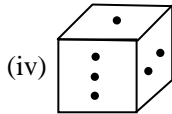
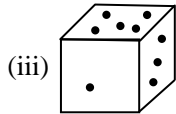
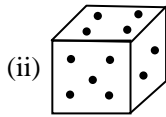
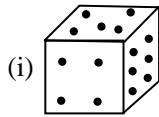
Q.29 A cube is painted red on two adjacent faces and on one opposite face, yellow on two opposite faces and green on the remaining face. It is then cut into 64 equal cubes.



How many cubes have only one red coloured face ?

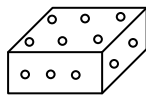
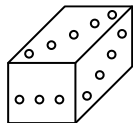
- (A) 4 (B) 8
 (C) 12 (D) 16

Q.30 If the numbers on the opposite sides of the cube total as 7, which one of the following dices is definitely defective ?



- (A) iii (B) iv
 (C) i (D) ii

Q.31 Two positions of a dice are shown below. If 1 is at the bottom which number will be on the top ?

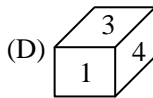
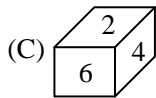
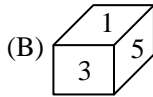
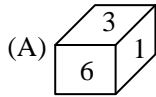
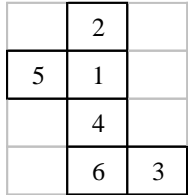


- (A) 4 (B) 3
 (C) 2 (D) 5

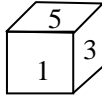
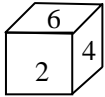
Q.32 The minimum number of colours required to paint all the sides of a cube that no two adjacent faces may have the same colours is -

- (A) 1 (B) 2
 (C) 3 (D) 4
 (E) 6

Q.33 The figure (X) given on the left hand side, in the problem, is folded to form a box. Choose from amongst the alternatives (A), (B), (C) and (D) the boxes that are similar to the box formed.



Q.34 Two positions of a block are shown below, when 2 is at the bottom what number will be at the top ?



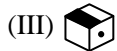
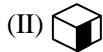
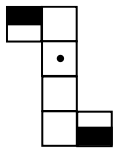
(A) 1

(B) 3

(C) 4

(D) 5

Q.35



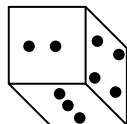
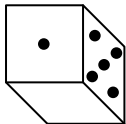
(A) I and II only

(B) II and III only

(C) II and IV only

(D) I, II, III and IV

Q.36 What will be number of dots on the top of the following dice, if it is placed as in the second figure ?



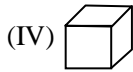
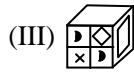
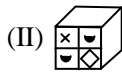
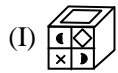
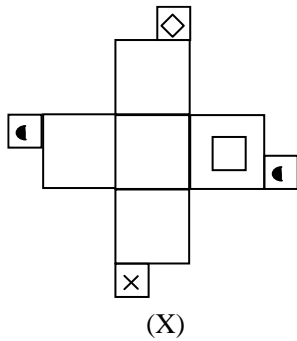
(A) 5

(B) 1

(C) 6

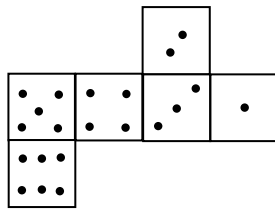
(D) Can't be said

Q.37 The figure (X) given on the left hand side, in the problem, is folded to form a box. Choose from amongst the alternatives (a), (b), (c) and (d) the boxes that are similar to the box formed.



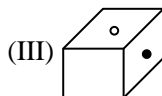
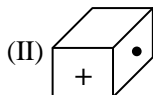
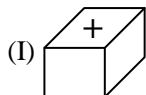
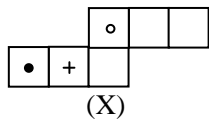
- (A) A, B and C only (B) B and C only
 (C) A, C and D only (D) B, C and D only

Q.38 If the following figure is folded along the lines to form a cube, how many dots would be there on the face opposite the face having six dots ?



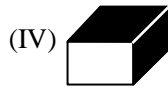
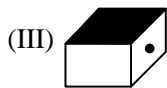
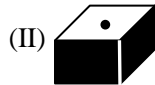
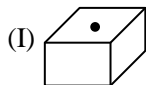
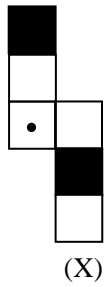
- (A) 3 (B) 2
 (C) 4 (D) 5

Q.39 The figure (X) given on the left hand side, in the problem, is folded to form a box. Choose from amongst the alternatives (A), (B), (C) and (D). the boxes that are similar to the box formed.



- (A) I only (B) I, II and III only
 (C) II and III only (D) I, II, III and IV

Q.40 The figure (X) given on the left hand side, in the problem, is folded to form a box. Choose from amongst the alternatives (A), (B), (C) and (D), the boxes that are similar to the box formed.



(A) I only

(B) I and III only

(C) II and III only

(D) I, II, III and IV

Answer Key

Q.No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	C	B	D	B	B	A	B	D	A	C	B	B	C	D	A	B	A	A	D	A
Q.No	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	B	D	C	B	A	C	C	A	C	D	B	C	D	B	D	A	D	B	B	B