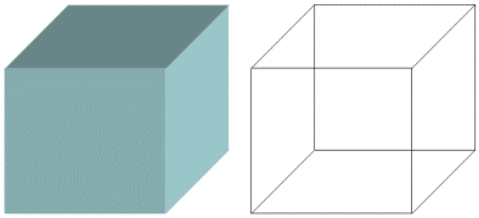
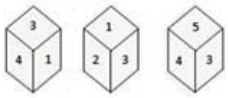
Cube & Dice

Cubes and dice

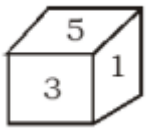
Dice is a small cube with each side having a different number of spots on it, ranging from one to six. It is a three-dimensional figure in which there are 6 Surfaces, 12 Edges and 8 Corners.
In the exam, the faces of the cube can have symbols, letter, numbers etc.



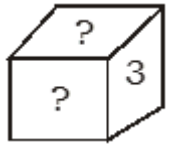
In the exam, two or more position of dice with three faces given in a question and your task is to find out the opposite surface of a given surface.



From the above diagram,
Pick out any common digit from any 2 dices and arrange the rest of numbers in the anti-clockwise or clockwise direction.
In dice (II) and (III), 3 is common
3 → 2 → 1
3 → 4 → 5
Put the missing digit at the place of repeated digit.
3 → 2 → 1
6 → 4 → 5
3 will opposite to 6
2 to 4
1 to 5
Standard Dice: The dice in which the sum of two opposite surfaces is equal to seven is considered as Standard Dice.

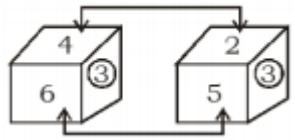


In the above dice, 5,3 and 1 are adjacent surfaces and it is clear that the sum of any two surfaces shown in dice is not equal to seven.
Therefore, Surface opposite to '5' is Surface '2' (i.e. 5 + 2 =7)
Surface opposite to '3' is Surface '4' (i.e. 3 + 4 = 7)
Surface opposite to '1' is Surface '6' (i.e. 1 + 6 = 7)
1. Below given is a standard dice. Which numbers will replace the question marks (?).

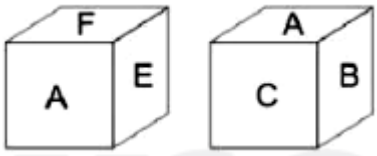


a. 4 and 2
b. 2 and 5
c. 1 and 6
d. 2 and 1
Ans. D
Solution –

Given dice is a standard dice, therefore opposite surfaces are 1 ↔ 6, 3 ↔ 4 and 2 ↔ 5
So, opposite surfaces can never be an adjacent surface.
Hence, option B is the correct response
General Dice – The general dice don't follow the rule which says the sum of two opposite surfaces is equal to seven.
The sum of two opposite side can be anything.
One surface common -

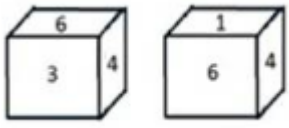


Here, Surface '3' is common surface in both the positions of dice. After fixing '3' and then moving in clockwise direction we can easily find the opposite surfaces.
3 – 6 – 4
3 – 5 – 2
It is clear that 6 and 5 are opposite surfaces and, 4 and 2 are opposite surfaces. Therefore, surface opposite of surface '3' is surface '1'.
1. Two position of a cube are shown below. What will come opposite to face containing 'B'?

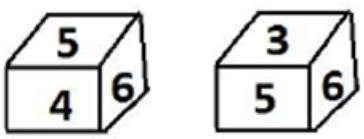


a. C
b. E
c. F
d. A
Ans. C
Solution –
It is very much clear from the face of a cube that when 'A' is facing top, 'B' gets down while 'F' gets up.
After moving in clockwise directions,
From cube 1 : A F E
From cube 2 : A B C
Clearly, B will be opposite to F.
Hence, the correct option is C.

Two surface common –

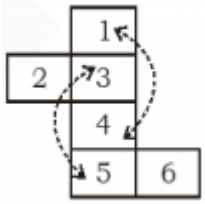


If two numbers are common in both the dices then the remaining number are opposite to each other. Therefore, 3 is opposite to 1.
1. Two positions of a dice are shown as below. After rolling the dice. If we get the number 4 on the face at the top, which number will be on the face at the bottom??

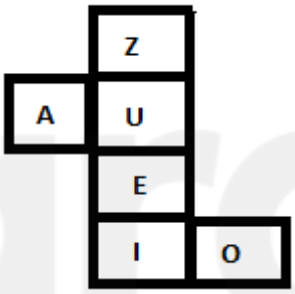


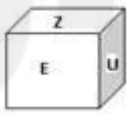
a. 1
b. 2
c. 5

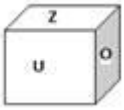
d. 3
Ans. D
Solution –
In both the diagrams, two faces numbered 5 and 6 are common .
Also 3 annd 4 are remaining faces. Hence, face which is numbered 3 is opposite to the face number 4
Hence, option D is the correct answer.
Open dice - In open dice all the six surfaces are clearly shown. The opposite surfaces are at the alternate positions of rows or columns.

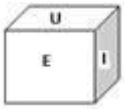


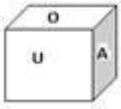
Here,
opposite of surface '1' is surface '4'
opposite of surface '3' is surface '5
opposite of surface '2' is surface '6'
1. Which of the following cubes can be created by folding the given figure ?



a. 

b. 

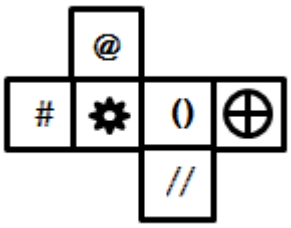
c. 

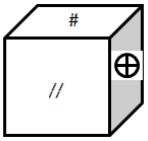
d. 

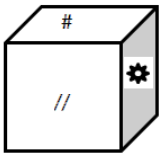
Ans. B
Solution –
From the given figure,
Z will be opposite to E
U will be opposite to I
A will be opposite to O
Option A cannot be formed as Z and E are opposite to each other.
Option C cannot be formed as U and I are opposite to each other.
Option D cannot be formed as A and O are opposite to each other.
Hence, option B is the correct response.

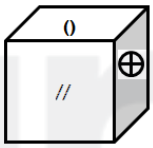
Expansion of dice – In these dice, an open figure of dice is given and we need to choose the correct answer from the given options.
Also, from the past few years they are asking the questions which have all the options correct according to the opposite pair of faces rule the way it is elaborated above.

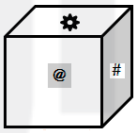
1. Which of the following cube in the answer figure cannot be made based on the unfolded cube in the question figure?



a. 

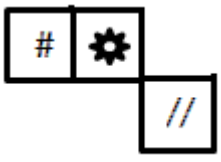
b. 

c. 

d. 

Ans. A
Solution –
Option A,
Open figure,

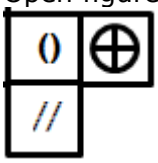
The positions shown in this figure is not same as in the question figure because () is to the left of ⊕ in the question figure.
Option B,
Open figure,



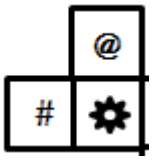
It is possible as the positions are same according to the question figure.

Option C,

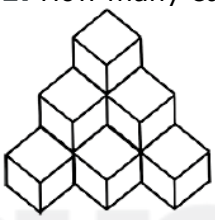
Open figure,



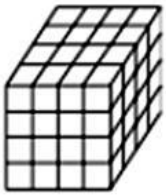
It is possible as the positions are same according to the question figure.
Option D,
Open figure,



It is possible as the positions are same according to the question figure.
Hence, option A is the correct response.
Counting the number of cubes – In these questions, we need to find out the total number of cubes which can be hidden or visible from the question figure.
1. How many cubes are there in the diagram?

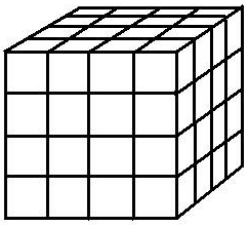


a. 10
b. 12
c. 8
d. 6
Ans. A
Solution –
Visible cubes – 6
Hidden cube in 1st later – 0
Hidden cube in 2nd layer – 1
Hidden cube in 3rd layer - 3
it is clear,
6 +1 + 3 = 10
Hence, there are total 10 cubes in the given diagram
Counting the number of cubes which are painted – A solid cube is given which is painted with different colour or the same and we have to find out the number of cubes which are painted on only one face, two faces, 3 faces or no face.



Important formula –
For a cube of side n x n x n painted on all sides,
Number of cubes with 0 sides painted – (n-2) ^3
Number of cubes with one side painted – 6(n-2) ^ 2
Number of cubes with 2 side painted – 12(n-2)
Number of cube with 3 sides painted – 8 always
1. A solid cube is made using 64 small cubes. In how many small cubes two sides are seen?
a. 24

b. 32
c. 40
d. 42
Ans. A
Solution –
The hidden cubes of a 4x4 cube.



8 - in first layer
4 - in second layer
4 - in second layer
8 - in first layer
Also, by formula – 12 (n-2) = 12(4-2) = 12x2 = 24
Hence, option A is the correct response.