

Dice and Cube Part I

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Practice Problems with Solution

Question 1: 343 cubes of similar size are arranged in the form of a bigger cube (7 cubes on each side, i. e., $7 \times 7 \times 7$) and kept at the corner of a room, all the exposed surfaces are painted then:

How many of the cubes have 0 faces painted?

A: 64

B: 125

C: 240

D: None of these

Question 2: 343 cubes of similar size are arranged in the form of a bigger cube (7 cubes on each side, i. e., $7 \times 7 \times 7$) and kept at the corner of a room, all the exposed surfaces are painted then:

How many of the cubes have 2 faces painted?

A: 14

B: 18

C: 16

D: None of these

Question 3: 343 cubes of similar size are arranged in the form of a bigger cube (7 cubes on each side, i. e., $7 \times 7 \times 7$) and kept at the corner of a room, all the exposed surfaces are painted then:

How many of the cubes have at most faces painted?

A: 208

B: 244

C: 342

D: None of these

Question 4: 216 cubes of similar size are arranged in the form of a bigger cube (6 cubes on each side, i. e., $6 \times 6 \times 6$) all the exposed surfaces are painted.

How many of the cubes have 0 faces painted?

A: 64

B: 125

C: 27

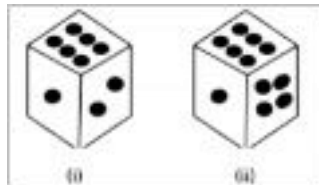
D: None of these

Question 5: 216 cubes of similar size are arranged in the form of a bigger cube (6 cubes on each side, i. e., $6 \times 6 \times 6$) all the exposed surfaces are painted.

How many of the cubes have at most faces painted?

- A: 208
- B: 144
- C: 210
- D: None of these

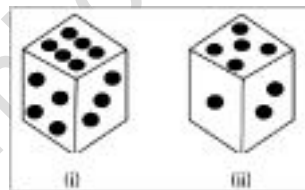
Question 6: Two Position of a dice are shown below:



When six is at the bottom, what number will be at the top?

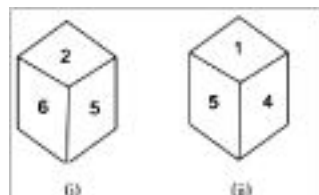
- A: 1
- B: 2
- C: 4
- D: 5

Question 7: Two positions of a block are shown below. When 2 is at the bottom which number will be at the top?



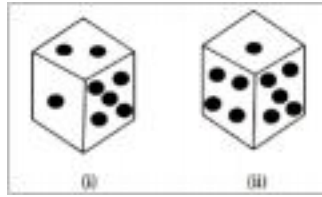
- A: 1
- B: 4
- C: 6
- D: Cannot be determined

Question 8: What number is opposite of 3 in the figure shown below?



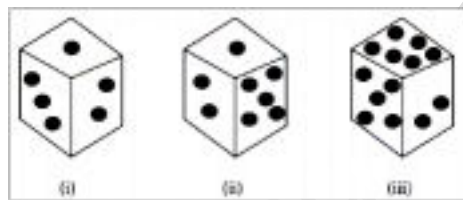
- A: 2
- B: 4
- C: 5
- D: 6

Question 9: How many dots are contained on the faces opposite to that containing four dots?



- A: 2
- B: 3
- C: 6
- D: 1

Question 10: Below there are three different positions of a dice. Find the number of dots on the face opposite to the face with one dot.



- A: 2
- B: 3
- C: 4
- D: 6

Answers and Solutions

1:- D

Solution: Out of 6 faces of 3 faces are exposed and those were painted.

Number of vertices with three faces exposed (Painted) is 1.

Number of vertices with 2 faces exposed (Painted) is 3.

Number of vertices with 1 faces exposed (Painted) is 3.

Number of vertices with 0 faces exposed (Painted) is 1.

Number of sides with 2 sides exposed (Painted) is 3.

Number of sides with 1 sides exposed (Painted) is 6.

Number of sides with no sides exposed (Painted) is 3.

From the above observation:

Number of cubes with 3 faces painted is 1.

Number of cubes with 2 faces painted is given by sides which is exposed from two sides and there are 3 such sides and from one side we will get 6 such cubes, hence required number of cubes is $6 \times 3 = 18$.

Number of cubes with 1 face Painted is given by faces which is exposed from one sides and there are 3 such faces, hence required number of cubes is $36 \times 3 = 108$.

Number of cubes with 0 face Painted is given by difference between total number of cubes – number of cubes with at least 1 face painted = $343 - 1 - 18 - 108 = 216$.

In other words number of cubes with 0 painted is $(7 - 1)^3 = 216$.

From the above explanation, number of the cubes with 0 faces painted is 216.

2:- B

Solution: Out of 6 faces of 3 faces are exposed and those were painted.

Number of vertices with three faces exposed (Painted) is 1.

Number of vertices with 2 faces exposed (Painted) is 3.

Number of vertices with 1 faces exposed (Painted) is 3.

Number of vertices with 0 faces exposed (Painted) is 1.

Number of sides with 2 sides exposed (Painted) is 3.

Number of sides with 1 sides exposed (Painted) is 6.

Number of sides with no sides exposed (Painted) is 3.

From the above observation:

Number of cubes with 2 faces Painted is given by sides which is exposed from two sides and there are 3 such sides and from one side we will get 6 such cubes, hence required number of cubes is $6 \times 3 = 18$.

From the above explanation, number of the cubes with 2 faces painted is 18.

3:- C

Solution: Out of 6 faces of 3 faces are exposed and those were painted.

Number of vertices with three faces exposed (Painted) is 1.

Number of vertices with 2 faces exposed (Painted) is 3.

Number of vertices with 1 faces exposed (Painted) is 3.

Number of vertices with 0 faces exposed (Painted) is 1.

Number of sides with 2 sides exposed (Painted) is 3.

Number of sides with 1 sides exposed (Painted) is 6.

Number of sides with no sides exposed (Painted) is 3.

From the above observation Number of cubes with 3 faces Painted is 1.

Number of cubes with 2 faces Painted is given by sides which is exposed from two sides and there are 3 such sides and from one side we will get 6 such cubes , hence required number of cubes is $6 \times 3 = 18$.

Number of cubes with 1 face Painted is given by faces which is exposed from one sides and there are 3 such faces, hence required number of cubes is $36 \times 3 = 108$.

Number of cubes with 0 face Painted is given by difference between total number of cubes – number of cubes with at least 1 face painted = $343 - 1 - 18 - 108 = 216$.

From the above explanation, number of the cubes with at most 2 faces painted is $216 + 108 + 18 = 342$.

4:- A

Solution: Substitute $n = 6$, number of the cubes with 0 faces painted is $(6 - 2)^3 = 4^3 = 64$.

5:- A

Solution: At most 2 faces painted means number of cubes with 0 face painted + number of cubes with 1 face painted + number of cubes with 2 face painted = $64 + 48 + 96 = 208$.

6:- D

Solution: From both the figures we find that numbers 1,2,3 and 4 dots appear adjacent to 6. Thus, the number 5 dots will appear opposite to 6. Therefore when 6 is at the bottom, 5 will be at the top.

7:- C

Solution: Number three is common in both the figures. We assume that the block in figure (ii) has to be rotated, so that three appears at the same position as in figure (i) and the numbers 5 and 2 move to the faces hidden behind the numbers 4 and 6 respectively. Thus the combined figure will have 3 on right hand side face, 4 on the front face, 6 on the top face, 5 on the rear face and 2 on the bottom face. Clearly when 2 is at the bottom, 6 is at the top.

8:- C

Solution: As 5 is common on both the figures, and 1,2,4 and 6 are adjacent to 5 . Hence 3 is opposite of 5.

9:- A

Solution: As both the figures contains one dot and 5 dots, fixing the 5 dots face and moving one dot face position to fig (i). we find 4 dots is opposite to 2 dots.

10:- D

Solution:

As 1, 3, 5 and 6 are adjacent to 2 in all the three positions, if 3 is opposite to 5 that we came across from the figures. So it is obvious that one will be opposite to 6.

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