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CUBES



Question: 01

A cube of side length 8 cm is taken and small cubes of 2 cm length are cut along all the eight corners of the cube. By what percentage does the total surface area of the cube changes?

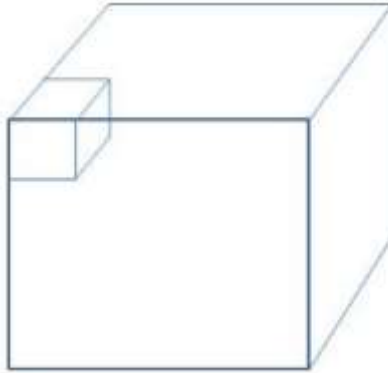
- A. 5%
- B. 12.5%
- C. 20%
- D. None of these

Answer: D



Explanation:

Each cube that is cut had three sides exposed outside and three sides not exposed when it was in the bigger cube.



Question: 02

A cuboid of dimensions 45cm, 75cm and 90cm is to be divided into identical cubes of side X cm. What is the maximum possible value of X ?

- A. 10
- B. 12
- C. 15
- D. 17

Answer: C



Explanation:

As it is given that the smaller cubes to be formed are to be identical and for the side of it to be maximum it has to be the HCF of the dimensions of the given cuboid. HCF of 45, 75 and 90 is 15. Hence the maximum possible value of the side of the smaller cubes is 15.



Question: 03

Four cubes are placed adjacently in a row. What is the ratio of the surface area of the new cuboid to the total surface area of the four cubes ?

- A. $9/16$
- B. $3/4$
- C. $16/9$
- D. $4/3$

Answer: B



Explanation:

Let a be the side of the small cuboid. Surface area of one cuboid = $6a^2$

Thus, the total surface area of the 4 cubes = $4 \times 6a^2 = 24a^2$

The side of the new cuboid formed is a , a and $4a$. The total surface area of the new cuboid formed = $2(a^2 + 4a^2 + 4a^2) = 18a^2$

Thus, the surface area of the new cuboid to that of the 4 cubes = $18a^2 / 24a^2 = 3/4$



Question: 04

A cube of side 3 cm is cut into smaller cubes of side 1 cm. What is the ratio of Total surface area of the larger cube and the sum of the total surfaces of all the smaller cubes ?

- A. 1:1
- B. 1:2
- C. 1:3
- D. 1:4

Answer: C



Explanation:

Total surface area of the larger cube = $6 \times 3 \times 3 = 54$.

Total surface area of a smaller cube = $6 \times 1 \times 1 = 6$.

The number of smaller cubes = $3 \times 3 \times 3 = 27$.

Sum of the total surface areas of all the smaller cubes = $6 \times 27 = 162$.

Thus the required ratio = $54:162 = 1:3$.



Question: 05

A cube of side n is painted green on all its sides. It is then cut into identical cubes. How many of the smaller cubes will have three of its sides painted ?

- A. 4
- B. 6
- C. 8
- D. cannot be determined

Answer: C



Explanation:

Since, all the sides of the cube is painted, the cubes cut out from the corners will have three of its faces green. Since there are 8 corners for a cube, there will be 8 such cubes.



Question: 06

A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal size. Now, answer the following questions based on this statement :How many cubes have no face coloured?

- A. 24
- B. 8
- C. 16
- D. 0

Answer: B



Explanation:

Since, there are 64 smaller cubes of equal size, therefore, n = no. of divisions on the face of undivided cube = 4

no. of cubes with no face coloured = $(n - 2)^3 = (4 - 2)^3 = 8$



Question: 07

A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal size. Now, answer the following questions based on this statement :How many cubes are there which have only one face coloured?

- A. 4
- B. 8
- C. 16
- D. 24

Answer: D



Explanation:

Since, there are 64 smaller cubes of equal size, therefore, n = no. of divisions on the face of undivided cube = 4

no. of cubes with one face painted = $(n - 2)^2 \times 6 = (4 - 2)^2 \times 6 = 24$



Question: 08

A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal size. Now, answer the following questions based on this statement :How many cubes have two red opposite faces?

- A. 0
- B. 8
- C. 16
- D. 24

Answer: A



Explanation:

Since, there are 64 smaller cubes of equal size, therefore, $n = \text{no. of divisions on the face of undivided cube} = 4$

no. of cubes with two red opposite faces = 0

(none of the cubes can have its opposite faces coloured)



Question: 09

A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal size. Now, answer the following questions based on this statement :How many cubes have three faces coloured?

- A. 24
- B. 8
- C. 16
- D. 0

Answer: B



Explanation:

Since, there are 64 smaller cubes of equal size, therefore, $n = \text{no. of divisions on the face of undivided cube} = 4$

Number of cubes with three faces coloured = $4(\text{cubes at top corners}) + 4(\text{cubes at bottom corners}) = 8$



Question: 10

A cube is painted blue on two adjacent surfaces and black on the surfaces opposite to blue surfaces and green on the remaining faces. Now the cube is cut into 216 smaller cubes of equal size.

- A. 56
- B. 48
- C. 32
- D. 64

Answer: D



Explanation:

We know that Cubes with no surface painted can be find using

$$(x-2)^3$$

$x-23$, where x is number of cuttings. Here $x=6$.

$$\therefore (6-2)^3 = 64$$



Question: 11

There are 128 cubes with me which are coloured according to two schemes viz. 64 cubes each having two red adjacent faces and one yellow and other blue on their opposite faces while green on the rest.

64 cubes each having two adjacent blue faces and one red and other green on their opposite faces, while red on the rest. They are then mixed up.

How many cubes have at least two coloured red faces each ?

- A. 0
- B. 32
- C. 64
- D. 128

Answer: D



Explanation:

Explanation:

64 and 64 cubes of both types of cubes are such who have at least two coloured faces red each.

Therefore, total number of the required cubes is 128.



Question: 12

There are 128 cubes with me which are coloured according to two schemes viz. 64 cubes each having two red adjacent faces and one yellow and other blue on their opposite faces while green on the rest.

64 cubes each having two adjacent blue faces and one red and other green on their opposite faces, while red on the rest. They are then mixed up.

What is the total number of red faces ?

- A. 0
- B. 64
- C. 320
- D. 128

Answer: C



Explanation:

No. of red faces among first 64 cubes $= 64 \times 2 = 128$

No. of red faces among second 64 cubes $= 64 \times 3 = 192$

Therefore, total number of red faces $= 128 + 192 = 320$



Question: 13

There are 128 cubes with me which are coloured according to two schemes viz. 64 cubes each having two red adjacent faces and one yellow and other blue on their opposite faces while green on the rest.

64 cubes each having two adjacent blue faces and one red and other green on their opposite faces, while red on the rest. They are then mixed up.

How many cubes have only one red face each ?

- A. 128
- B. 32
- C. 0
- D. None of these

Answer: A



Explanation:

Out of 128 cubes no cube have only one face is red



Question: 14

There are 128 cubes with me which are coloured according to two schemes viz. 64 cubes each having two red adjacent faces and one yellow and other blue on their opposite faces while green on the rest.

64 cubes each having two adjacent blue faces and one red and other green on their opposite faces, while red on the rest. They are then mixed up.

Which two colours have the same number of faces ?

- A. Red and Yellow
- B. Blue and Green
- C. Red and Green
- D. Red and Blue

Answer: B



Explanation:

First 64 cubes are such each of whose two faces are green and second 64 cubes are such each of whose two faces are blue.

Therefore, green and blue colours have the same number of faces.



Question: 15

Four colours namely Blue, Green Red and White are used to paint a cube such that each face is painted in exactly one colour and each colour is painted on at least one face. The cube is now cut into 120 identical pieces by making least number of cuts.

What is the number of cubes with no face painted?

- A. 24
- B. 36
- C. 48
- D. 56

Answer: A



Explanation:

For least number of cuts $120 = 4 \times 5 \times 6$ i.e. number of cuts must be 3, 4 and 5 in three planes in this case number of cubes on a face is either $6 \times 5 = 30$ or $6 \times 4 = 24$ or $4 \times 5 = 20$ cubes . And number of cuboids on an edge is 4 or 5 or 6
Number of cuboids with no face painted is $(4 - 2)(5 - 2)(6 - 2) = 2 \times 3 \times 4 = 24$



THANK YOU

