"Cubes, Cuboids& Dices"

Basic Level

1. What is the maximum number of identical pieces a cube can be cut into by 3 cuts?
   a)9 b)8 c)7 d)6
2. What is the maximum number of identical pieces a cube can be cut into by 4 cuts?
   a)10 b)12 c)16 d)5
3. A cube is cut parallel to one face by making 10 cuts (such that all the resulting pieces are identical).What is the maximum number of identical pieces that can be obtained by now making two more cuts(in any direction)?
   a)33 b)40 c)55 d)44
4. What is the maximum number of identical pieces a cube can be cut into by 13 cuts?
   a)120 b)140 c)180 d)150
5. What is the least number of cuts required to cut a cube into 24 identical pieces?
   a)2 b)4 c)6 d)8
6. What is the maximum number of identical pieces a cube can be cut into by 7 cuts?
   a)36 b)49 c)25 d)56
7. What is the least number of cuts required to divide a cube into 120 identical pieces?
   a)6 b)8 c)15 d)12
8. What is the maximum number of identical pieces a cube can be cut into by 12 cuts?
   a)100 b)144 c)150 d)125
9. What is the maximum number of identical pieces a cube can be cut into by 6 cuts?
   a)12 b)36 c)18 d)27
10. What is the maximum number of identical pieces a cube can be cut into by 5 cuts?
    a)25 b)20 c)18 d)16

Directions for Question 11 to 13:

A large cube painted on all six faces is cut into 27 smaller but identical cubes.

11. How many of the smaller cubes have no faces painted at all?
    a)0 b)1 c)3 d)4
12. How many of the smaller cubes have exactly one face painted?
    a)3 b)6 c)12 d)15
13. How many of the smaller cubes have exactly two faces painted?
    a)36 b)6 c)12 d)15

Directions for Question 14 and 15:

A large cube is painted on all six faces and then cut into a certain number of smaller but identical cubes. It was found that among the smaller cubes, there were eight cubes which had no face painted at all.

14. How many of the smaller cubes as the original large cube cut into?
    a)27 b)48 c)64 d)125
15. How many small cubes have exactly one face painted?
    a)12 b)24 c)16 d)32

16. How many small cubes have exactly to faces painted?
    a)6 b)12 c)18 d)24
17. What is the least number of identical cuboids, each of dimensions 2cmx 4 cm x 5cm, that are required to forma cube?
    a)160 b)240 c)220 d)200
18. 1256 small but identical cubes have been put together to form a large cube. How many more such small cubes will be required to cover this large cube completely?
    a)208 b)212 c)218 d)224
19. 64 smaller but identical cubes are placed on a table to form a large. How many more such smaller cubes are required to enclose this large cube placed on this table completely?
    a)125 b)116 c)100 d)132
20. A cube of side 6cm has been cut into 64 smaller but identical cubes. If it was estimated that it would take 4 litres of paint to paint all the faces of the original cube , then how much paint is required to paint all the faces of the smaller cubes?
    a)16 litres b)12 litres c)20 litres d)4 litres

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Progressive Level

21. 125 small but identical cubes are put together on a table to form one large cube. A knife is passed through this cube this cube starting along one edge of the top face to the diagonally opposite edge on the bottom face. How many of the small cubes are cut by this knife?
    a)25 b)36 c)64 d)16
22. Each face of a cube is painted either white or black. In how many different ways can the cube be painted?
    a)8 b)10 c)12 d)16
23. A cube is cut into smaller but identical cubes such that the edges of each small cube are integers. It was found that a particular cube X could be cut into 27 identical cubes or 64 identical cubes, but identical cubes that can be cut from X, if X has the least possible dimensions?
    a)1331 b)729 c)1728 d)2179
24. It was found that a cube can be cut into certain number of identical cubes each measuring 1 cm x 2 cm x 5 cms. What is the side of the smallest such cube? How many such cuboids can be formed from such a cube?
    a)10cm, 100 b)5cm,50 c)20cm,800 d)20cm,200

Directions for Question 25 to 27:

There is cube in which one pair of opposite faces is painted red, the second pair of opposite faces is painted blue and the third pair of opposite faces is painted green. This cube is now cut into 216 smaller but identical cubes.

25. How many small cubes are there with no red paint at all?
    a)121 b)144 c)169 d)100
26. How many small cubes are there with atleast two different colors on their faces?
    a)49 b)64 c)56 d)81

27. How many small cubes are there with only red and green on their faces?
a)9 b)16 c)27 d)18

Directions for Question 27 to 30:

There is a cube in which one pair of adjacent faces is painted red, the second pair of adjacent faces is painted blue and the third pair of adjacent faces is painted green. This cube is now cut into 216 smaller but identical cubes.

28. How many small cubes are there with one face painted red?
a)64 b)81 c)60 d)120
29. How many small cubes are there with both red and green on their faces?
a)8 b)12 c)16 d)32
30. How many small cubes are there showing only green or only blue on their faces?
a)64 b)72 c)81 d)96

Directions for Question 31 to 33:

A cube has all the six faces painted in six different colors- white, Blue, Red, Yellow, Green and Pink in such a way that pink and Green are on two opposite faces. This cube is placed on a table with the pink face touching the top of the table. Red is facing you, whereas white and blue faces are opposite to each other. The cube is cut into 120 identical pieces by making the least number of cuts possible where all the cuts are parallel to the faces of the cube. Least number of possible cuts are made in the horizontal direction and maximum number of possible cuts are made parallel to Red face.

31. How many small pieces have white color on their faces?
a)36 b)42 c)30 d)24
32. How many small pieces have at least two different colors on their faces?
a)44 b)28 c)38 d)30
33. How many small pieces have no color on their faces?
a)42 b)24 c)36 d)27

Directions for Question 34 to 36:

Two identical wooden cubes P and Q, placed on a table facing you, have their faces painted as follows. One pair of opposite faces of cube P is painted with the same color i.e. Red color and another pair of opposite faces is painted blue. One of the remaining faces is painted Yellow, whereas the other one is painted Brown. One pair of opposite faces of cube Q is painted blue. Second pair of opposite faces of Q is painted, in such a way that the opposite face of Brown is Green. The other two opposite faces are painted Black and Yellow respectively. In the following questions," two faces touch each other" implies that the complete are of one face touches the complete are of second face.

34. The two cubes are placed next to each other on the table touching each other such that, whether the positions of P and Q are interchanged or left as they are, the two faces of P and Q touching each other are of the same color. If the top faces of both P and Q have to be of the same color, then which of the following must be true?
a) The front faces of cube P and Q are Red and Yellow respectively.

b) The two faces of cube P and Q which are touching the table top are of Brown and Black colors respectively.

c) The front face of cube P is of Red color.

d) The top faces of cubes P and Q are of Red and Yellow colors respectively.

35. Q is placed at the top of P such that no Blue face of either cube is horizontal. If Brown and Blue are the front faces P and Q respectively, then which of the following statements must be true?
    a) The faces of the cube touching each other are of Red and Green color.
    b) The faces of two cubes which are touching each other are of Red and Brown colors.
    c) If blue and Green are the colors on the right side faces of the cubes respectively, then the left side faces of two cubes will be Blue and Brown respectively.
    d) The faces of the two cubes which are touching each other are Yellow and Brown.
36. If cube Q is kept behind cube P in such a way, that the yellow face of P faces the Brown face of cube Q and the faces touching the table are Red and Black colors, then which faces of both the cubes have same color?
    a) Top faces
    b) Top and bottom faces only
    c) The faces to the left and right only
    d) Both top and front faces only

Directions for Questions 37 to 39:

Some smaller and identical cubes are taken. Each cube is painted in red color on all of its faces. 27 such cubes are taken to make a bigger cube and that cube is painted in blue on all of its faces. Such 27 cubes are made and joined to make a much bigger cube and this bigger cube is painted in green on all of its faces.(Assume that we have sufficient number of smaller cubes.)

37. How many smaller cubes are painted in exactly one color?
    a) 120 b)100 c)27 d)96
38. How many smaller cubes are painted in green?
    a) 362 b)332 c)386 d)278
39. How many smaller cubes are painted in only red and blue?
    a) 296 b)324 c)316 d)356

Directions for Questions 40 to 42:

Three different faces of a cube are painted in three different colors-Red, Green and Blue. This cube is now cut into 216 smaller but identical cubes.

40. What are the least and the largest number of smaller cubes that have exactly one face painted?
    a) 75 and 86 b)64 and 81 c)64 and 72 d)75 and 84
41. What is the maximum number of small cubes that have one face painted green and one face blue and no other face painted?
    a) 2 b)4 c)6 d)8
42. What are the least and maximum numbers of cubes that have no face painted at all?
    a) 125 and 130 b)120 and 125 c)115 and 120 d)100 and 125

Directions for Questions 43 to 46:

Each face of a cube is painted in green, red or blue.

43. Totally in how many different ways can the cube be painted?
    a) 49 b)56 c)64 d)81
44. In how many different ways can the cube be painted with atleast two faces blue?
    a) 24 b)56 c)64 d)81
45. In how many different ways can the cube be painted such that all the three colors are there on the cube?
    a) 32 b)29 c)25 d)30
46. In how many different ways can the cube be painted such that no two adjacent faces have the same color?
    a) 3 b)1 c)2 d)4

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Advance Level

Directions for Questions 47 to 49:

Two colors red and blue, are used to paint a cube. Red is painted on three faces, each of which is adjacent to the other two and blue is painted on the remaining faces. Assume that one can see exactly three faces when the cube is kept on a plane.

47. What is the total number of ways in which the blue color is not seen at all when the cube is kept on a table?
    a) 4 b)3 c)2 d)1
48. What is the total number of ways in which exactly one face painted blue is seen?
    a) 2 b)4 c)3 d)5
49. What is the total number of ways in which exactly two faces painted blue are seen?
    a) 3 b)2 c)5 d)1

Directions for Questions 50 to 52:

A cube is painted red, blue and green in such a way that each face is painted with a single color and each color is painted on two adjacent faces. The cube is placed on a table and one can see exactly three faces of the cube.

50. What is the total number of distinct corners from where red and blue colors are visible?
    a) 5 b)4 c)6 d)8
51. What is the total number of ways in which all three colors can be seen?
    a) 2 b)3 c)1 d)5
52. What is the total number of distinct possible combinations of three colors that can be seen?
    a) 8 b)8 c)7 d)6

Directions for Questions 53 to 55:

Each face of a die is marked with a different number from 1 to 6.The numbers on the faces of the die are marked in such a way that the sum of the numbers on any pair of opposite faces is

seven. Two such dice are thrown. Assume that one can always see exactly three faces of each die.

53. What is the total number of distinguishably different ways in which the sum of the numbers on the visible faces of both the cubes together is 20?
    a) 2 b)6 c)3 d)5
54. What is the total number of distinguishably different ways in which the sum of the numbers on the visible faces is exactly 10 on atleast one die?
    a) 12 b)17 c)15 d)19
55. What is the total number of ways in which a specified number is visible on both the dice?
    a) 32 b)16 c)14 d)18

Answer Key

1.B	2.B	3.D	4.D	5.C	6.A	7.D	8.D	9.D	10.C
11.B	12.B	13.C	14.C	15.B	16.D	17.D	18.C	19.B	20.A
21.A	22.B	23.C	24.A	25.C	26.C	27.B	28.C	29.C	30.B
31.D	32.A	33.B	34.C	35.D	36.C	37.C	38.C	39.C	40.D
41.C	42.B	43.B	44.C	45.B	46.B	47.D	48.C	49.A	50.B
51.A	52.C	53.D	54.C	55.B					