

CUBES - II

Question 1 - 4:

A large cube is painted with violet colour on two opposite faces, green colour on the other pair of opposite faces and pink colour on the third pair of opposite faces. After painting, the cube is sliced into 125 pieces. Answer the following questions.

- 1) How many smaller cubes have all three colours on them?
- 2) How many smaller cubes have exactly two sides painted with two different colours?
- 3) How many of the smaller cubes have only pink colour on them?
- 4) How many of the smaller cubes have at least two colours?

Question 5 - 9:

A large cube is painted with black colour on two adjacent faces, red colour on the other two adjacent faces and white colour on the third set of adjacent faces. After painting, the cube is subjected 21 cuts in order to get the maximum number of pieces. Answer the following questions.

- 5) How many smaller cubes have all three colours on them?
- 6) How many smaller cubes have red colour on exactly two painted sides?
- 7) How many smaller cubes have exactly two sides painted with two different colours?
- 8) How many smaller cubes have exactly two colours on them?
- 9) How many of the smaller cubes have red and white on them?

Question 10 - 13:

A cube of 18cm painted with golden colour on two adjacent faces and purple colour on two opposite faces. Remaining two faces left unpainted. The cube is cut into smaller cubes of 3cm each after painting.

- 10) How many smaller cubes have three sides painted?
- 11) How many smaller cubes have golden colour on at least one painted side?
- 12) How many of the smaller cubes have no side painted?
- 13) How many smaller cubes have no purple colour on them?

Question 14 - 16:

A cube of 7cm is painted with Maroon on all the sides and cut into smaller cubes of 1cm each.

- 14) How many smaller cubes would be surrounded by other cubes on all sides?
- 15) How many MORE cubes of 1cm each required to make a complete outer cover for the large cube? (Large cube is formed by putting together small cubes of 1cm each).
- 16) How many of the smaller cubes have exactly four sides not exposed?

Answers:

- 1) Ans: 8 (All corner cubes)
- 2) Ans: 36 (3 cubes on one edge x 12 edges)
- 3) Ans: 18 (9 cubes on one side x 2 pink sides)
- 4) Ans: 44 (36 cubes exact two colours + 8 cubes three colours)
- 5) Ans: 2 (Only 2 corner cubes)
- 6) Ans: 6 (Cubes at the edge of Red and Red; excluding 2 corner cubes)
- 7) Ans: 54 (6 cubes on one edge x 9 edges) (3 edges excluded because of the same colour on 2 adjacent faces)
- 8) Ans: 60 (54 cubes 2 sides painted with 2 colours + 6 cubes 3 sides painted but 2 colours)
- 9) Ans: 22 (Red and White, however, any other colour on third side as well)
(If it is ONLY Red and White, then answer would be 20) (If ONLY Red and White with exact two sides painted, then answer would be 18)
- 10) Ans: 2 (Out of 8 corner cubes, 6 have either 1 side or 2 sides painted)
- 11) Ans: 66 (36 on one side and 30 (36 – 6) on adjacent side)
- 12) Ans: 100 (64 inner cubes + 36 from 2 unpainted surfaces)
- 13) Ans: 144 (36 + 36 = 72 have purple colour on them; therefore 216 – 72 = 144)
- 14) Ans: 125 (Inner of 7x7x7 cube is 5x5x5 cube, so answer 125)
- 15) Ans: 386 (Size of outer cover is $9 \times 9 \times 9 = 729$, however, we have 343 already.
So $729 - 343 = 386$)
- 16) Ans: 60 (Exactly 4 SIDES NOT EXPOSED means, exactly 2 SIDES EXPOSED. Each edge we have 5 smaller cubes with exact 2 sides exposed. 5 cubes x 12 edges)