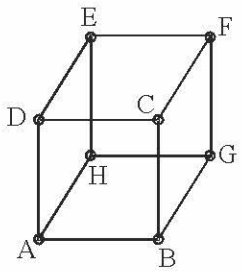
# CH 5 CUBE AND DICE

# ANSWERS AND EXPLANATIONS

## EXERCISE 1

*1.* (c)

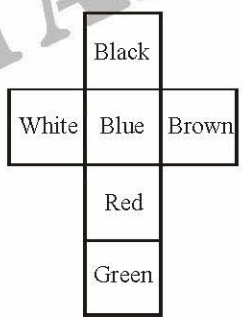



Let faces ABCD, ABGH and CDEF are painted with red colour.

Faces BCFG and ADEH are painted with yellow and EFGH is painted with green colour.

Clearly the cubes which have only one red coloured face and all other faces uncoloured are the four central cubes at each of the three faces ABCD, ABGH and CDEF. Thus, there are $4 \times 3 = 12$ such cubes.

*2.* (d) When the cube is unfolded, it will look like as




The four colours adjacent to green are black, brown, red and white.

*3.* (a) The red side is opposite to the black. Therefore, if red is at the bottom, black will be at the top.

*4.* (d) VI does not add to the information provided by I – V.

*5.* (b) Adjacent to white, we have brown.

**6-9.** Since, there are 64 smaller cubes of equal size, therefore, n = no. of divisions on the face of undivided cube = 4

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

$= (4 - 2)^3$

$= 8$

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

$= (4 - 2)^2 \times 6 = 24$

8. (a) no. of cubes with two red opposite faces = 0

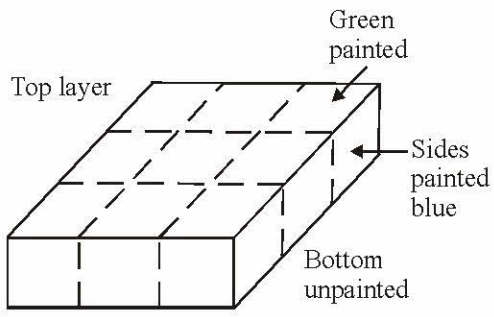
(none of the cubes can have its opposite faces coloured)

9. (c) Number of cubes with three faces coloured

= 4(cubes at top corners) + 4(cubes at bottom corners) = 8

**10-14.** The figure may be analysed by dividing it into three horizontal layers :

**In the top layer**, the central cube has only one face painted green, the four cubes at the corner have three faces painted one face green and two faces blue. The remaining four cubes have two faces painted one green and one blue.




**In the middle layer**, the central cube has no any face painted, four cubes at the corners have two faces painted blue and the remaining four cubes have one face painted blue.

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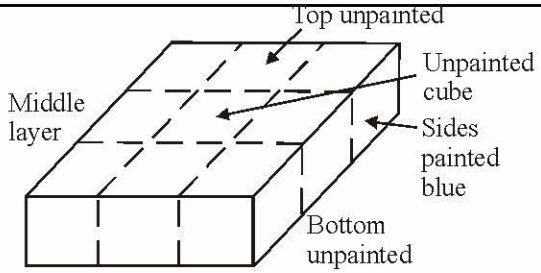
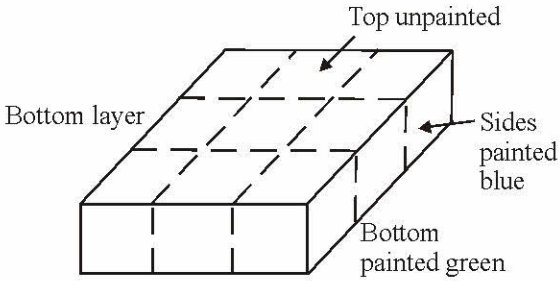



**In the bottom layer**, the central cube has one face painted green and four cubes at the corners have three faces painted–two blue and one green. The remaining four cubes have two faces painted-one blue and one green.




10. (d) There are four cubes in the middle layer which have one face painted only in blue.

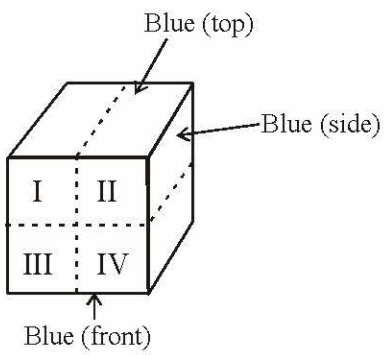
11. (b) There is one (central) cube in the top layer and one (central) cube in the bottom layer which have one face painted only in Green.

12. (c) There are 9 cubes in each of the three layers. Thus there are 27 cubes in all.

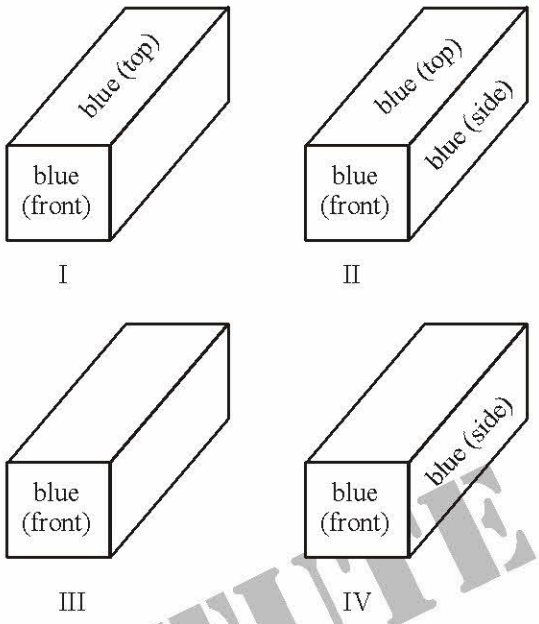
13. (a) number of cubes with three sides painted = 4[cubes in the top corners + 4[cubes in the bottom corners] = 8 cubes

14. (d) Only one central cube in the middle layer has no faces painted at all.

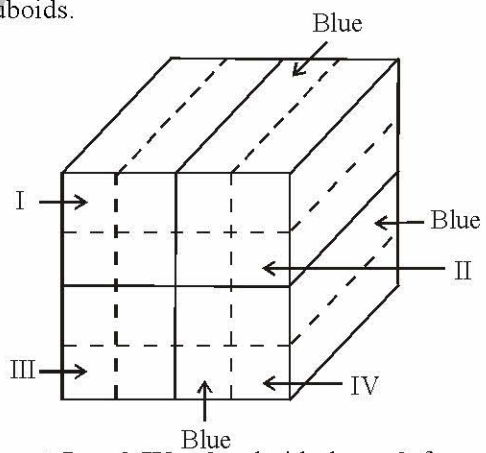
**15-17.** The adjoining figure shows the cube coloured andcut into four cuboids as stated in the question.




Four cuboids are obtained as shown below :




Now, all uncoloured faces of each cuboid are coloured with pink and then again cut each cuboid into four cuboids.




**In set I and IV :** 2 cuboids have 2 faces blue, 2 faces pink and 2 faces uncoloured each. 2 cuboids have 1 face blue, 3 faces pink and 2 faces uncoloured each.

**In set II :** 2 cuboids have 2 faces blue, 2 faces pink and 2 faces uncoloured each.

1 cuboid has 3 faces blue, 1 face pink and 2 faces uncoloured each.

1 cuboid has 1 face blue, 3 faces pink and 2 faces uncoloured each.

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