Surface Areas and Volume of a Cuboid and Cube Ex 18.1 Q18

Answer :

External dimensions of the bookshelf are,

Length, $L = 85\,\text{cm}$

Breadth, $B = 25\,\text{cm}$

Height, $H = 110\,\text{cm}$

External surface area of the bookshelf excluding the front face,

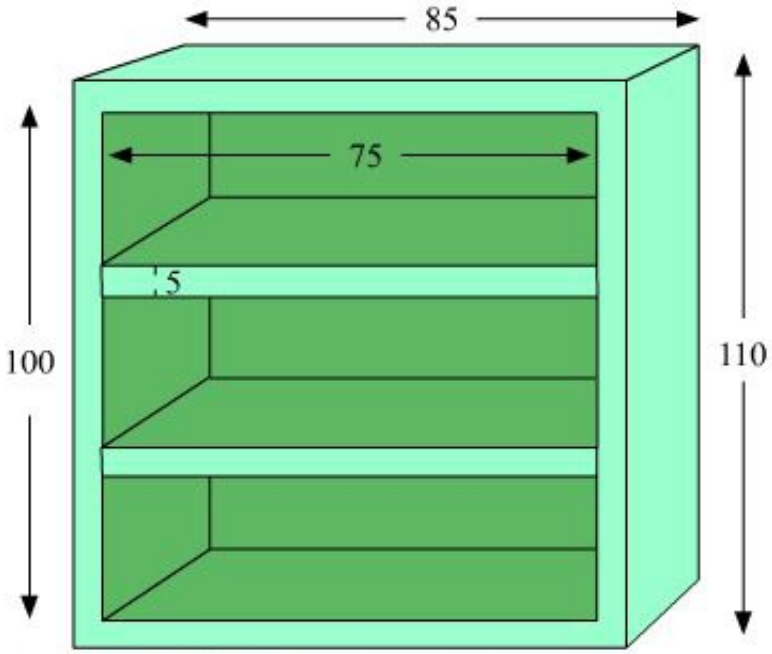
$$A_1 = 2(LB + BH + HL) - HL$$

$$= 2(LB + BH) + HL$$

$$= 2(85 \times 25 + 25 \times 110) + (85 \times 110)$$

$$= 9750 + 9350$$

$$= 19100\,\text{cm}^2$$



Area of the front face,

$$A_2 = \left[85 \times 110 - 75 \times 100 + 2(75 \times 5)\right]$$

$$= (9350 - 7500 + 750)$$

$$= 1850 + 750$$

$$= 2600\,\text{cm}^2$$

Area to be polished,

$= A_1 + A_2$

$= 19100 + 2600$

$= 21700\,\text{cm}^2$

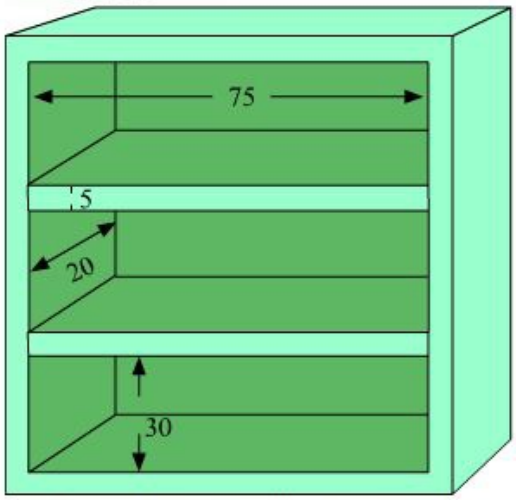
Rate of polishing $(R_1) = \text{Rs.}0.20/\text{cm}^2$

Total cost of polishing,

$C_1 = R_1(A_1 + A_2)$

$= 0.20 \times (21700)$

$= \text{Rs.}4340$



Now, above diagram will make it clear that for each row of bookshelf,

Length $(l) = 75\,\text{cm}$

Breadth $(b) = 20\,\text{cm}$

Height $(h) = 30\,\text{cm}$

Hence, area to be painted in one row,

$$A_3 = 2(l+h)b + lh$$

$$= 2(75+30)20 + 75\times 30$$

$$= 2(105)20 + 2250$$

$$= 4200 + 2250$$

$$= 6450\,\text{cm}^2$$

Area to be painted in three rows,

$$3A_3 = 3\times 6450$$

$$= 19350\,\text{cm}^2$$

Rate of painting $(R_2) = \text{Rs.}0.10/\text{cm}^2$

Total cost of painting,

$$(C_2) = (3A_3)\times R$$

$$= 19350\times 0.10$$

$$= \text{Rs.}1935$$

Total Expense

$$= C_1 + C_2$$

$$= 4340 + 1935$$

$$= \text{Rs.}6275$$

Therefore, the total expenses are $\boxed{\text{Rs.}6275}$.

********** END **********