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

Answer :

External dimensions of the bookshelf are,
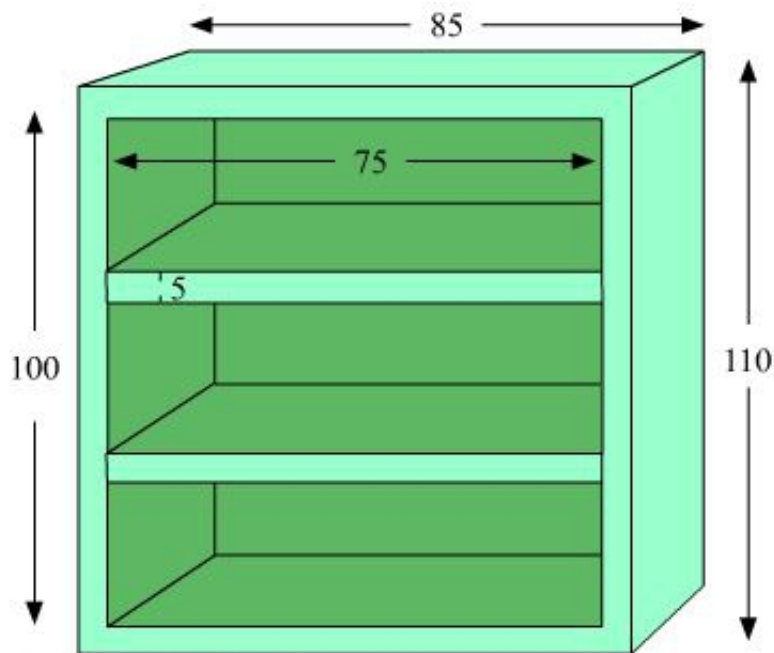
Length, $L = 85\,cm$

Breadth, $B = 25\,cm$

Height, $H = 110\,cm$

External surface area of the bookshelf excluding the front face,

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

$= 2(LB + BH) + HL$

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

$= 9750 + 9350$

$= 19100\,cm^2$

Area of the front face,

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

$= (9350 - 7500 + 750)$

$= 1850 + 750$

$= 2600\,cm^2$

Area to be polished,

$$= A_1 + A_2$$
$$= 19100 + 2600$$
$$= 21700\,\text{cm}^2$$

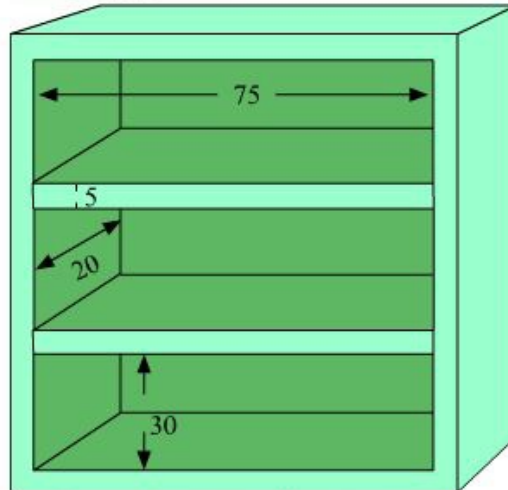Rate of polishing $(R_1) = \text{Rs.}\,0.20/\text{cm}^2$

Total cost of polishing,

$$C_1 = R_1\left(A_1 + A_2\right)$$
$$= 0.20 \times (21700)$$
$$= \text{Rs.}\,4340$$

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

Length $(l) = 75\,cm$

Breadth $(b) = 20\,cm$

Height $(h) = 30\,cm$

Hence, area to be painted in one row,

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

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

$= 2(105)20 + 2250$

$= 4200 + 2250$

$= 6450\,cm^2$

Area to be painted in three rows,

$3A_3 = 3 \times 6450$

$\qquad = 19350\,cm^2$

Rate of painting $(R_2) = Rs.0.10/cm^2$

Total cost of painting,

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

$\qquad = 19350 \times 0.10$

$\qquad = Rs.1935$

Total Expense

$= C_1 + C_2$

$= 4340 + 1935$

$= Rs.6275$

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

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