$$\iint_R \left(4 - x^2 - 2y^2\right) dA$$

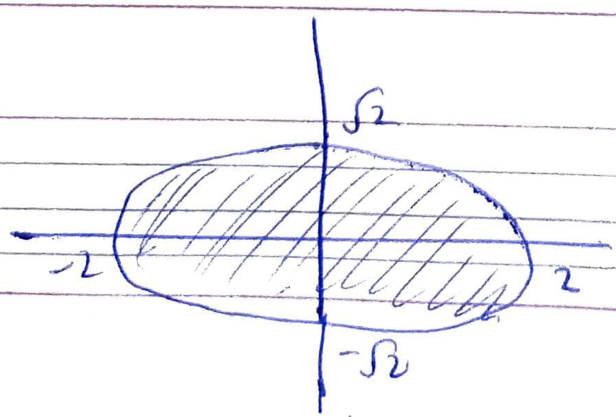
The integral will be maximum on the region where $4 - x^2 - 2y^2 \geq 0$

$\Rightarrow \quad -4 + x^2 + 2y^2 \leq 0$

$\Rightarrow \quad x^2 + 2y^2 \leq 4 \quad \Rightarrow \quad \boxed{\dfrac{x^2}{(2)^2} + \dfrac{y^2}{(\sqrt{2})^2} \leq 1}$

This is the region inside the ellipse

$$\boxed{\frac{x^2}{(2)^2} + \frac{y^2}{(\sqrt{2})^2} = 1}$$



$$\iint_R (x^2+y^2-9)\, dA$$

To minimize this double integral, we want to find the region over which the function we are integrating has negative values.

if $x^2+y^2-9 \le 0$

$\Rightarrow x^2+y^2 \le 9$

Thus, region is inside the circle

$\boxed{x^2+y^2=9}$