

The mass fraction of a substance in a mixture



Blood is a liquid connective tissue.

The body of an adult contains about 5-6 liters of blood and is 5-8% of body weight.

The main part of the blood consists of:

- liquid intercellular substance — plasma (55-60%);
- formed elements (blood cells) (40 - 45%): **erythrocytes, leukocytes and platelets.**

Blood plasma consists of 90% water, 10% consists of dissolved organic substances (proteins, fats, carbohydrates) and inorganic compounds (mineral salts). Some of these substances are nutrients carried by blood to various organs. **Salts in human blood are about 0.9%. Blood density $\rho = 1.05 \text{ kg/dm}^3$, blood viscosity $\eta = 5 \cdot 10^{-3} \text{ Pa}\cdot\text{s}$.**

Using this information, solve the problem in 2 ways

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(mathematically and by chemical formulas), but first convert kilograms to grams, dm³ to liters, and the mass fraction from percent to a fraction of a unit:

Determine the mass of salt in 5 liters of blood.

Solving steps:

1. Find the mass 5 blood's liters	
The first method is mathematical	The second method is chemical
1 liter of blood has a mass - g	Find the mass 5 blood's liters according to the formula
..... liters of blood has a mass - x g	$m = V\rho$
$X = \dots \times \dots = \dots \text{ g}$	$m(\text{blood}) = \dots \times \dots = \dots \text{ g}$
1. Find the mass of salt	
The first method is mathematical	The second method is chemical
..... g of solution is - 100%	Find the mass of salt using the formula
X g of salt is -%	$m(\text{substances}) = w(\text{substances}) \cdot m(\text{solution})$
..... : = X :	$m(\text{salt}) = \dots \cdot \dots = \dots \text{ g}$
.....X = ·	
$X = \dots : \dots$	
$X = \dots \text{ g}$	
Answer: g	