

# Eritmalar mavzusiga oid masalalar

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**1. Idishda 40 kg 15%li eritmalar bor. Dastlabki eritmadan 30%ni olindi, keyin qolgan eritmaning yana 20%ni olindi. Idishda qolgan eritmaning massasi 40 kg bo'lguncha suv quyildi. Hosil bo'lgan eritmadagi erigan moddaning massa ulushini (%) aniqlang.**

Yechim: 1)  $m = w \cdot M = 40 \cdot 0,30 = 12 \text{ kg}$  (olingan eritma)

2)  $40 \text{ kg} - 12 \text{ kg} = 28 \text{ kg}$  (qolgan eritma)

3)  $m = w \cdot M = 28 \cdot 0,20 = 5,6 \text{ kg}$  (olingan eritma)

4)  $28 \text{ kg} - 5,6 \text{ kg} = 22,4 \text{ kg}$  (qolgan eritma)

5)  $m = w \cdot M = 22,4 \cdot 0,15 = 3,36 \text{ kg}$  (erigan modda)

6)  $w\% = \frac{m}{M} \cdot 100\% = \frac{3,36}{40} \cdot 100\% = 8,4 \%$

**Javob: Moddaning massa ulushi 8,4 %**

**2. 100 gr  $x\%$  eritmaga suv qo'shilganda hosil bo'lgan eritmadagi suvning massasi dastlabki eritma massasiga teng bo'lsa va konsentratsiya 1,5 marta kamaydi. Agar hosil bo'lgan eritmaga dastlabki eritma massasicha tuz qo'shilsa necha %li eritma hosil bo'ladi?**

Yechim:  $\frac{x}{100+y} \cdot 100 = \frac{x}{1,5}$

$100 - x + y = 100 \rightarrow x = y$

$\frac{100x}{100+x} = \frac{x}{1,5}$

$x = 50 \text{ gr}$  (tuz)  $y = 50 \text{ gr}$  (qo'shilgan suv)

$w\% = \frac{50 + 100}{150 + 100} \cdot 100\% = 60\%$

**Javob: Eritmadagi tuzning massa ulushi 60%**

**3.  $H_2SO_4$  eritmasiga 210ml suv qo'shilganda eritmaning konsentratsiyasi 2 marta kamaydi. Bunda jami atomlar soni  $\frac{8}{3}$  marta ortdi. Hosil bo'lgan eritmadagi suvning massa ulushini (%) aniqlang.**

Yechim:  $\frac{100\%}{2} = 50\%$  (hosil bo'lgan eritma)

$\frac{210gr}{x} = \frac{50\%}{50\%}$ ;  $x = 210gr$  (dastlabki eritma)

$n = \frac{210gr}{18gr} \cdot 3 = 35ta$  atom  $H_2O$

$\frac{35}{x} = \frac{1,667}{1}$ ;  $x = 21ta$  atom (eritmadagi)

$\begin{cases} 3x + 7y = 21 \\ 18x + 98y = 210 \end{cases}$ ;  $y = 1,5 \cdot 98 = 147gr$   $H_2SO_4$

$m = 210gr - 147gr + 210gr = 273gr$   $H_2O$

$M = 210gr + 210gr = 420gr$  (hosil bo'lgan eritma)

$w\% = \frac{m}{M} \cdot 100\% = \frac{273}{420} \cdot 100\% = 65\%$

**Javob: Eritmadagi suvning massa ulushi 65%**

**4. 80 gr  $x\%$ li NaOH va 120 gr  $y\%$ li NaOH eritmalari aralastirilganda 24%li eritma hosil bo'ldi.  $x\%$ li eritma massasidagi tuz massasicha suv 120 gr  $y\%$ li eritmaga qo'shilganda hosil bo'ladigan eritma konsentratsiyasini (%) aniqlang. ( $2x = y$ )**

Yechim:  $\frac{80x+120 \cdot 2x}{200} = 0,24$  ;

$x = 0,15$  ;  $y = 0,30$

$m_{(x)} = 80 \cdot 0,15 = 12$  gr tuz

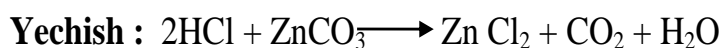
$m_{(y)} = 120 \cdot 0,30 = 36$  gr tuz

$M = 120gr + 12gr = 132gr$  eritma

$w\% = \frac{m}{M} \cdot 100\% = \frac{36gr}{132gr} \cdot 100\% = 27,3\%$

**Javob: Hosil bo'lgan eritma konsentratsiyasi 27,3%.**

**5. Tarkibida 1,46% HCl va 0,544%  $ZnCl_2$  bo'lgan eritmaning 250 gr miqdoriga  $ZnCO_3$  qo'shilgach  $ZnCl_2$  ning massa ulushi ikki marta ko'paygan. Hosil bo'lgan eritmadagi HCl ning massa ulushini hisoblang.**



Agar  $x$  mol  $\text{ZnCO}_3$  qo`shilganda  $x$  mol  $\text{ZnCl}_2$  va  $x$  mol  $\text{CO}_2$  hosil bo`ladi.

$$M_{\text{eritma}} = 250 + 125x - 44x \text{ eritmadagi } \text{ZnCl}_2 \text{ massasi: } 250 \cdot 0,00544 + 136x$$

$$\frac{1,36 + 136x}{250 + 81x} = 0,544 \cdot 2 \%$$

$$\frac{250 + 81x}{250 + 81x} = 100 \%$$

$$136 + 13600x = 272 + 88,128x$$

$$13511,872x = 136$$

$$x = 0,01$$

$$\frac{250 + 81 \cdot 0,01}{250 \cdot 0,0146 - 73 \cdot 0,01} = 100 \% \quad x = 1,16 \%$$

$$\frac{250 \cdot 0,0146 - 73 \cdot 0,01}{250 \cdot 0,0146 - 73 \cdot 0,01} = x$$

Demak, hosil bo`lgan eritmada HCl ning massa ulushi % 1,16 % ga teng.

**6. 500 g  $x\%$ li eritmaga erituvchi qo`shilganda  $(x-10)\%$  bo`ldi, eruvchi qo`shilganda  $(x+10)\%$  bo`ldi. Eritma to`liq bug`latilganda 400 g qattiq qoldiq qolgan bo`lsa, eritmaga qo`shilgan moddalarning massa nisbatini toping?**

$$\left\{ \begin{array}{l} \frac{5x}{500 + a} = \frac{x - 10}{100} \\ \frac{5x + b}{500} = \frac{x + 10}{100} \\ 5x + b = 400 \end{array} \right.$$

$$\frac{400}{500} = \frac{x + 10}{100}$$

$$40000 = 500x + 5000$$

$$500x = 35000$$

$$x = 70$$

$$b = 400 - 350$$

$$b = 50$$

$$\frac{350}{500 + a} = \frac{60}{100}$$

$$30000 + 60a = 35000$$

$$60a = 35000 - 30000$$

$$60a = 5000$$

$$a = 83,33$$

$$83,33 : 50$$

$$1,67 : 1$$

*Javob: eritmaga qo`shilgan moddalarning massa nisbati 1,67 : 1 ga teng.*

**7. 200 gr x%li NaCl eritmasiga uning x gr x%li eritmasi qo`shildi. Bunda 20%li osh tuzi ( $\rho = 1,1 \text{ gr/ml}$ ) eritmasi hosil bo`ldi. Hosil bo`lgan eritmaning titrini (gr/ml) aniqlang.**

$$\text{Yechim: 1) } \frac{(200 \cdot x) + (x \cdot x)}{(200 + x) \cdot 100} = 0,2$$

$$200x + x^2 = 4000 - 20x$$

$$x^2 + 180x - 4000 = 0$$

$$x = 20 \text{ gr}$$

$$2) M = 200 + 20 = 220 \text{ gr}$$

$$3) m = 220 \cdot 0,2 = 44 \text{ gr NaCl}$$

$$4) v = \frac{m}{\rho} = \frac{220 \text{ gr}}{1,1 \text{ g/ml}} = 200 \text{ ml}$$

$$5) \frac{200 \text{ ml}}{1 \text{ ml}} = \frac{44 \text{ gr}}{x} ; x = 0,22 \text{ titr}$$

**Javob: Eritmaning titri 0,22 g/ml ga teng.**

**8.  $X$  gr eritma tarkibida 20% tuz bo'lib unga avval 100gr suv, so'ngra  $Y$  gr 50% li tuz eritmasi solindi. Natijada 500gr 28%li tuz eritmasi hosil bo'ldi. 20% %li eritmaning massasini toping.**

Yechim: 1)  $x + 100 + y = 500$  ;  $m_{(x+y)} = 400\text{gr}$

2)  $m_{\text{tuz}} = 500 \cdot 0,28 = 140\text{gr}$

3)  $\begin{cases} 0,2x + 0,5y = 140\text{gr} \\ x + y = 400\text{gr} \end{cases} \rightarrow \begin{cases} 0,2x + 0,5y = 140\text{gr} \\ y = 400 - x \end{cases}$

$0,2x + 0,5 \cdot (400 - x) = 140\text{gr}$

$0,5x - 0,2x = 200 - 140$

$x = 200\text{gr}$  20%li

$y = 200\text{gr}$  50%li

**Javob: 200gr 20%li eritma bo'lgan.**