

Subject:

Year. Month. Date. (1)

سوال 4 ص 13:  $100 \text{ lb}_m$  آب را با سرعت  $V = 10 \frac{\text{ft}}{\text{s}}$  انرژی جنبشی آن را بدست آورید.  $k = ?$

$$g_c = 32.174 \frac{\text{ft}}{\text{s}^2} \frac{\text{lb}_m}{\text{lb}_f}$$

$$k = \frac{1}{2} m \frac{V^2}{g_c} = \frac{1}{2} \times 100 \text{ lb}_m \times 100 \frac{\text{ft}^2}{\text{s}^2} \times \frac{\text{s}^2}{32.174 \text{ ft} \frac{\text{lb}_m}{\text{lb}_f}} = \frac{5000}{32.174} \text{ ft} \cdot \text{lb}_f$$

$$F = m \frac{g}{g_c} \quad \text{lb}_f = \text{lb}_m \frac{\text{ft}}{\text{s}^2} \times \frac{1}{g_c}$$

$$[g_c] = \frac{\text{lb}_m}{\text{lb}_f} \frac{\text{ft}}{\text{s}^2}$$

سوال 7 ص 19:  $k = A \exp(\frac{B}{T})$  ثابت جراثیمی فنز  $\leftarrow$  روی مطلق

$$[k] = \frac{J}{\text{smk}}$$

exp ( )

$$[A] = [k]$$

sin ( )

$$[B] = k$$

log ( )

سوال 7 ص 17:  $h = \frac{0.0026 \cdot G^{0.6}}{D^{0.14}}$  ضرایب انتقال حرارت

$$[h] = \frac{\text{Btu}}{(\text{hr})(\text{ft}^2)(^\circ\text{F})}$$

$$1 \text{ Btu} = 252 \text{ cal}$$

$$1.8^\circ\text{F} = 1^\circ\text{C}$$

$$60 \text{ min} = 1 \text{ hr}$$

$$[D] = \text{ft}$$

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فرد [h'] =  $\frac{\text{cal}}{(\text{min})(\text{cm}^2)(\text{C}^\circ)}$

فرد ثابت جرمی و ثابت دما و ثابت مساحت

$$h' \frac{\text{cal}}{\text{min} \cdot \text{cm}^2 \cdot \text{C}^\circ} \times \frac{1 \text{ Btu}}{252 \text{ cal}} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{10^4 \text{ cm}^2}{1 \text{ m}^2} \times \frac{1 \text{ m}^2}{(3.28 \text{ ft})^2} \times \frac{1 \text{ C}^\circ}{1.8 \text{ F}^\circ} =$$

$$122,995 \frac{\text{Btu}}{\text{hr} \cdot \text{ft}^2 \cdot \text{F}^\circ} \Rightarrow h' \times 122,995 = h$$

1 m = 3.28

1 lbm = 4.54 gr

1 ft = 12 in

1 atm = 14.7 psi

1 in = 25.4 mm

1 atm = 1.01325 pa

1 Btu = 252 cal

1 pa =  $\frac{1 \text{ N}}{\text{m}^2}$

1 cal = 4.18 J

1 bar =  $10^5 \text{ pa}$

م. ب. س. ب. [D'] م. ب. س. ب.  $\frac{\text{kg}}{\text{s} \cdot \text{m}^2}$  م. ب. س. ب. [G] م. ب. س. ب.  $\frac{\text{Btu}}{\text{hr} \cdot \text{ft}^2 \cdot \text{F}^\circ}$  م. ب. س. ب. [h]

12 gr C → 1 gr mol

12 kg C → 1 kg mol

12 lb<sub>m</sub> C → 1 lb<sub>m</sub> mol

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$$\left. \begin{array}{l} 39.8 \text{ kg NaCl} \\ 100 \text{ kg H}_2\text{O} \end{array} \right\} \begin{array}{l} \text{22.3} \\ \text{kg mol NaCl} \\ \text{kg mol H}_2\text{O} \end{array}$$

$$1 \text{ kg mol NaCl} = 58.4 \text{ kg NaCl}$$

$$1 \text{ kg mol H}_2\text{O} = 18 \text{ kg H}_2\text{O}$$

$$\frac{39.8 \text{ kg NaCl}}{100 \text{ kg H}_2\text{O}} \times \frac{1 \text{ kg mol NaCl}}{58.4 \text{ kg NaCl}} \times \frac{18 \text{ kg H}_2\text{O}}{1 \text{ kg mol H}_2\text{O}} = 12.267 \times 10^{-3} \frac{\text{kg mol NaCl}}{\text{kg mol H}_2\text{O}}$$

- |      |    |         |     |    |        |
|------|----|---------|-----|----|--------|
| 7.0  | 85 | op (6)  | 4.0 | 18 | op (1) |
| 17.0 | 87 | op (7)  | 5.0 | 23 | op (2) |
| 21.0 | 88 | op (8)  | 4.0 | 23 | op (3) |
| 24.0 | 89 | op (9)  | 1.0 | 82 | op (4) |
| 29.0 | 90 | op (10) | 5.0 | 84 | op (5) |

Subject:

Year. Month. Date. 4

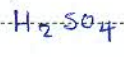
وزن =  $\frac{\text{حجم}}{\text{وزن}} \times \text{حجم}$

وزن =  $\frac{\text{حجم درجه مارت}}{\text{حجم درجه مارت}} \times \text{حجم درجه مارت}$

سوال 31

$1 \text{ cm}^3 \text{ Hg}$   
 $13.6 \text{ gr}$        $\rho = 13.6 \frac{\text{gr}}{\text{cm}^3}$

سوال 6 ص 31



98% H2SO4

2% H2O

100 gr →  $\left\{ \begin{array}{l} 98 \text{ gr } \text{H}_2\text{SO}_4 \\ 2 \text{ gr } \text{H}_2\text{O} \end{array} \right.$

$\frac{\text{H}_2\text{SO}_4 \text{ mol}}{\text{H}_2 \text{ mol}}$

$98 \text{ gr } \text{H}_2\text{SO}_4 \times \frac{1 \text{ gr mol } \text{H}_2\text{SO}_4}{98 \text{ gr } \text{H}_2\text{SO}_4} = 1 \text{ gr mol } \text{H}_2\text{SO}_4$

$2 \text{ gr } \text{H}_2\text{O} \times \frac{1 \text{ gr mol } \text{H}_2\text{O}}{18 \text{ gr } \text{H}_2\text{O}} = 0.11 \text{ gr mol } \text{H}_2\text{SO}_4$

$\frac{\text{H}_2\text{SO}_4 \text{ gr mol}}{\text{H}_2\text{O gr mol}} = \frac{1}{0.11} = 9$

سوال 7 ص 31

1,704 lbm HNO3

1 lbm H2O

$\rho = 1.382$

خالص HNO3 1,704 lb

1 lb H2O

وزن = ?

وزن 2,1704 lb

$\frac{1,704 \text{ lb } \text{HNO}_3}{2,1704 \text{ lb Acid}} \times 100 = 63\%$

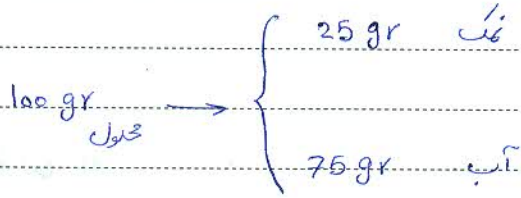
Subject:

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(ب) پوند براتر آهو (ft)<sup>3</sup> از محلول

(ج)

سؤال 2 ص 32



$$\frac{25 \text{ gr نمک}}{75 \text{ gr آب}} = \frac{1 \text{ gr نمک}}{3 \text{ gr آب}}$$

(د)

$$\rho_{\text{محلول}} = 112 \frac{\text{gr}}{\text{cm}^3} \times \frac{1 \text{ lb}_m}{454 \text{ gr}} \times \left(\frac{1 \text{ cm}}{3.28 \text{ ft}}\right)^3 = 74,90 \frac{\text{lb}_m}{\text{ft}^3}$$

(ب)

$$1 \text{ ft}^3 \rightarrow 74,90 \text{ lb}_m \text{ محلول}$$

$$\frac{1}{4} \times 74,90 = 18,72 \frac{\text{lb}_m}{\text{مگ}}$$

$$T_c = \frac{T_f - 32}{1,8}$$

$$T_k = T_c + 273$$

$$T_R = T_c + 462$$

$$T_R = 1,8 T_k$$



$$P_{\text{abs}} = P_g + P_{\text{atm}}$$

فشار داخل مخزن ها را با فشار مطلق ( $P_g$ ) نشان می دهند

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$$760 \text{ mm Hg} = 1 \text{ atm}$$

$$14.7 \text{ psi} = 1 \text{ atm} \quad \text{pound per square in}$$

$$1 \text{ atm} = 101325 \text{ pa}$$

$$1 \text{ bar} = 10^5 \text{ pa}$$

$$1 \frac{\text{N}}{\text{m}^2} = 1 \text{ pa}$$

$$\frac{\text{lb}_m}{\text{in}^2} = 1 \text{ psi}$$

سؤال 4 ص 56

$$\text{ا) } 800 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mmHg}} \times \frac{14.7 \text{ psi}}{1 \text{ atm}}$$

$$\text{ب) } 800 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mmHg}} \times \frac{10^2 \text{ kpa}}{1 \text{ atm}}$$

$$\text{ج) } 800 \text{ mmHg} \times \frac{1 \text{ atm}}{760 \text{ mmHg}}$$

80 , 78 , 76 , 73 , 70 , 68 , 63 , 51 , 50 سؤال ص 96

82

$$P_{\text{abs}} = P_g + P_{\text{atm}}$$

$$P_{\text{abs}} = P_{\text{atm}} - \underbrace{(P_v)}_{P_i}$$

جواب سوال 82

$$33.1 \text{ psi} = P_A + 27 \text{ inHg}$$

$$33.1 \text{ psi} \times \frac{29.92 \text{ inHg}}{14.7 \text{ psi}} = 67.4 \text{ inHg}$$

$$P_A = (67.4 - 27) \text{ inHg} = 40.4 \text{ inHg (gauge)}$$

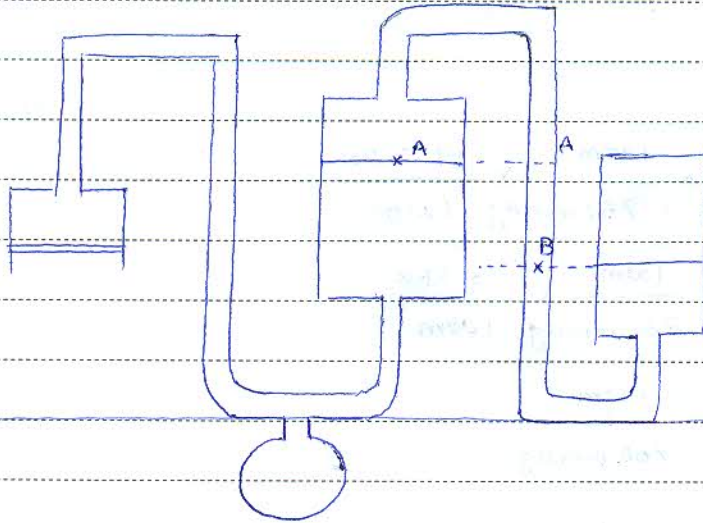
Subject:

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$$P_B = P_A + 8 \text{ in oil}$$

$$8 \text{ in oil} \times \frac{.78 \text{ inHg}}{13.6 \text{ in oil}} = 0.47 \text{ inHg}$$

$$P_B = (40.4 + 0.47) \text{ inHg} = 40.87 \text{ inHg}$$



10.9, 10.5, 10.3, 9.9, 9.8, 9.4, 9.1

من 16 من 225

CO<sub>2</sub> 6.4%

O<sub>2</sub> 1.2%

CO 40% + 40%

H<sub>2</sub> 50.8%

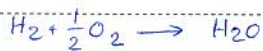
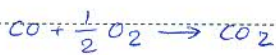
N<sub>2</sub>

100%

طابقاً جزوی

صواغیت  
اصبی

من 100 من 100



Subject:

Year. Month. Date. (8)

$$40 \text{ mol CO} \times \frac{\frac{1}{2} \text{ mol O}_2}{1 \text{ mol CO}} = 20 \text{ mol O}_2$$

$$50.8 \text{ mol H}_2 \times \frac{\frac{1}{2} \text{ mol O}_2}{1 \text{ mol H}_2} = 25.4 \text{ mol O}_2$$

نیاز  $\text{O}_2$  :  $20 + 25.4 - 12 = 45.2 \text{ mol O}_2$

نیاز  $\text{O}_2$

$$45.2 \times 1.4 = 63.28 \text{ mol O}_2 \text{ (نیاز)}$$

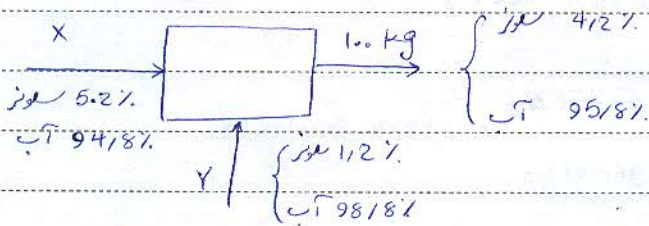
$$\%E = \frac{\text{نیاز} - \text{F}}{\text{نیاز}} = \frac{F - R}{R} \Rightarrow F = \%E \cdot R + R = R(1 + \%E)$$

57, 53, 52, 43, 37, 36, 28, 23, 18 (فصل 2)  
48, 46, 24

س. 6 ص. 174

$$5.2\% \text{ بخار} + 1.2\% \text{ بخار} \Rightarrow 4.2\% \text{ بخار}$$

کل بخار در تمام اجزای است (بخار را در نظر نماند)



$$\text{بخار} : 0.052x + 0.012y = 0.042 \times 100$$

$$\text{آب} : 0.948x + 0.988y = 0.958 \times 100$$

$$x + y = 100$$

$$x = 100 - y$$

$$0.052(100 - y) + 0.012y = 4.2$$

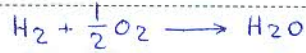
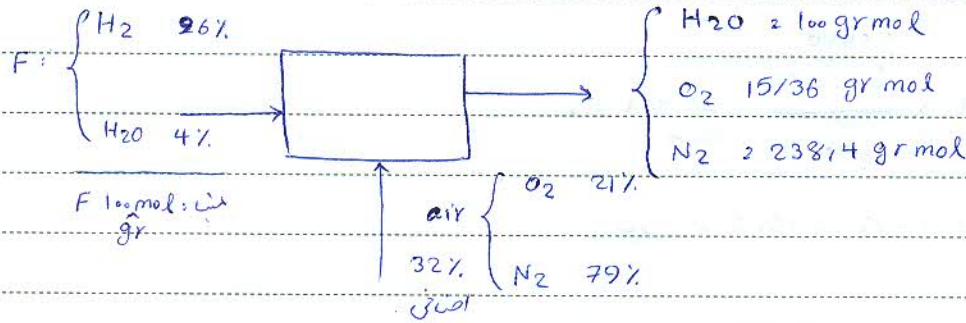
$$5.2 - 0.040y = 4.2 \Rightarrow 0.040y = 1$$



Subject:

Year. Month. Date. (9)

226 ص 18 ص



$96 \text{ gr mol}$	$1 \text{ gr mol } H_2O$	$= 96 \text{ gr mol } H_2O$
$1 \text{ gr mol } H_2$	$1 \text{ gr mol } H_2$	

$$H_2O: 96 \text{ gr mol } H_2O + 4 \text{ gr mol } H_2O = 100 \text{ gr mol } H_2O$$

$96 \text{ gr mol } H_2$	$\frac{1}{2} \text{ gr mol } O_2$	$= 48 \text{ gr mol } O_2$
$1 \text{ gr mol } H_2$	$1 \text{ gr mol } H_2$	

$$O_2: \frac{100}{2} = 1.32 \times 48 = 63.36 \text{ gr mol } O_2$$

$63.36 \text{ gr } O_2$	$79 \text{ gr mol } N_2$	$= 238.4 \text{ gr mol } N_2$
	$21 \text{ gr mol } O_2$	

$$63.36 - 48 = 15.36 \text{ gr mol}$$

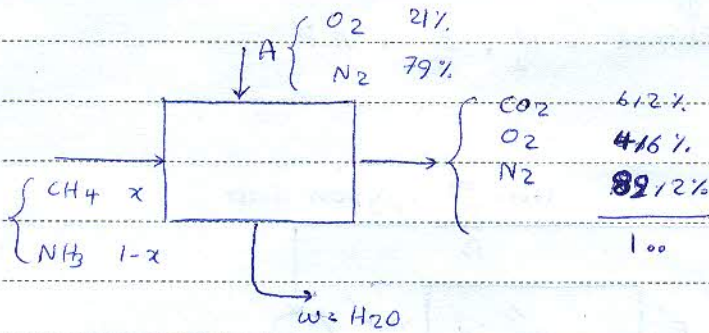
$15.36$	$61.5\%$
$238.4$	$93.95\%$
$253.76$	

234 ص 43 ص



Subject:

Year. Month. Date. (10)



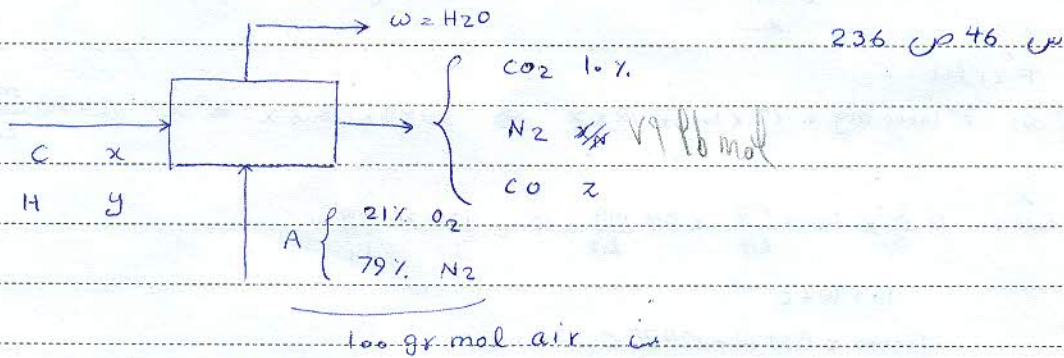
C:  $6.2 = x$

H:  $4x + 3y = 2w \Rightarrow 24.8 + 3y = 2w$

O:  $1/21 A = 6.2 + 4.6 + \frac{w}{2} \Rightarrow w = 1.42 A - 21.6$

N<sub>2</sub>:  $\frac{y}{2} + 1.79 A = 8.9/2$

$$\Rightarrow \left\{ \begin{array}{l} 24.8 + 3y = 1.82 A - 43/2 \\ y + 1.58 A = 17.8/4 \\ 24.8 + 3(1.78/4 - 1.58 A) = 1.82 A - 48/2 \end{array} \right.$$



$100 \text{ gr mol air} \times \frac{29 \text{ gr A}}{1 \text{ gr mol A}} = 2900 \text{ gr A}$

$\frac{2900 \text{ gr A}}{12.15 \text{ gr A}} = 239.5 \text{ gr F} \quad 12x + y = 233/9 \text{ gr}$

$N_2 = \frac{N}{2} = 79 \text{ gr mol}$

C:  $x = 1/12 P + Z$

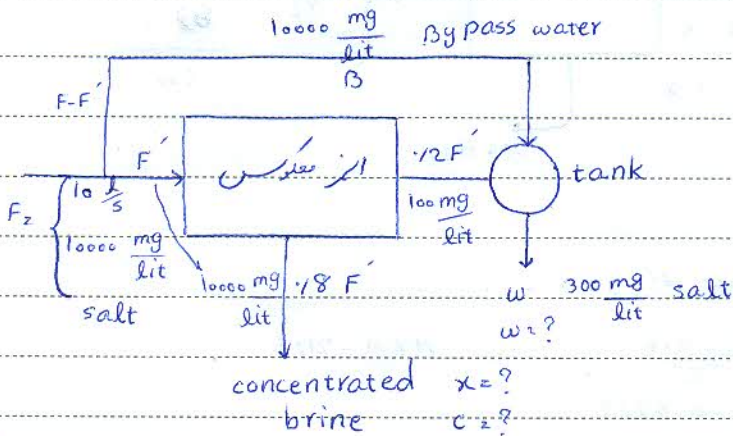
H:  $y = 2w$

Subject:

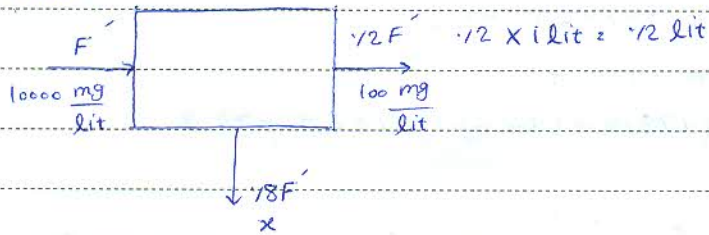
Year. Month. Date. (11)

$$O_2: 21 \text{ lb mol} = \frac{w}{2} + \frac{z}{2} + 0.1 P$$

245  
66  
س



$F' = 1$  lit



$F' = 1$  lit

$$10000 = 10000 \text{ mg} = \frac{1}{2} \times 100 + \frac{1}{8} \times x \Rightarrow 9980 = \frac{1}{8} \times x \Rightarrow x = 12475 \frac{\text{mg}}{\text{lit}}$$

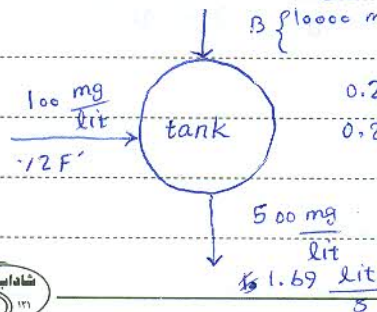
$$10 \frac{\text{lit}}{5} \times 10000 \frac{\text{mg}}{\text{lit}} = 500 \frac{\text{mg}}{\text{lit}} \times w + 12475 \frac{\text{mg}}{\text{lit}} \times c$$

$$10 = w + c$$

$$10000 = 500(w) + 12475c$$

$$10000 = 500(10 - c) + 12475c \Rightarrow 72500 = 11975c$$

$$c = 8.31 \frac{\text{lit}}{5} \quad w = 1.69 \frac{\text{lit}}{5}$$



$$0.2 F' = 1.69 - B$$

$$0.2 F' + B = 1.69$$

$$B \times 10000 + 0.2 F' \times 100 = 1.69 \times 600$$

$$B \times 10000 + (1.69 - B) \times 100 = 845$$

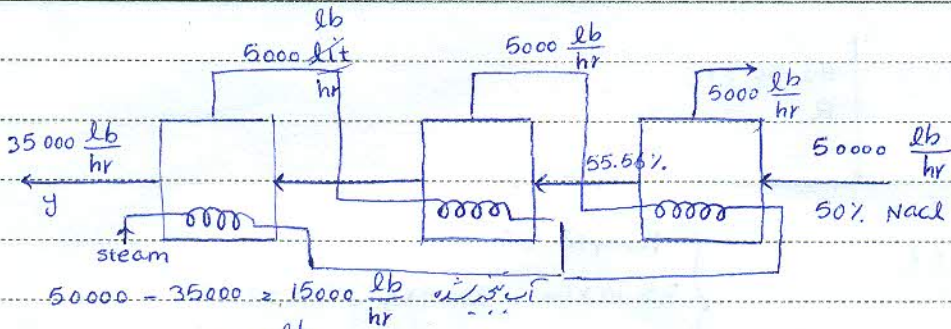
$$9900 B = 845 - 169$$

$$B = 0.068 \frac{\text{lit}}{5}$$

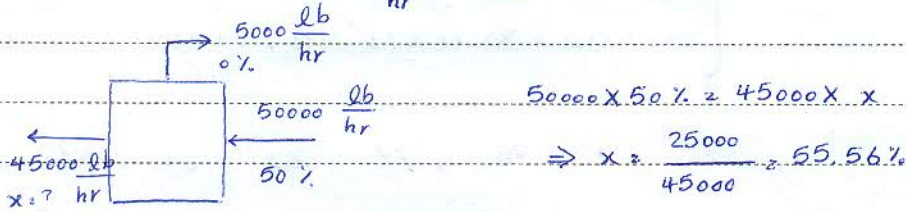
$$F' = 8.11 \frac{\text{lit}}{5}$$

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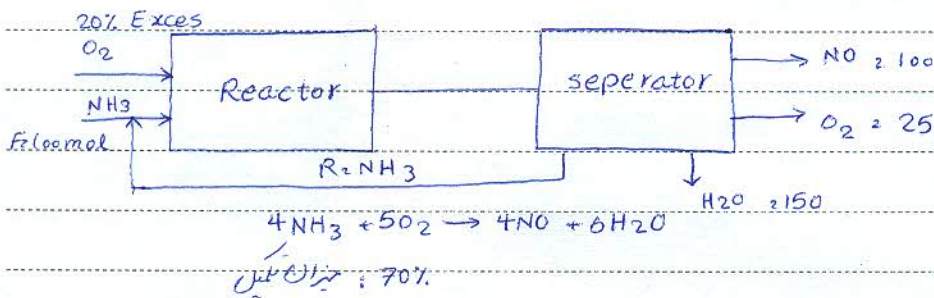


247  
69



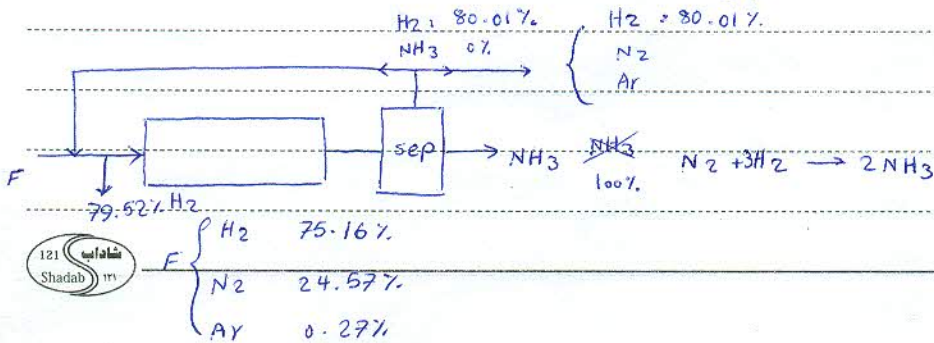
50,000 \* 50% = 35,000 \* y ⇒ y =  $\frac{25,000}{35,000} = 71.42\%$

74  
250



$O_2 = 150 \text{ mol} = 125 + 25$

$(100 + R) \times 0.17 = 30 + 0.3R = R \Rightarrow 0.17R = 30 \Rightarrow R = \frac{30}{0.17} = 176.47 \text{ mol}$



73  
249

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$H_2$  80.01%  
R

$F = 100$   
 $H_2$  75.16%

$F' = 79.52\%$

$$\begin{cases} 100 + R = F' \\ 75.16 \times 100 + 80.01 \times R = 79.52 \times F' \\ 75.16 \times 100 + 80.01 \times (F' - 100) = 79.52 \times F' \end{cases}$$

75 , 77 , 73 , 68 , 67

Subject

YEAR: MONTH: DATE:

س 5 ص 270

$$pV = nRT$$

$$250 \times 10^3 \text{ pa} \times 2 \text{ m}^3 = n \times 8.314 \frac{\text{J}}{\text{mol K}} \times (273 + 50) \text{ K}$$

$$n = \frac{250 \times 10^3 \times 2}{8.314 \times 323} \text{ gr mol}$$

5

$$m = n \times 16 \text{ gr}$$

س 10 ص 277

$$N_2 \text{ فشار } V_{N_2} \quad P_t = P_1 + P_2 + \dots + P_n$$

10 O<sub>2</sub> " "

N<sub>2</sub> فشار

$$\frac{P_1}{P_2} = \frac{n_1}{n_2}$$

O<sub>2</sub> " "

1 /  
O<sub>2</sub> و N<sub>2</sub> اوضاع

$$\frac{V_1}{V_2} = \frac{n_1}{n_2}$$

? = N<sub>2</sub> فشار

15

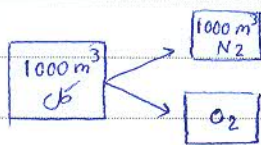
$$V_{N_2} = 0.179 \times 1000 \text{ m}^3 = 179 \text{ m}^3$$

$$V_{O_2} = 0.21 \times 1000 \text{ m}^3 = 210 \text{ m}^3$$

$$P_{N_2} = 0.179 \times 1 \text{ atm} = 0.179 \text{ atm}$$

$$P_{O_2} = 0.21 \times 1 \text{ atm} = 0.21 \text{ atm}$$

20



$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} = nR$$

$$0.179 \times 790 = P_2 \times 1000$$

$$\Rightarrow P_2 \text{ محاسب می شود}$$

25

Espira

مثال 279

$$P_{CO_2} = 0.14 \times 765 \text{ mmHg}$$

$$P_{O_2} = 0.06 \times 765 \text{ mmHg}$$

$$P_{N_2} = 0.8 \times 765 \text{ mmHg}$$

5

آرزش نیمی درصد ها در جدول باشند سوالات کونی زیر جدول شود

	درصد	$m_i$ (gr)	$n_i$ (gr mol)	مبنا: 100 gr مخلوط
CO <sub>2</sub>	14%	14	14/44 = 0.32	
O <sub>2</sub>	6%	6	6/32 = 0.19	
N <sub>2</sub>	80%	80	80/28 = 2.86	

10

$x_i$ %	$P_i$
9.5%	0.095 × 765
5.64%	0.0564 × 765
84.87%	0.8487 × 765

15

مس 290

$$\left(P + \frac{a}{\hat{v}^2}\right)(\hat{v} - b) = RT$$

$$\hat{v} = \frac{V}{n}$$

$$\left(90 \text{ atm} + \frac{2.31 \times 10^6 \text{ atm} \cdot \left(\frac{\text{cm}^3}{\text{gr mol}}\right)^2}{\hat{v}^2}\right) \left(\hat{v} - 44.9 \frac{\text{cm}^3}{\text{gr mol}}\right) \frac{101325 \text{ Pa}}{1 \text{ atm}} \left| \frac{1 \text{ m}^3}{10^6 \text{ cm}^3} \right. = 8.314 \frac{\text{J}}{\text{gr mol K}} \times 373 \text{ K}$$

20

$$\left(90 + \frac{2.31 \times 10^6}{\hat{v}^2}\right) (\hat{v} - 44.9) = 30606$$

$$(90 \hat{v}^2 + 2.31 \times 10^6) (\hat{v} - 44.9) = 30606 \hat{v}^2$$

25

Espira

Subject

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س 4 ص 328

$$\ln p^* = A - \frac{B}{T + C}$$

$$A = 1619119$$

$$B = 3803198$$

$$C = -41168$$

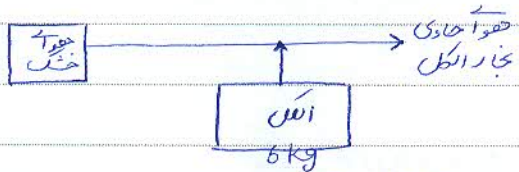
$$\ln p^* = 1619119 - \frac{3803198}{323 - 41168}$$

$$\Rightarrow p^* = 29,67 \text{ mmHg}$$

رغ رسانی قبل  
استفاده  
T = 270 K  $\bar{v}$  369 K  
-3°C  $\bar{v}$  98°C

ب ↑ ⇒ ش رطوبت ↑

10



مثال 20 فصل 3  
EtoH 5193%  
Air 94107%

$$P_{\text{EtoH}} = 5,93 \text{ kpa}$$

$$P_{\text{Air}} = 100 - 5,93 = 94,07 \text{ kpa}$$

15

$$\frac{6000 \text{ gr}}{46 \frac{\text{gr}}{\text{mol}}} = 130,4 \text{ gr mol EtoH}$$

20

EtoH 130,4 gr mol  
Air 2064 gr mol

مثال 21 فصل 3

25

10000 ft<sup>3</sup>  
80°F  
6 in H<sub>2</sub>O (gauge)

Espira



$P_{\text{barometer}} = 28.46 \text{ inHg}$

$m_{\text{H}_2\text{O}} = ?$

6 in H <sub>2</sub> O	= 0.44 inHg
13/6	

$P_{\text{abs}} = 28.46 + 0.44 = 28.90 \text{ inHg}$

$P_{\text{air}} = 28.90 - 1.03 = 27.87 \text{ inHg}$

$m = ?$

$10000 \text{ ft}^3$   
 $T = 80^\circ \text{F}$

مثال 21 ص 322

$P_2 = 6 \text{ in H}_2\text{O}$

$P_b = 28.46 \text{ inHg}$

$P_g = 0.44 \text{ inHg}$

$P_a = 28.90 \text{ inHg}$

$v_g = 633.7 \frac{\text{ft}^3}{\text{lb}_m}$

$v = 10000 \text{ ft}^3$

$m = \frac{v}{v_g} = \frac{10000 \text{ ft}^3}{633.7 \frac{\text{ft}^3}{\text{lb}_m}} =$

فشار جزئی بخار = رطوبت نسبی  
فشار بخار

$$\frac{\text{تعداد مولها آب به صورت بخار}}{\text{تعداد مولها آب به صورت بخار} + \text{تعداد مولها آب به صورت مطلق}} = \frac{n_1}{n_2} \rightarrow \text{رطوبت طوی}$$

$$\frac{\text{تعداد مولها آب به صورت بخار}}{\text{تعداد مولها آب به صورت بخار} + \text{تعداد مولها آب به صورت مطلق}} = \frac{P_1}{P_2} = \frac{P_t - P_1}{P_t - P^*}$$

$$\frac{\text{تعداد مولها آب به صورت بخار}}{\text{تعداد مولها آب به صورت بخار} + \text{تعداد مولها آب به صورت مطلق}} = \frac{P_1}{P_2} = \frac{P_t - P_1}{P_t - P^*}$$

مثال 25-3

Subject

YEAR: MONTH: DATE:

$$RH = \frac{P_{Et-AC}}{P_t - P_{Et-AC}} \times \frac{P_{Et-AC}^*}{P_t - P_{Et-AC}^*}$$

$$5. P_{Et-AC} = \frac{12}{100} \times 98 = 11,76$$

$$P_{He} = 98 - 11,76 = 86,24$$

$$P_{Et-AC}^* = 15,9 \text{ kPa}$$

$$P_{He}^* = 98 - 15,9 = 82,1$$

$$RH = \frac{11,76}{15,9} \times 100 = 74\%$$

10.

Relative Humidity =  $\frac{11,76}{86,24} \times \frac{82,1}{15,9} = 70,14\%$

28-3 من

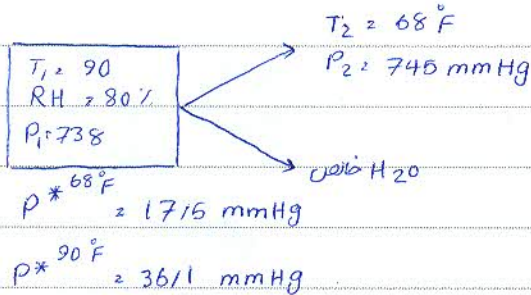
$$T_1 = 90^\circ F \quad T_2 = 68^\circ F$$

$$15. RH_1 = 80\% \quad RH_2 = ?$$

$$P_1 = 738 \text{ mmHg} \quad P_2 = 745 \text{ mmHg}$$

نسب ؟

20.



بناءً: 738 مول هواء جاف

$$RH_1 = \frac{80}{100} = \frac{P}{P^*} \Rightarrow P = \frac{80}{100} \times 36,1 = 28,88 \text{ mmHg}$$

25.

Espira

$$P = 738 - 28/88 = 709/12$$

$$n_{\text{هو}} = 738 \times \frac{709/12}{738} = 709/12 \text{ mol}$$

$$P_{\text{آب}} = 738 - 709/12 = 28/88$$

$$5. \quad RH_2 = ?$$

$$P_2 = 745 \text{ mm Hg}$$

$$P_1 = 17/5 \text{ mm Hg}$$

$$P = 745 - 17/5 = 727/5$$

$$\frac{n_1}{n_2} = \frac{P_1}{P_2} \quad \frac{n_1}{709/12} = \frac{17/5}{727/5} \Rightarrow n_1 = 17/106 \text{ mol}$$

$$n_{\text{آب}} = 11/82$$

فصل 3 (1، 6، 11، 26، 23، 78، 81، 87، 94، 97)

مخلوط آب و هگزان را به نسبت ابر 3 بهم مخلوط می کنیم و به جوش می آوریم و سپس بخارات حاصل را توسط یک سردردنی نسیم، ترکیب در صد مایع را به نسبت آورید. (راهحالی: از رابطه آنتوان استفاده کنید)

$$\ln P^* = A - \frac{B}{T+C}$$

یا درجه بر صغیری G:

$$20. \quad \begin{cases} A_1 = 15/84 \\ B_1 = 2697/55 \\ C_1 = -48/38 \end{cases} \quad \text{هگزان}$$

$$25. \quad \begin{cases} A_2 = 18/3 \\ B_2 = 3816/4 \\ C_2 = -46/13 \end{cases} \quad \text{آب}$$

Subject \_\_\_\_\_

YEAR: \_\_\_\_\_ MONTH: \_\_\_\_\_ DATE: \_\_\_\_\_

$$P_t = P_1^* + P_2^*$$

$$P_t = (A_1 + A_2) \frac{B_1}{T+C_1} + \frac{B_2}{T+C_2} \quad P_t = \exp\left(A_1 - \frac{B_1}{T+C_1}\right) + \exp\left(A_2 - \frac{B_2}{T+C_2}\right)$$

$$\ln(760 \text{ mmHg}) \Rightarrow T \text{ درجه سانتیگراد}$$

5

$$T = 86^\circ\text{C}$$

$$\ln P_1^* = A_1 - \frac{B_1}{86+273-C_1}$$

$$\ln P_2^* = A_2 - \frac{B_2}{86+273-C_2}$$

$$10 \quad \frac{n_1}{n_2} = \frac{P_1}{P_2}$$

59 , 56 , 53 , 43 , 29 , 26 , 20 , 15 , 9 , 1 (4 فصل)

س 132 فصل 4 CO با اکسیژن هوا اصطناعی می گورد. درصد هوا اصطناعی را

در فشار ثابت

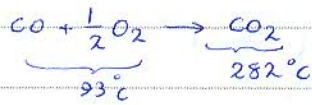
$$15 \quad p = cte$$

بر نسبت آورید

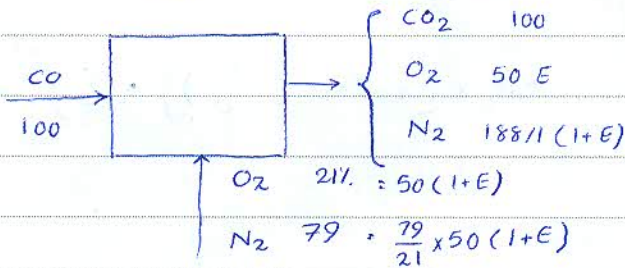
هوا اصطناعی

$$\frac{1}{T_1} = 1255 \text{ K}$$

$$\frac{1}{T_2} = 93^\circ\text{C}$$



20



$$\Delta H_c = 282199 \frac{\text{kJ}}{\text{g mol}}$$

$$736 \text{ F}$$

25

**Espira**

$CO, O_2, N_2$  $93^\circ C$ 

$$\Delta H_1 = 100 \int_{93}^{25} c_{p,CO} dt + 50(1+E) \int_{93}^{25} c_{p,O_2} dt + 188.1(1+E) \int_{93}^{25} c_{p,N_2} dt$$

 $25^\circ C$  $CO, O_2, N_2$ 

سوختن

$$\Delta H_c = -288,9 \text{ kJ} \times 100$$

 $282^\circ C$ 

$$\Delta H_2 = 100 \int_{25}^{982} c_{p,CO} dt + 50E \int_{25}^{982} c_{p,O_2} dt + 188.1(1+E) \int_{25}^{982} c_{p,N_2} dt$$

 $CO_2, O_2, N_2$  $25^\circ C$ 

$$\Delta H_1 + \Delta H_c + \Delta H_2 = 0$$

درصد تبدیل در یک واکنش سوختن از رابطه زیر بدست می آید. تعیین کنید درصد هوا اضافی چند درصد است

$$\text{درصد تبدیل} = 1 - \exp\left(-\frac{1}{C} \cdot E\right)$$

عدد ثابتی است

تا حد اکثر در حالت بدترین آید

$$\Delta H_c \times \left[1 - \exp\left(-\frac{E}{a}\right)\right] = \sum_{25}^T c_p dt$$