

8-

$$w = -P_{\text{ext}} \Delta V \times 10^1$$

5- There is 4.8 g of O₂ gas in a 5.6 L container at 273°C. How many atm is the pressure applied to the vessel? (O: g/mol)

a) 1,2b) 1,5c) 1d) 0,5e) 2 Leave blank

$$m = 4.8 \text{ g}$$

$$V = 5.6 \text{ L}$$

$$T = 273^\circ\text{C} + 273 = 546 \text{ K}$$

$$P = ? \text{ atm}$$

$$M_r = 32 \text{ g/mol}$$

$$R = 0.0821$$

$$PV = nRT$$

$$PV = \frac{m}{M_r} RT$$

$$P = \frac{mRT}{VM_r}$$

$$= \frac{4.8 \times 0.0821 \times 546}{5.6 \times 32}$$

$$= 1.2 \text{ atm}$$

9-

5- The pressure of the gas in a 12 L container with an ideal frictionless piston is 2 atmospheres. When the piston is pushed down until the vessel volume is 4 liters, it is observed that the pressure of the gas is 8 atmospheres and the temperature is 127 °C. What is the initial temperature of the gas in °C? (Assume that the gas behaves ideally.)

a) 200b) 105c) 52d) 27e) 300 Leave blank

$$V_1 = 12 \text{ L}$$

$$P_1 = 2 \text{ atm}$$

$$T_1 = ? ^\circ\text{C}$$

$$V_2 = 4 \text{ L}$$

$$P_2 = 8 \text{ atm}$$

$$T_2 = 127^\circ\text{C}$$

$$+ 273 =$$

$$400$$

Combined gas law

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

$$T_1 = \frac{P_1 V_1 T_2}{P_2 V_2} = \frac{12 \times 2 \times 400}{8 \times 4}$$

$$= 300 \text{ } ^\circ\text{C} - 273$$

$$= 27^\circ\text{C}$$

10-

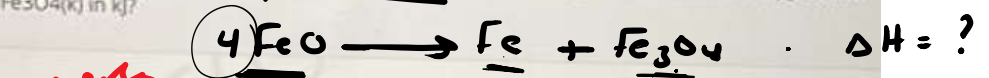
4. 1 bar pressure corresponds to how many atm pressure?

- a) 7.3 0.987
 b) 0.987 0.9869
 c) 1.01325
 d) 2.5
 e) 0.125
 Leave blank
- 1 atm = 1.01325 bar
 ?
 $\frac{1}{1.01325} = \underline{\underline{0.9869}}$

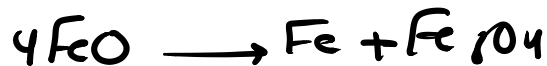
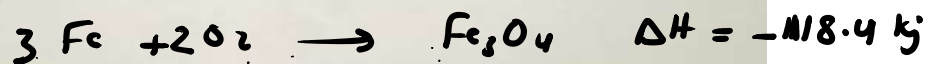
11-

5. $2 \text{Fe}(k) + \text{O}_2(g) \rightarrow 2 \text{FeO}(k) \Delta H = -544,0 \text{ kJ}$ and $3 \text{Fe}(k) + 2\text{O}_2(g) \rightarrow \text{Fe}_3\text{O}_4(k) \Delta H = -1118,4 \text{ kJ}$. What is the enthalpy of the reaction $4 \text{FeO}(k) \rightarrow \text{Fe}(k) + \text{Fe}_3\text{O}_4(k)$ in kJ?

- a) 574,4
 b) 1662,4
 c) 2206,4
 d) -30,4
 e) -1662,4
 Leave blank



reverse



$\Delta H = +544,0 \times 2 - 1118,4 = \underline{\underline{-30,4 \text{ kJ}}}$

12-

1- 200 ml of NaOH solution of unknown concentration is titrated with 0.1 M H₂SO₄ solution. Since 40 ml H₂SO₄ is consumed during this process, what is the concentration of NaOH solution (M)?

a) 0,1
 b) 1
 c) 0,08
 d) 1,6
 e) 0,5
 Leave blank

$$2 \text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$$

$n_{\text{NaOH}} = 2 n_{\text{H}_2\text{SO}_4}$
 $n_{\text{H}_2\text{SO}_4} = c \times v = 0,1 \times \frac{40}{1000} = 0,004$
 $n_{\text{NaOH}} = 2 \times 0,004 = 0,008$
 $c = \frac{n}{v} = \frac{0,008}{0,2}$

$$c_{\text{NaOH}} \times V_{\text{NaOH}} = 2 (c_{\text{H}_2\text{SO}_4} \times V_{\text{H}_2\text{SO}_4})$$

$$c_{\text{NaOH}} \times 200 = 2 (0,1 \times 40)$$

$c_{\text{NaOH}} = 0,04$

13-

6- How many kJ is the heat released when 10 ml of ethanol is burned? (The molar enthalpy -1367 kJ/mol; its density is 0,789 g/ml; its molar mass is 46 g/mol)

a) -856
 b) -1367
 c) -296
 d) -234
 e) -1079
 Leave blank

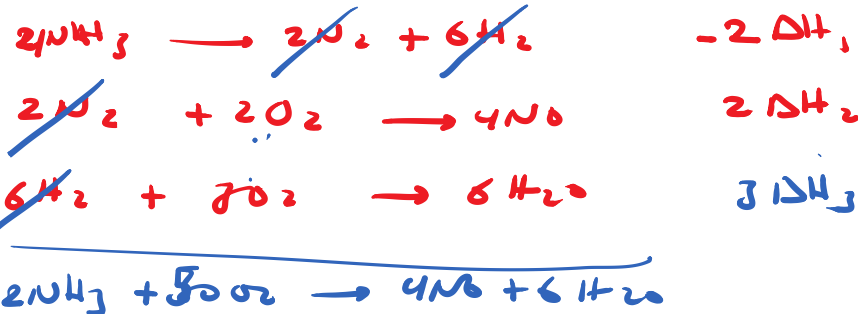
$q = ?$
 $\Delta H = \frac{q}{n}$
 $q = n \times \Delta H$
 $V = 10 \text{ ml}$
 $\Delta H = -1367$
 $d = 0,789 \text{ g/ml}$
 $M_r = 46 \text{ g/mol}$
 $m = d \times V = 10 \times 0,789 = 7,89$
 $n = \frac{m}{M_r} = \frac{7,89}{46} = 0,1715$
 $q = n \times \Delta H = 0,1715 \times -1367 = -234,4 \text{ kJ}$

14-

7- Calculate the enthalpy value of the reaction $4 \text{NH}_3(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 4 \text{NO}(\text{g}) + 6 \text{H}_2\text{O}(\text{l})$ in terms of the enthalpy values the reactions given below. $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightarrow 2 \text{NH}_3 \Delta H_1$ $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2 \text{NO} \Delta H_2$ $2 \text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2 \text{H}_2\text{O} \Delta H_3$

a) $2 \Delta H_1 - \Delta H_2 - 2 \Delta H_3$
 b) $2 \Delta H_1 - 2 \Delta H_2 - 3 \Delta H_3$
 c) $3 \Delta H_1 - 2 \Delta H_2 - 2 \Delta H_3$
 d) $\Delta H_1 + 3 \Delta H_2 - 2 \Delta H_3$
 e) $-2 \Delta H_1 + 2 \Delta H_2 + 3 \Delta H_3$
 Leave blank

$2 \times (\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3) \quad \Delta H_1$
 $2 \times (\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}) \quad \Delta H_2$
 $3 \times (2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}) \quad \Delta H_3$



15-

$-2\Delta H_1 + 2\Delta H_2 + 3\Delta H_3$

7- Which of the following sets of quantum numbers, n , l , m_l , m_s , represents the 2p orbital?

- a) (2, 1, 0, 1/2)
- b) (3, 1, 1, 1/2)
- c) (3, 2, 1, 0)
- d) (1, 1, 1, 1/2)
- e) (3, 2, 0, -1/2)
- Leave blank

16-

9 - Which of the following sets of quantum numbers, n , l , m_l , m_s , represents the 3d orbital?

- a) (1, 1, 1, 1/2)
- b) (2, -1, 0, 1/2)
- c) (3, 2, 0, -1/2)
- d) (3, 2, 1, 0)
- e) (3, 1, 1, 1/2)
- Leave blank

17-

14 - 1900 mmHg pressure corresponds to how many atm pressure?

a) 1.25

b) 70.3

c) 2.5

d) 0.125

e) 703000

Leave blank

$$1 \text{ atm} \rightarrow 760 \text{ mmHg}$$

$$? \quad 1900 \text{ mmHg}$$

$$\frac{1900}{760} = \underline{\underline{2.5}} \text{ atm}$$