

Name: Answer Key

9:40

All Questions 4 Marks Each

1. Give the name of the formula:

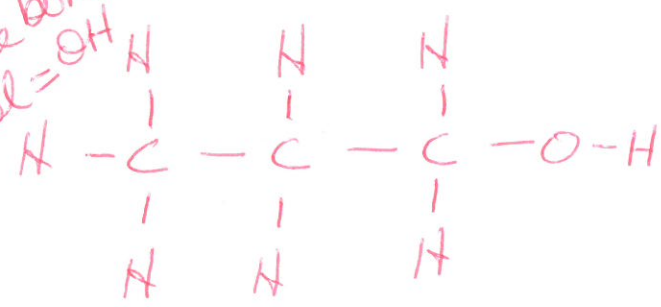
- A)  $K_3PO_4$  potassium phosphate
- B)  $CuI_2$  copper (II) iodide
- C)  $Ni(ClO_3)_3$  nickel (III) chlorate
- D)  $P_2S_3$  diphosphorus trisulfide

2. Determine the formula:

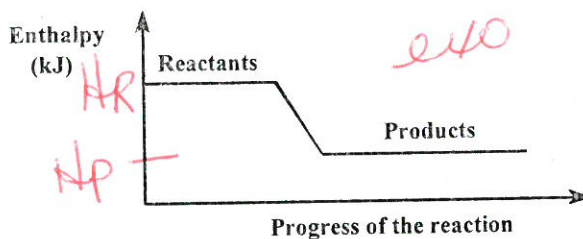
- A) Magnesium sulfate  $MgSO_4$
- B) Hydrogen phosphide  $H_3P$
- C) Iron (2) chloride  $Fe^{2+}Cl_2^-$
- D) calcium acetate  $Ca(C_2H_3O_2)_2$

3. Draw the Lewis dot diagram of propanol.

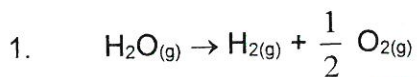
pro = 3C  
 alc = single bonds  
 ol = alcohol = OH



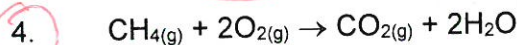
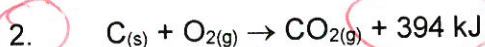
4. The following diagram shows the enthalpy involved in certain systems as a function of the progress of the reaction.



Which of the following two equations can be represented by this diagram?



$\Delta H = +242 \text{ kJ}$  *endo*



$\Delta H = -803 \text{ kJ}$  *exo*

A) 1 and 2

C) 2 and 4

B) 1 and 3

D) 3 and 4

5. Below is a list of physical and chemical changes.

1. Sublimation of iodine crystals

2. Solidification of water *S ← L*

3. Combustion of a match

4. Vaporization of alcohol *L → G = endo*

Which of these changes are exothermic?

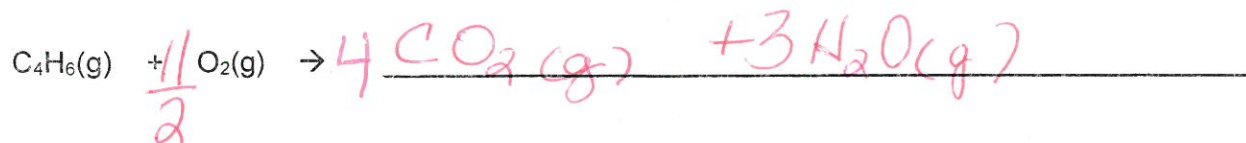
A) 1 and 2

C) 2 and 3

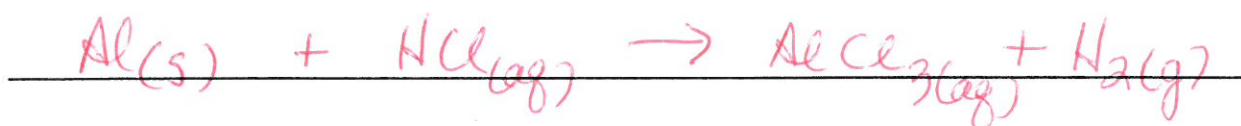
B) 1 and 4

D) 3 and 4

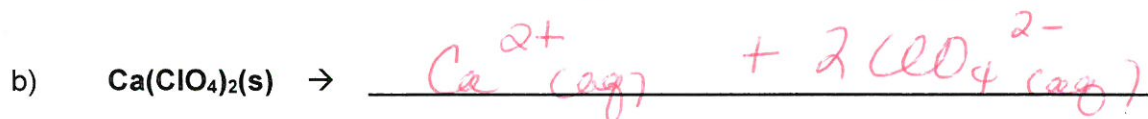
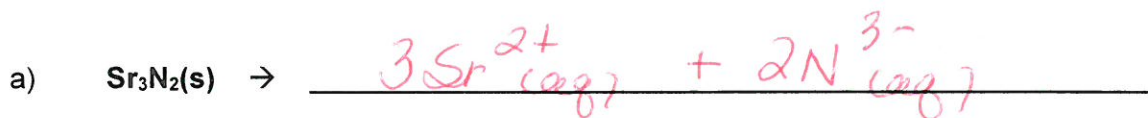
6. Complete and balance the following 2 chemical equations:



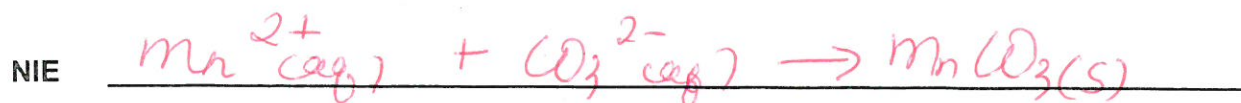
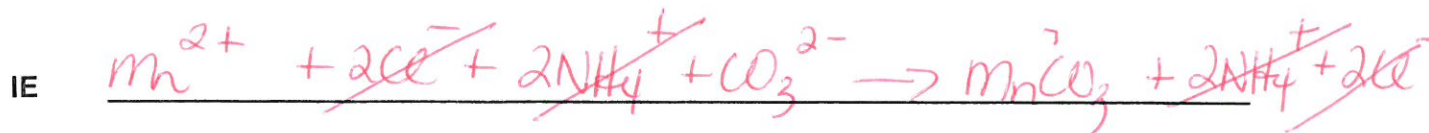
Aluminum and hydrochloric acid react to form aluminum chloride and hydrogen.



7. Show how the following 2 ionic compounds dissociate in water:



8. Write the net ionic equation for the following reaction:



9. What is the mass of a piece of iron given its specific heat capacity is  $0.46 \text{ J/g}^\circ\text{C}$  and it takes  $3341.5 \text{ J}$  to raise its temperature from  $55.0^\circ\text{C}$  to  $200.0^\circ\text{C}$ ?

$$Q = mc\Delta T$$

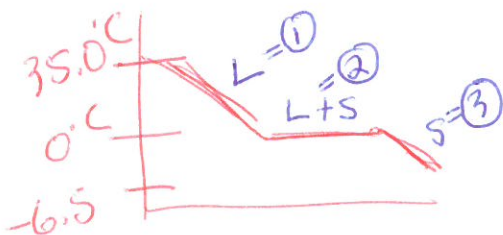
$$\frac{3341.5 \text{ J}}{(0.46 \text{ J/g}^\circ\text{C})(200.0^\circ\text{C} - 55.0^\circ\text{C})} = 50.1 \text{ g}$$

Answer: 50.1 g Fe

10. Given the following information determine how much heat energy involved as  $25.0 \text{ mL}$  of water is taken from  $35.0^\circ\text{C}$  to  $-6.5^\circ\text{C}$ ?

**Thermal Constants of Water**

Specific heat capacity of ice ( $\text{J/g}^\circ\text{C}$ )	2.12
Specific heat capacity of water ( $\text{J/g}^\circ\text{C}$ )	4.19
Specific heat capacity of water vapour ( $\text{J/g}^\circ\text{C}$ )	2.00
Heat of fusion of water ( $\text{kJ/mol}$ )	6.01
Heat of fusion of water ( $\text{kJ/mol}$ )	40.8



$$1) Q = mc\Delta T = (25.0 \text{ g})(4.19 \text{ J/g}^\circ\text{C})(0^\circ\text{C} - 35.0^\circ\text{C}) = -3666 \text{ J}$$

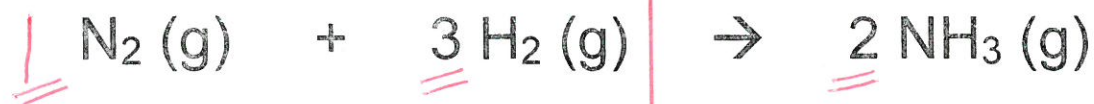
$$2) Q = n\Delta H = (25.0 \text{ g}) \left( \frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g}} \right) (-6.01 \text{ kJ/mol}) = -8.347 \text{ kJ}$$

$$3) Q = mc\Delta T = (25.0 \text{ g})(2.12 \text{ J/g}^\circ\text{C})(-6.5^\circ\text{C} - 0) = -345 \text{ J}$$

Answer: -12000 J      -12000 J

cooling down! losing  $\epsilon$ ! exo!

11. Determine the molar enthalpy for the following reaction using bond energies.



$$1 \text{ N} \equiv \text{N} = 945$$

$$3 \text{ H}-\text{H} =$$

$$3(436) = 1308$$

$$2 \times 3 \times \text{N}-\text{H} =$$

$$6(391) = 2346$$

$$\text{BER} = 2253 \text{ kJ}$$

$$\text{BEP} = 2346 \text{ kJ}$$

$$\Delta H = -93 \text{ kJ}$$

Answer:           -93 kJ

