

Chemistry 200
Final

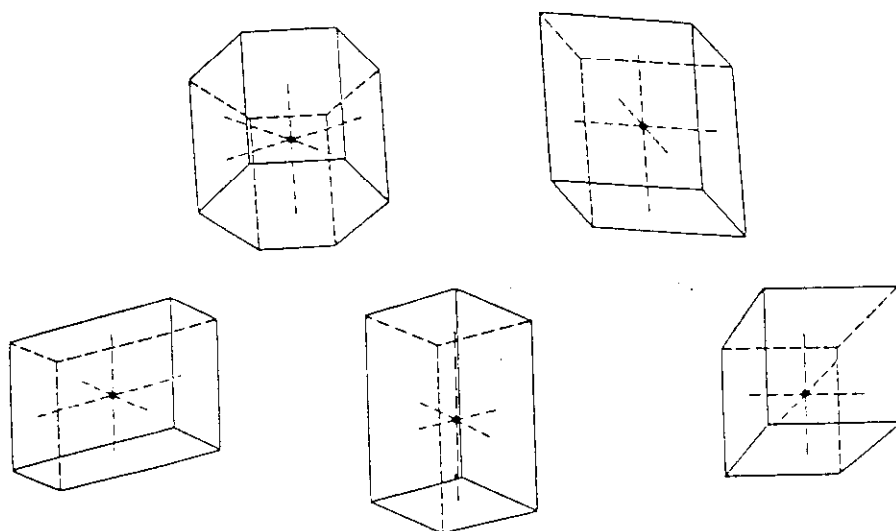
Fall 1995/6
2 Hours

Family Name:
First Name:
I.D. No.

Additional Data: $R=0.082 \text{ Latm/Kmol}$, Avogadro's number 6.02×10^{23}

Q1 [3 marks]

Circle the crystalline pattern which best represents a triclinic crystal



Q2 [8 marks]

How many carbon atoms are there in 0.00220g of carbon dioxide

Q3 [8 marks]

A compound was found to contain 72.0% Mn, and the remainder was oxygen. Determine its empirical formula

Q4 [7 marks]

The following materials can be classified into one of the four types of crystalline solid:

- I Ionic
- II Molecular
- III Atomic-Metallic
- IV Atomic-Nonmetallic

Circle the appropriate type for each crystalline compound

Diamond	<input checked="" type="radio"/>	I	II	III	IV
Calcium	<input checked="" type="radio"/>	I	II	III	IV
Cesium Fluoride	<input checked="" type="radio"/>	I	II	III	IV
Copper Sulfide	<input checked="" type="radio"/>	I	II	III	IV
Rubidium	<input checked="" type="radio"/>	I	II	III	IV
Sucrose	<input checked="" type="radio"/>	I	II	III	IV
Graphite	<input checked="" type="radio"/>	I	II	III	IV

Q5 [12 marks]

Given the following information

Salt	K _{sp} at 25°C
Ag ₂ CrO ₄	1.9×10 ⁻¹²
CaF ₂	3.9×10 ⁻¹¹
AgCl	1.7×10 ⁻¹⁰

Calculate the concentration of:

- Ag⁺ in a saturated aqueous solution of AgCl at 25°C
- Fluoride in a saturated aqueous solution of CaF₂ at 25°C
- CrO₄²⁻ in a saturated solution of Ag₂CrO₄ at 25°C.

Q6 [9 marks]

A beaker containing an aqueous solution of Na_2SO_4 was heated by flame, and the solution boiled at 100.40°C . Given that the atmospheric condition was such that pure water boiled at 99.90°C , determine the original concentration of the sodium sulfate solution in moles per kilograms water before heating. ($K_b=0.52^\circ\text{C/m}$)

Q7 [8 marks]

4.0g of a mixture of calcium carbonate and sand is treated with an excess of hydrochloric acid, and 0.880g of carbon dioxide is produced. What is the percentage of CaCO_3 in the original mixture?

Q8 [8 marks]

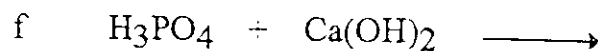
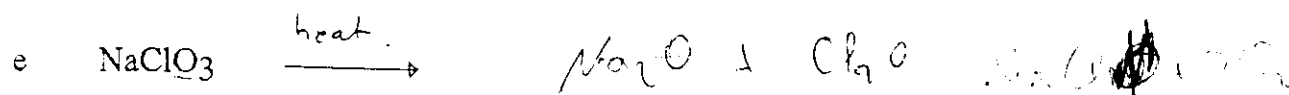
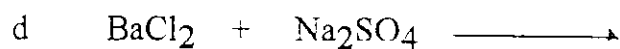
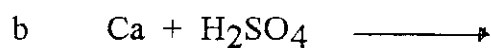
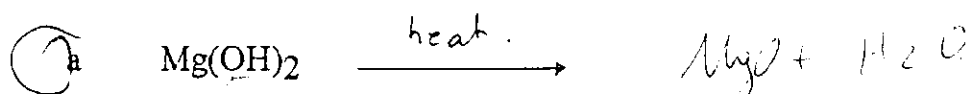
If 12.0g of nitrogen, 0.40g of hydrogen and 9.0g of oxygen are put into a 1.0 litre container at 27°C, what is the total pressure in the container?

Q9 [7 marks]

2.60g of water is injected into an evacuated chamber having a volume of 5.0 litres and a constant temperature of 100.0°C. Calculate the gas pressure (in torr) at equilibrium.

Q10 [12 marks]

Complete and balance the following equations, and state what type of reactions they are i.e. decomposition, single-replacement or double-replacement

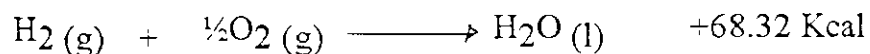
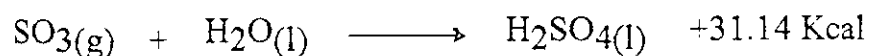
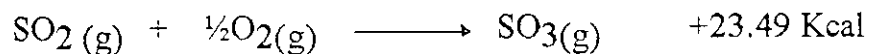
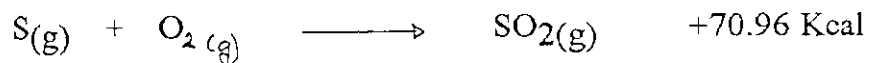


Q 11 [8 marks]

The hydrofluoric acid in a 0.040 M HF solution is 13.4% ionized. Calculate K_a for HF.

Q 12 [10 marks]

Consider the following the equation:



Calculate ΔH_f° for $\text{H}_2\text{SO}_4(\text{l})$ using Hess's Law. If the formation of $\text{H}_2\text{SO}_4(\text{l})$ from its elements is

