

Chemistry 3202

June 2011 Public Exam Outcome Report

This examination follows the specifications, conventions and standards set out in the:
Chemistry 3202 Provincial Exam Standards

Units 1 – From Kinetics to Equilibrium 3 – Thermochemistry
 2 – Acids and Bases 4 – Electrochemistry

PART I: Selected Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Outcome Description
1	(Unit 1) 28	ACC-1	L1	Identify a piece of evidence that supports KMT.
2	28	ACC-1	L1	Label a PE diagram.
3	28	ACC-1	L2	Identify a method of measuring the reaction rate of given reaction in a closed system.
4	30	ACC-2	L2	Describe factors that affect reaction rate.
5	34	ACC-3	L1	Compare potential energy diagrams relative to rate of reaction.
6	38	323-3	L1	State the criteria that apply to a system at equilibrium.
7	40	323-4 323-5	L2	Determine the change imposed on an equilibrium system from a graphical representation of the equilibrium system.
8	44	323-3	L1	Write the equilibrium constant expression, K , for a given reaction.
9	40	323-4 323-5	L2	Use LCP to predict a shift in equilibrium.
10	44	323-3	L1	Recognize when the equilibrium constant, K , changes for a system.
11	44	323-3	L2	Given a percentage yield for a system at equilibrium, describe the equilibrium constant and the volume of the system.
12	44	323-3	L3	Calculate K_{eq} given the equilibrium equation and the amounts of each species in a given volume.
13	(Unit 2) 54	320-1	L1	Identify acids & bases using the appropriate theory.
14	54	320-1	L1	Describe acids & bases using the appropriate theory.

15	68	320-4	L1	Describe a strong/weak acid.
16	56	214-17	L1	Identify an amphoteric substance.
17	58	214-17	L3	Compare acids by making connections between the properties of strong and weak acids.
18	60	320-2	L2	Predict whether acids or bases are favored in an acid-base equilibrium.
19	58	214-17	L1	Determine acid or base strength from the acid-base strength table.
20	66	320-4	L2	Convert between any two of $[H_3O^+]$, $[OH^-]$, pH, and pOH.
21	62,66	320-4	L2	Calculate the pOH from the concentration of a solution.
22	66	320-4	L1	Convert between any two of $[H_3O^+]$, $[OH^-]$, pH, and pOH.
23	66	320-4	L2	Perform dilution calculations to determine the resultant pH.
24	76	320-6	L1	Identify a lab instrument used during the process of a titration.
25	80	320-7	L3	Given a graphical representation, interpret the affect of pH on an indicator.
26	84	214-5	L2	Sketch and interpret titration curves.
27	STSE	ACC-5	L2	State general examples of how our lives are affected by acid-base chemistry.
28	56	214-17	L2	Identify conjugate acid-base pairs in an acid-base equilibrium.
29	(Unit 3) 92	308-2	L1	Explain temperature and heat using the concept of kinetic energy and the particle model of matter.
30	94	324-3	L1	Describe heat transfer in a given situation.
31	94	324-3	L1	Identify the features of open, closed and isolated systems.
32	94	324-3	L2	Perform calculations involving heat capacity and specific heat capacity.
33	96	324-3	L2	Perform calculations involving specific heat capacity.
34	98	324-3	L2	Communicate energy changes using an enthalpy diagram.
35	104	324-1	L3	Use stoichiometry involving enthalpy calculations to determine an unknown substance.
36	104	324-1	L2	Calculate the energy associated with a substance performing a phase change.
37	104	324-1	L1	Identify the symbol for various molar enthalpy changes.
38	104	324-1	L2	Use stoichiometry to calculate the amount of heat released in an exothermic reaction.
39	108	214-3	L2	Interpret the energy changes in heating and cooling curves.
40	110	117-9	L1	Compare physical, chemical, and nuclear changes based on the magnitude of the energy involved.

41	(Unit 4) 126	322-1	L1	Relate the process of oxidation and reduction to a change in oxidation number.
42	126	322-1	L2	Identify the oxidizing agent and the reducing agent in a redox equation.
43	126	322-3	L2	Determine the oxidation number of an atom in an ion or a molecule.
44	126	322-1	L2	Determine whether a reaction is a redox reaction.
45	128	322-3	L1	Identify oxidation and reduction half reactions.
46	130	322-2	L2	Solve redox stoichiometry problems.
47	142	322-8	L1	Define electrolytic cells as requiring electrical energy to cause a non-spontaneous reaction to occur.
48	138	322-5 322-6	L3	Use standard reduction potentials to predict cell voltage.
49	144	322-8	L2	Perform stoichiometry calculations relating to electroplating.
50	150	322-7	L1	Distinguish between different types of cell batteries.

PART II: Constructed Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Value	Outcome Description
51a(i)	(Unit 1) 32,34	ACC-3	L2	1	Given a reaction mechanism, determine the equation for the overall reaction.
51a(ii)	32,34	ACC-3	L2	2	Given a reaction mechanism, identify any intermediates and/or catalysts present.
51b(i)	38	323-4 323-5	L2	2	Describe the changes that occur to an equilibrium system when the amount of a species in the system changes.
51b(ii)	44	323-3	L3	2	Given the concentrations of a system and the equilibrium constant, decide the direction the system will shift to reestablish equilibrium.
51c	38	323-3	L3	2	Given a graphical representation of a system establishing equilibrium, write the balanced equation for the equilibrium reaction.
51d	46	ACC-4	L2	4	Solve K_{eq} problems involving initial concentrations and percent reaction.

52a	(Unit 2) 60	320-2	L2	2	Predict the Brønsted-Lowry acid-base neutralization reaction that is most likely to occur between two solutions.
52b	68	320-4	L3	2	Given the properties of three solutions of unknown acids and bases, evaluate and categorize information about each solution.
52c	70	320-3	L2	4	Calculate pH given the initial concentration of a weak acid (or weak base) and K_a (or K_b).
52d	76	320-6	L2	4	Given the volumes of four titration trials, perform stoichiometric calculations to determine the concentration of an acid (science communication mark).
52e(i)	80,84	320-7 214-5	L3	1	Given the number of protons transferred and the appropriate indicator used for an acid-base titration, sketch a curve of the titration.
52e(ii)	80,84	320-7 214-5	L3	1	Identify a possible acid and a possible base for this titration.
53a	(Unit 3) 96,106	324-3 324-1	L3	4	Find the specific heat capacity of a metal using the information provided in a graph (science communication mark).
53b	112	ACC-8	L2	2	Determine fuel value based on calorimeter data.
53c	114	324-4	L2	4	Use Hess's Law to calculate the enthalpy of a reaction.
53d	118	324-4	L2	3	Use bond energies to determine the enthalpy of a reaction.
54a	(Unit 4) 130	322-2	L2	3	Balance redox reactions under basic conditions.
54b	138	322-5 322-6	L3	3	Given a list of lab materials and chemicals, construct an electrochemical cell that produces a specified voltage. Write the two half reactions identifying the anode, cathode and cell voltages used to produce the cell.
54c	144	322-8	L2	4	Perform stoichiometric calculations using Faraday's Law to determine the amount of time required to electroplate a specified amount of a metal (science communication mark).