



Information Document

Chemistry

CHE-500.A11

Theory Examination – Secondary 5

Creation Team: English Montreal School Board

Validation Team: Western Quebec School Board

Portal Validation: Lester B. Pearson and English Montreal School Board

Structure

This theory examination evaluates mastery and use of subject-specific knowledge as well as Competencies 2 and 3 of the *Chemistry* program. It consists of 25 questions in two sections worth a total of 100 marks.

The following table provides a distribution of the questions in each content area of the program, a breakdown of the types of questions and the percentage value for the exam.

Content Area	Gases	Energy Changes in Reactions	Reaction Rate	Chemical Equilibrium
Weighting	28 %	28 %	12 %	32 %
Part A Multiple-Choice 40 %	3 questions	2 questions	2 questions	3 questions
Part B Constructed-Response 60 %	4 questions	5 questions	1 question	5 questions

NOTE: *Each question is worth four marks.
Significant figures will be evaluated in one question.*

Secondary 5 – CHE-500.A11 (Cont'd)

Competencies and Criteria Evaluated

Competencies:

- *Makes the most of his/her knowledge of chemistry.*
- *Communicates ideas relating to questions involving Chemistry, using the languages associated with science and technology*

Criteria:

- *Mastery of subject-specific knowledge targeted in the Progression of Learning:
Gases, Energy Changes in Reactions, Reaction Rates, Chemical Equilibrium and Measurement Techniques.*
- *Relevant use of knowledge of chemistry*
- *Appropriate formulation of explanations or solutions*

Time Allotted

3 hours (An additional 15 minutes may be allotted if needed.)

Provided Documents

Administration and Marking Guide
Question Booklet
Student Booklet

Authorized Materials

The following materials are permitted during the examination:

- Calculators with or without graphic displays*
- Writing instruments
- Rulers

* Calculators with or without graphic displays designed mainly to perform mathematical calculations are authorized during official exams. **Before the exam starts**, data and programs stored in calculators' memories must be deleted. Calculators equipped with formal calculation software are not authorized for the exams. These models are allowed **under the sole condition** that the formal calculation functions are deactivated during the exam. Computers, tablet computers, electronic organizers and calculators with alphanumeric keyboards (QWERTY or AZERTY) are not authorized. All calculator peripherals, such as instruction manuals and memory expansion devices, are forbidden. It is strictly forbidden to use memory expansion cards or chips, as well as data or program libraries. Communication between calculators is not allowed during the exam. Using calculators containing stored data or programs will be considered as cheating. Students cannot share calculators.

[Adapted from *MELS Information Document, Science and Technology, Applied Science and Technology, June/August/January 2013*, and provided as a recommendation.]

Note: Students may refer to the Periodic Table of Elements and the Formulas and Physical Constants lists included in the *Student Booklet*.

Evaluation Tools¹

In order to determine what is expected of the students and to ensure a uniform understanding of the evaluation tools, it is suggested that teachers in each school form a marking committee to analyze the work of a sample of students.

Guidelines for correcting questions requiring an explanation, a justification or a representation:

Analyze the student's work and determine if it is appropriate.

- An explanation, a justification or a representation is **appropriate** if most of the elements of the answer are correct and if appropriate terminology or symbolism is used.
- An explanation, a justification or a representation is **partially appropriate** if:
 - Most of the elements of the answer are correctly indicated, **but** the terminology or symbolism used is not appropriate.
 - Some elements of the answer are indicated, **and** some of the terminology or symbolism used is appropriate.
- An explanation, a justification or a representation is **inappropriate** if most of the elements of the answer are incorrect or missing, or if the terminology or symbolism used is inappropriate.

Guidelines for correcting questions requiring the use of formal mathematical solutions:
Step 1

Analyze the work to understand the procedure used by the student, and then decide if the procedure is appropriate or not.

A procedure is **appropriate** if most of the steps are relevant and could lead to the correct answer.

A procedure is **partially appropriate** if the steps presented do not lead to the correct answer, but include at least one step that is relevant and correct.

A procedure is **inappropriate** if none of the steps presented are relevant or if the student has not shown any work.

Step 2

If the procedure is deemed **appropriate** or **partially appropriate**, then evaluate the answer. If the answer is incorrect, identify the type of error(s) made.

An **error** is considered **minor** if it is an error in calculation or transcription, or if the unit of measurement is incorrect or missing.

An **error** is considered **major** if a law, rule or formula has been applied incorrectly.

No marks are allotted for a correct answer when the procedure used is **inappropriate**, or no work is shown.

¹. Adapted from: *MELS, 555-410, Science and Technology, Marking Guide, June 2012*, and provided as a recommendation.

FORMULAS

$$Q = mc\Delta T$$

$$PV = nRT$$

$$\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

$$P_T = P_A + P_B + P_C + \dots$$

$$P_A = P_T \frac{n_A}{n_T}$$

PHYSICAL CONSTANTS

SYMBOL	NAME	VALUE
C_{H_2O}	Specific heat capacity of water	4190 J/(kg • °C) or 4.19 J/(g • °C)
ρ_{H_2O}	Density of water	1.00 g/mL
R	Molar gas constant	8.31 kPa•L/(mol•K)
SATP	Standard ambient temperature and pressure	Temperature: 25.0 °C
		Pressure: 101.3 kPa
STP	Standard temperature and pressure	Temperature: 0 °C
		Pressure: 101.3 kPa