

## Midterm Exam – GEO1115 (Fall 2019)

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### WEIGHT –

- 5% of final mark.

### OBJECTIVES –

- Review the terminology, notions and concepts covered during the lectures as well as the geological evidences observed during the field trips of this first half of the semester.
- Make links between the lecture material and the geological evidences studied in the field.
- Become acquainted with the style of questions to be expected on the final exam.

### INSTRUCTIONS –

- This is an open book exam. You will need to complete the exam during the Fall reading week. You are encouraged to consult both your lecture and field trip notes to help you answer the exam questions.
- The exam should be written individually (see ‘Academic fraud’ section of the course outline). Students turning-in plagiarized work will automatically be given a mark of “zero” with no chance of a make-up evaluation.
- **SUBMISSION** – As for lab reports, you are asked to submit both an electronic **and** a paper copy of your exam. Exam questions will be posted on virtual campus in the afternoon of October 11<sup>th</sup> and you will be asked to submit your answers according to the following instructions and deadlines (see below).

#### Submission deadlines:

1. **ELECTRONIC copy (text only):** As for your lab reports, your submissions should be in WORD format (.doc or .docx) and only include the # of the exam questions – e.g. 1., 2., etc. – and your answers – **DO NOT WRITE OUT THE QUESTIONS**. In addition, it is important to respect the following format when naming your file:

**GEO1115\_2019\_midterm\_LASTNAME\_Firstname.docx**

You will have until Sunday, October 20<sup>th</sup> at 10:00 PM (at the latest) to submit your electronic copy on Virtual Campus.

2. **PAPER copy (text AND figures/diagrams):** To hand in at the latest on Tuesday, October 22<sup>th</sup> by 11:00 AM, in the mailbox labeled “GEO1115” situated to the right of the elevator on the first floor of Marion Hall.

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**QUESTIONS – Answer all 8 questions. (Total: /40)**

**Hint:** To guide you with respect to the length and level of detail expected in your answer, look at: (1) the verb of the question (“list” ≠ “discuss”), and (2) the number of points attributed to the question.

**A. PLATE TECTONICS and DATING ( /14)**

1. Draw an annotated diagram of a ‘continental-continental’ type of convergent boundary. Make sure that your diagram includes the following elements: dominant stress (force), lithosphere and asthenosphere, continental crust, effect on lithosphere thickness, and metamorphism sites. In addition, give the name and approximate age (in years) of the local geological event that corresponds to this situation. Finally, name two rock units (along with the field trip site where they were observed) which were formed by this event. ( /10)

2. Illustrate (diagram) and explain the principle of inclusion (relative dating) based on the example of the sedimentary lag (residual deposit) seen at the site of the unconformity during the Lac Beauchamp field trip. ( /4)

**B. GEOLOGICAL HISTORY I (Precambrian to Mesozoic) ( /10)**

3. Describe, in a short paragraph and with complete sentences, the tectonic context at the origin of the Ottawa-Bonnechere Graben. In your answer, make sure to indicate the name and age (in years) of the tectonic event at the origin of the formation of this structure, the type of force and the type of tectonic boundary associated to its formation, the type of lithosphere in which the graben was formed, and finally its particular position with respect to the typical “Y-shaped” geometry of a rift. ( /8)

4. In addition, name two examples of geological evidences observed during our field trips which support the hypothesis of the formation of the Ottawa-Bonnechere Graben. ( /2)

**C. GLACIERS ( /8)**

5. Using the terminology related to the various types of deformation (*refer to Lecture 6 - Deformation on Virtual Campus and/or the Glossary*), explain why crevasses of a glacier are essentially restricted to the top 40 m of the ice.

In comparison, what is the principal type of deformation at greater depth (below 40 m), and why? ( /4)

6. Name two factors/conditions that favour a greater amount of meltwater at the base of a glacier. In addition, name the type of glacier which has meltwater at its base and indicate the impact of the presence of this meltwater on the glacier’s displacement velocity. ( /4)

**D. GEOLOGICAL HISTORY II (Quaternary) ( /8)**

7. Explain why geologists can find evidence of no more than four glaciations during the Pleistocene Epoch on the North American continent, while the analysis of cores of seafloor sediment indicates a much higher number of glaciations (~20), during this same Epoch. ( /4)

8. Give the mathematical expression that defines “sensitive clay”, and in your own words, explain its significance. In addition, explain why/how a rapid snow melt in the Spring could increase the risk of landslide in an area having sensitive clay deposits. ( /4)