

**UNIVERSITY OF TORONTO**  
**Faculty of Arts and Science**

**December 2007 Examinations**

GLG110H1F Introductory Geology  
duration - 2 hours  
no aids allowed

Last name: \_\_\_\_\_ First name: \_\_\_\_\_

Student no: \_\_\_\_\_

total marks: 70

This exam consists of 12 pages, including this cover page.

Read this before you start:

**multiple choice:** 30 questions of one point each (approximately three questions per lecture).

Note that questions are ordered as material was presented in the course, rather than by level of difficulty (that means: don't get stuck on a difficult question, guess if you have to). There is one best answer for each question.

**short answers:** 10 questions of 2 points each (approximately one question per lecture).

Answer what is being asked, and limit your answer to two sentences.

**concept map and long answer:** 10 points each.

See the marking guide for details on how these will be graded. Remember to use clear concepts and powerful propositions in the concept map; and think about the "4Cs" of writing.

A. multiple choice	/30
B. short answers	/20
C. concept map	/10
D. long answer	/10
<b>total</b>	<b>/70</b>

your result

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## A. Multiple Choice

*Please mark your selection clearly. One answer matches best.*

1. Why is uranium 238 not used for nuclear power?
  - half-life is too long
  - not enough available
  - isotope is not radioactive
  - it is too heavy
2. An atom has 6 neutrons, 5 protons, and 4 electrons. Its atomic number is therefore
  - 6
  - 9
  - 10
  - 11
3. Which of these countries does **NOT** have (and does not aspire to have) nuclear weapons?
  - USA
  - Canada
  - Israel
  - China
4. You are shown a mineral which is rather soft, displays rhombic cleavage, is transparent and colourless. This mineral is
  - calcite
  - diamond
  - quartz
  - ruby

5. On the right is an image by M. C. Escher. In this image we can define a “unit cell”

- the complete black grumpy guy at the bottom.
- the complete white smiley guy on the left.
- any rectangle which covers enough of the image.
- exactly one black and one white guy.



6. Why is it so difficult to “fingerprint” a diamond?

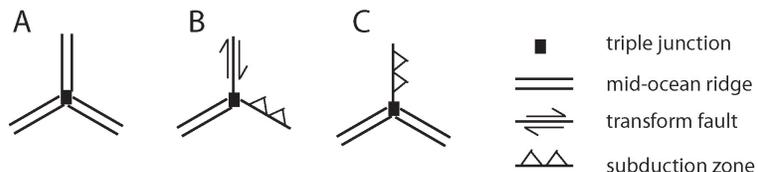
- Diamonds tend to be too small.
- High-quality stones are inclusion-free.
- Jewellers polish fingerprints off.
- The industry does not support this idea.

7. Volcanic island arcs (for example Japan) typically form at

- ocean-continent subduction zones.
- ocean-ocean subduction zones.
- continent-continent collision zones.
- mid-ocean ridges.

8. Triple junctions are spots where three plate boundaries meet. Which of the triple junctions on the right is least likely?

- (A)
- (B)
- (C)



9. We distinguish between crust and mantle by \_\_\_\_\_, while the difference between lithosphere and asthenosphere is defined by \_\_\_\_\_.

- composition, velocity
- velocity, rigidity
- composition, rigidity
- rigidity, composition

10. Geologic formations (for example Cambrian, Devonian, Permian) are named after

- places where they were first investigated.
- royal castles of the 18th and 19th centuries.
- people who were the first to describe them.
- fictitious characters or ideas.

11. Which lifeform is older than amphibians?

- flowering plants
- dinosaurs
- bacteria
- mammals

12. Which of these is a trace fossil?

- trilobite
- shell of a snail
- petrified wood
- petrified poo

13. Rock salt is formed

- from evaporating seawater.
- on land.
- under high pressure.
- from a melt.

14. Which of the following is a high-grade metamorphic rock?

- andesite
- conglomerate
- garnet
- gneiss

15. Which process is not explicitly mentioned in the rock cycle?

- deposition
- subduction
- erosion
- melting

16. Assume the following aquifers all have the same porosity. Which one do you expect to be the most productive?

- limestone with connected joints
- granite with unconnected cracks
- sandstone
- silt

17. Mark the correct statement.

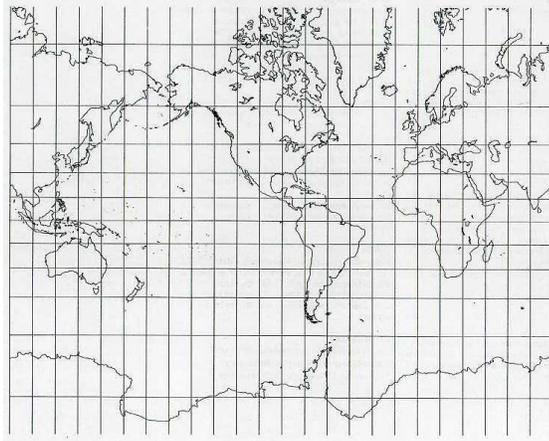
- Wells tapping unconfined aquifers are very productive.
- Porosity is key to the movement of groundwater.
- Air fills the pores in the unsaturated zone.
- Groundwater flows through connected pore space.

18. The area covered by a 20-year flood is also called

- prolonged flood.
- recurrence interval.
- floodplain.
- floodway.

19. The world map on the right is based on a \_\_\_\_\_ projection.

- cylindrical
- conical
- azimuthal



20. Ductile deformation of a rock is

- reversible.
- elastic.
- breaking the rock.
- permanent.

21. The same extensional stress will

- cause different amounts of extension in different rocks.
- not cause any strain, regardless of the rock type.
- result in either breaking or shearing of the same rock.
- not cause strain in any type of rock.

22. How many GPS satellites are at a minimum necessary so you can use your receiver to navigate?

- 2
- 3
- 4
- 6

23. The passing of a warm front is typically preceded by

- gusts of wind.
- prolonged drizzle.
- heavy rainfall.
- a drop in temperature.

24. A volcano above a hotspot (for example the islands of Hawaii or Galapagos) erupts usually

- ash and toxic gasses.
- pyroclastic flows.
- low-viscosity (runny) basaltic lava.
- high-viscosity (sticky) basaltic lava.

25. A tsunami wave

- is triggered by an earthquake.
- travels very fast across the ocean.
- speeds up upon approaching the shore.
- cannot be caused by a submarine landslide.

- 26. An avalanche**
- can be rather slow.
  - is made up of snow moving downhill.
  - is a very fast type of landslide.
  - happens most often in late winter.
- 27. The “great unconformity” marks a gap of about 500 million years between**
- the Hadean and the Archean eons.
  - old rocks of the shield and paleozoic sedimentary rocks.
  - paleozoic marine rocks and young glacial cover.
  - continental rocks and volcanic lava flows.
- 28. Most rocks in the Canadian Cordillera show**
- moraines and drumlins from the recent ice age.
  - layer upon layer of sediments eroded from the rising Rockies.
  - rocks from the Archean deformed by rifting events.
  - island arcs added one by one to the continent.
- 29. The movement of a glacier can best be compared to**
- the flow of a sticky substance.
  - the advance of an avalanche in slow motion.
  - the tumbling of a ball downhill.
  - the extension of a rock under brittle conditions.
- 30. Large rocks found in sediments far away from land**
- show how far icebergs have floated.
  - are most likely meteorites from space.
  - could be chunks from a volcanic explosion.
  - are evidence for plate tectonics.

## B. Short answers

*Write legibly, answer what is being asked, and limit your answer to two sentences or use point form where appropriate.*

1. Explain the term “enrichment” and give two examples from the geosciences.

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2. How do we define hardness in a mineral, and why do minerals differ in this property?

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3. Which two pieces of information are essential in any method that measures plate velocities?

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4. Describe an eruption of the Soufrière Hills volcano in the Caribbean.

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5. Why do we seldom find fossil skin?

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6. Name two differences between a sandstone and a limestone.

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7. Why are floods more severe today than they were 100 years ago?

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8. Draw a map view of a hurricane, and write how it derives energy.

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9. Which two geologic events should you think of when you look at the Niagara Falls?

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10. Draw two sketches which compare a valley shaped by a glacier to a valley shaped by a flowing river.



## D. Long answer

Choose one of the three topics listed in part C, and compose a one-paragraph answer. You must use another topic than the one you created the concept map on. You may use the bottom of this page and/or the last page to scribble notes.

marking guide                      your topic \_\_\_\_\_

/5: content

- scientifically correct, balanced, key information

/2: clarity of sentences

- strong verbs and clear nouns
- avoid fragmented or run-on sentences, filler words/clauses, singular/plural mismatches, unnecessary nominalizations, illogical links, unclear passive, unclear it/this/which

/2: coherence of paragraph

- strong beginning and good ending
- sentences link together (topic threads)

/1: craft

- grammar, punctuation, spelling are flawless

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/10: total

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*space for notes, will not be marked*



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