

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 |
| total | /70 |

your result

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?

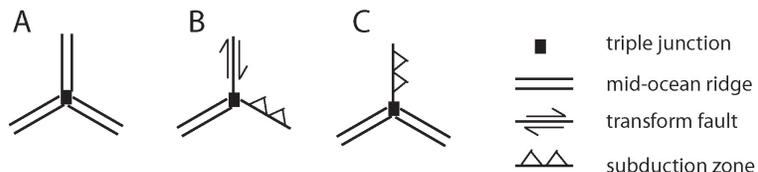
- Diamonds tend to be too small.
- High-quality stones are inclusion-free.
- Jewellers polish fingerprints off.
- The industry does not support this idea.

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

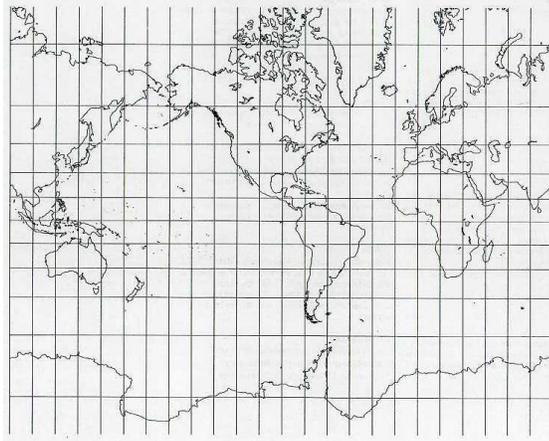
10. Geologic formations (for example Cambrian, Devonian, Permian) are named after

- 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 porespace.
- 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.

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

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

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

5. Why do we seldom find fossil skin?

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

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

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

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

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 threats)

/1: craft

- grammar, punctuation, spelling are flawless

/10: total

space for notes, will not be marked

This page left empty for your notes. Will not be marked.