GEOB 103 - 201 MID-TERM EXAMINATION FEBRUARY 2013
ANSWER KEY

Read the following notes carefully before checking your answers.

There were two different exam versions. If your exam has a dot after the words 'February 2013' at the top of the exam, you wrote exam version 1, which begins on page 2 of this document. If there was no dot, you wrote exam version 2, which begins on page 5 of this document.

If you wrote Exam 1, the red mark is simply the sum of the sub-totals at the left-hand foot of each page. Check that there have been no addition errors. The blue mark is then the red mark, scaled up by 40/35, reported to the nearest half-mark.

If you wrote exam Exam 2, the red mark is sum of the sub-totals at the left-hand foot of each page plus one mark. The blue mark is then the red mark scaled up 40/35, reported to the nearest half-mark. The reason for the additional mark in Exam 2 was that the average marks of the two exam versions differed by one mark. Given the large size of this class it is most improbable that the lower average on Exam 2 reflects a real difference in student abilities. Occam's Razor says that it almost certainly related to the exam version. Since all the marks were going to be scaled up, it was important to remove the exam-version effect first, otherwise the mark advantage of Exam 1 would have been compounded.

On some of the multiple choice questions you will note that a one mark part-credit has been given. On these questions the 'best' answer involved checking that 'both x and y are correct'. So, provided that either x or y were checked, one mark was awarded. The 'best' answer was awarded two marks. Due to an oversight on my part, there were two 'best' answers to Question 11 on Exam 2. So on this question you got 2 marks for either (a) or (b).

Although your blue scaled total is reported to the nearest half-mark at the top of your paper, the course spreadsheet retains all decimal fractions. So if your computed scaled mark was 25.2, this is written as 25 on your paper; 25.3 is written as 25½, 25.8 is 26, etc.

There has been some confusion as to how much this mid-term exam is worth, percentage-wise. The posted course outline says 30% and this is correct. Unfortunately a slide in the first set of posted notes stated 40%. This was incorrect. My apologies for any confusion which this may have caused. Since the total for the mid-term is 40 marks, to compute the contribution of your mid-term mark to your final percentage in the course, multiply the blue mark by 0.75 to get a total out of 30%.

If you find addition errors on your paper, or wish to discuss any aspect of your exam, please see me at the end of class or during my office hour. Please make sure that you have thoroughly checked the correct answer key first.

GEOB 103 - 201 MID-TERM EXAMINATION, February 2013•
EXAM 1

Answer all the questions in the spaces provided on this question paper. **Marks possible = 40**.

Multiple Choice questions: In each question, circle the **one best answer** **(2 marks each).**

1. The Principle of Original Horizontality implies that:
   a. tectonic events can be deduced from rock structure
   b. all sedimentary rocks are horizontal
   c. past physical processes were similar to those of the present day
   d. none of the above are correct

2. The term "lithologic control" means that:
   a. rock type controls rock structure
   b. rock structure controls rock type
   c. rock type controls landforms
   d. none of the above

3. An area subject to compressive forces will display:
   a. normal faulting
   b. reverse faulting
   c. a graben
   d. both a) and c)

4. The term *plutonic rock* refers to:
   a. all igneous rocks b. rocks such as basalt and granite
   c. most extrusive rocks d. none of the above

5. If a stratum strikes towards the southeast, then according to the right-hand rule the direction of dip of the stratum would be towards: a. 135° b. 225° c. 315° d. 045°

6. Which one of the listed rocks fits the description *fine-grained felsic:*
   a. gabbro b. andesite c. diorite d. rhyolite

7. Which statement is correct?
   a. a reverse fault has the downthrown block above the fault plane
   b. a normal fault has the upthrown block below the fault plane
   c. a transform fault is produced by subduction
   d. both a) and c) are correct

8. Which statement is correct?
   a. continental lithosphere consists mainly of felsic extrusive rock
   b. the Eurasian Plate extends as far west as the mid-Atlantic Ridge
   c. the Nazca Plate is subducting under Antarctica
   d. none of the above are correct

9. A shield volcano is: **1 mark for either (b) or (c)**
   a. steep-sided and composed of only mafic lava
   b. a low-angle cone associated with hot spots
   c. a low-angle cone composed mainly of mafic lava
   d. both b) and c) are correct

10. Which statement is correct?
   a. the continents bordering the North Atlantic Ocean are all passive margins
   b. Los Angeles is located on the North America Plate
   c. a major reverse fault lies along the Red Sea coast
   d. all of the above are correct

11. Which statement is correct?
   a. drainage area divided by flow volume = runoff
   b. average flow velocity = discharge divided by channel cross sectional area
   c. discharge multiplied by time = runoff
   d. none of the above are correct

Short Answers: Write your answers in the spaces provided.

12. Name **one** mafic mineral, **one** felsic mineral and **one** carbonate rock (1½ marks)

mafic ***biotite, hornblende, olivine, augite***
felsic ***quartz, orthoclase, plagioclase, muscovite***
carbonate ***limestone, dolostone (will accept dolomite)***

13. Write down **an equation** to calculate average discharge from runoff and drainage area. Define each term in your equation. (2 marks)

The product of runoff depth and drainage area = flow volume: $R \times A_d = V$. ***The quotient of flow volume and total time, t, = average discharge. Final equation:*** $Q = \frac{R \times A_d}{t}$

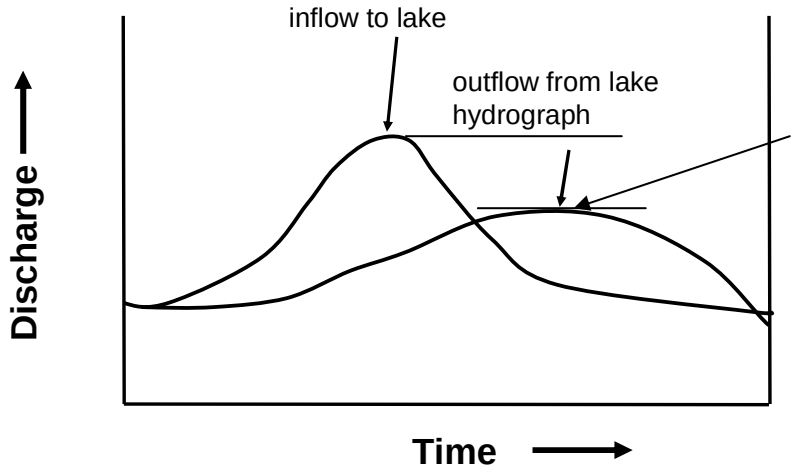
14. Complete the following table using **one** of the following locations in each cell: Red Sea, Alaska, Alberta, Hawaii, Newfoundland (1½ marks)

Passive Margin	**Spreading Zone**	**Subduction Zone**
Newfoundland	***Red Sea***	***Alaska***

15. Define the following geologic terms. (2 marks)

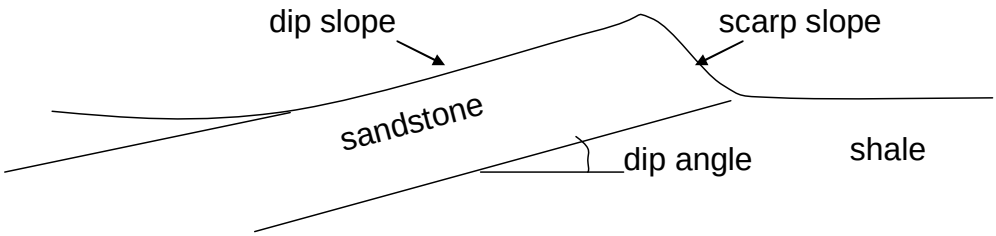
Geologic term	**Definition of geologic feature**
syncline	***an area of downfolded strata due to compression***
shield	***an area of ancient crystalline rocks within a continent***

16. Sketch and label inflow and outflow hydrographs to show how a lake can modify the peak discharge of a flood event. (3 marks)



Attenuation of outflow discharge peak. Peak of outflow is also lagged relative that of to input hydrograph.

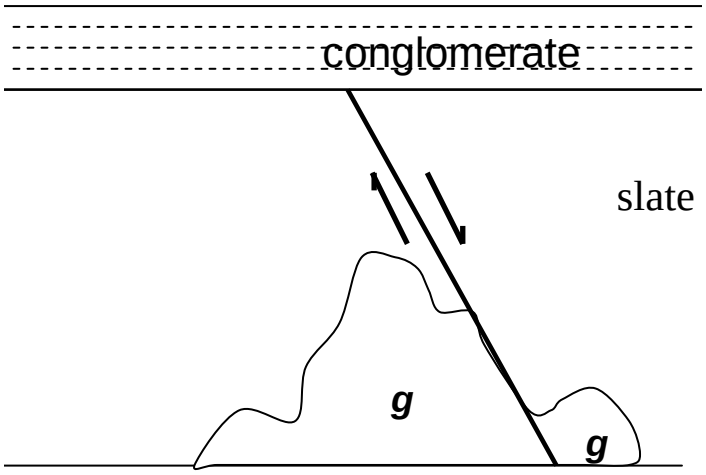
17. Draw a labeled geological profile of a cuesta developed in sedimentary strata. (3 marks)



dip slope < scarp slope

18. Describe **two** major hazards associated with stratovolcanoes. (2 marks)
- ***Volcanic mudflows, a.k.a. lahars, triggered by volcanic eruptions.***
- ***Pyroclastic flows, a.k.a. nuees ardentes, triggered by violent explosive eruptions***
- ***Inundation by falling volcanic tephra*** ***any 2 from 3***

19. **Describe** the geological events which produced the following cross-section, in the order in which they occurred. Note: g = granite. (3 marks)



1. **Deposition of shale protolith from which slate subsequently developed.**
2. **Folding and metamorphism of shale to slate**
3. **Intrusion of granitic pluton into slate**
4. **Normal faulting of granite/slate assemblage**
5. **Erosion of granite/slate assemblage**
6. **Deposition of conglomerate**

GEOB 103-201 MID-TERM EXAMINATION, FEBRUARY 2013
EXAM 2

Answer all the questions in the spaces provided on this question paper. **Marks possible = 40.**

Multiple Choice questions: circle the **one best** answer (2 marks each).

1. The Principle of Uniformity states that: **one mark for either (a) or (c)**
   a. past geologic processes were similar to present-day processes
   b. past geological processes were different from present-day processes
   c. the intensity of geological processes may have changed over time
   d. both a) and c) are correct

2. The term "structural control" means that:
   a. ridges and valleys follow the strike of the rocks
   b. rock structure determines rock type
   c. rock type controls rock structure
   d. both a) and c) are correct

3. In an area subjected to igneous intrusion you would find:
   a. igneous rocks underlying younger rocks
   b. discordant geologic contacts between rock units
   c. both a) and b) would be found
   d. none of the above would be found

4. The term 'crystalline rock' refers to:
   a. most igneous and all metamorphic rocks
   b. plutonic rocks and most high-grade metamorphic rocks
   c. some igneous and all metamorphic rocks
   d. none of the above are correct

5. If a stratum strikes northeast, then according to the right-hand rule, the dip direction of the stratum would be: (a) 135° (b) 225° (c) 315° (d) 045°

6. Which one of the following rocks is fine-grained, mafic?
   (a) gabbro (b) rhyolite (c) granite (d) basalt

7. Which statement is correct?
   a. a reverse fault has the upthrown block above the fault plane
   b. a normal fault has the downthrown block below the fault plane
   c. a thrust fault has the upthrown block below the fault plane
   d. none of the above are correct

8. Which statement is correct?
   a. continental lithosphere consists mainly of mafic intrusive rock
   b. the North America Plate comprises both oceanic and continental rocks
   c. the Nazca Plate is subducting under California
   d. both a) and b) are correct

9. A stratovolcano is: **one mark for either (a) or (b)**
   a. steep-sided and composed mainly of intermediate lava flows
   b. steep-sided and composed partly of volcaniclastic layers
   c. a low-angle cone composed of tephra and lava layers
   d. both a) and b) are correct

10. Which statement is correct? **No part credit for this question.**
   a. eastern North America and West Africa are passive margins
   b. Oregon is located on the Pacific Plate
   c. a major thrust fault lies off the Washington coast
   d. both (a) and (c) are correct

11. Which statement is correct? **Two marks for either (a) or (b)**
   a. average discharge times time = flow volume
   b. average flow velocity = discharge divided by channel cross sectional area
   c. flow volume times drainage area = runoff
   d. none of the above are correct

Short Answers: Write your answers in the spaces provided.

12. Name **one** coarse-grained clastic rock, **one** mafic mineral, and **one** carbonate mineral. (1½ marks)

clastic rock ***conglomerate, sandstone***
mafic ***biotite, hornblende, olivine, augite***
carbonate ***calcite, dolomite, aragonite.***

13. Complete the following table using **one** of location in **each** cell:
Red Sea, European Alps, Oregon, Brazil, Hawaii (1½ marks)

Passive Margin	**Subduction Zone**	**Divergent zone**
Brazil	***Oregon***	***Red Sea***

14. Define the following geologic terms. (2 marks)

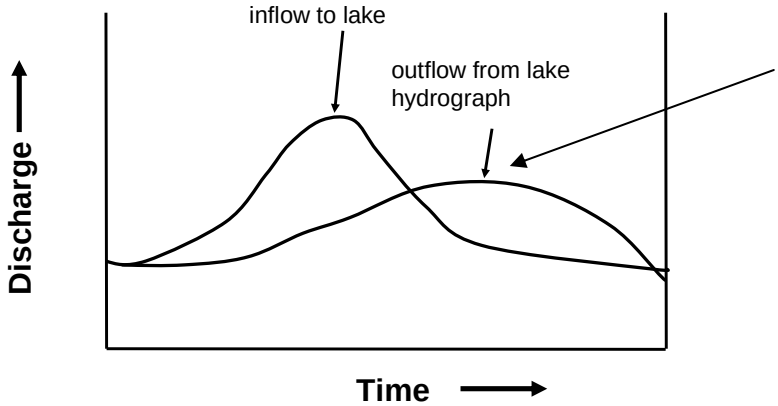
Geologic term	**Definition of geologic feature**
anticline	***an area of upfolded strata due to compression***
shield	***an area of ancient crystalline rocks within a continent***

15. Write down an equation to calculate average discharge from runoff and drainage area. Define each term in your equation. (2 marks)

The product of runoff depth and drainage area = flow volume: $R \times A_d = V$. The quotient of flow volume and total time, t, = average discharge. Final equation: $Q = \frac{R \times A_d}{t}$

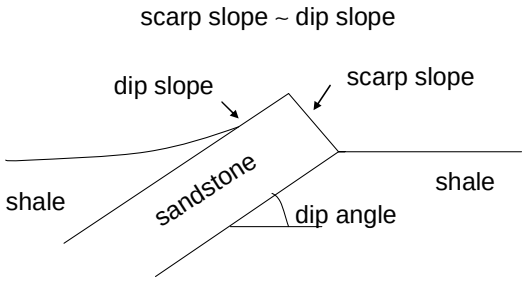
16. Sketch and label inflow and outflow hydrographs to show how a lake can modify the peak discharge of a flood event. (3 marks)

Attenuation of outflow discharge peak. Peak of outflow is also lagged relative that of to input hydrograph.



Attenuation of outflow discharge peak. Peak of outflow is also lagged relative that of to input hydrograph.

17. Draw a labeled geological cross-section of a hogback developed in sedimentary strata. (3 marks)



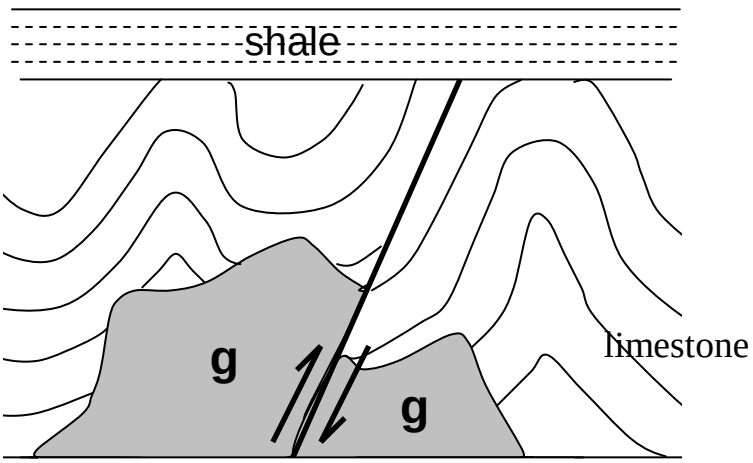
18. Describe **two** major hazards associated with subduction zones. (2 marks)

- Megathrust eaqthquakes, generated at the boundary between the subducting plate and the overlying plate

- Tsunamis, or seismically generated sea waves, produced by large dislocations of ocean floor during major earthquakes.

- Explosive eruptions from stratovolcanoes ***(any 2 from 3)***

19. **Describe** the geological events which produced the following cross-section, in the order in which they occurred. Note: g = granite. (3 marks)



1. **Deposition of limestone in ocean**
2. **Folding of limestone by tectonic compression**
3. **Intrusion of granitic pluton**
4. **Reverse faulting of limestone/granite assemblage**
5. **Erosion of limestone/granitic assemblage**
6. **Deposition of shale**