

name: Answer Key

Instructions:

Please answer all questions in the multiple choice section (part A) and four of the five remaining questions from part B. Please indicate clearly which question you want to skip. If you answer all four questions, only the first four will count towards your score.

A Multiple Choice Questions (check all that apply)

- A1. In the heliocentric model
- Earth orbits around the sun
 - the Sun orbits around the earth
 - Earth is a stationary planet
 - mercury and Venus orbit around the Sun, but all other planets orbit about Earth

- A2. The Big Bang theory states that
- all stars will end their lives explosively as supernovas
 - Earth formed through a series of violent collisions
 - meteors were responsible for the extinction of the dinosaurs
 - all matter in the Universe was once confined to one single point

- A3. By far the most common elements in the Universe and in our solar system are
- nitrogen and oxygen
 - iron and manganese
 - hydrogen and helium
 - hydrogen and oxygen

- A4. The metal alloy that makes up the core of the Earth is _____ as compared to the rocky mantle.
- less dense
 - denser
 - very similar in chemistry and density
 - distinct in chemistry but of very similar density

- A5. Topographically most of the ocean floor is made up of
- ocean trenches (5 - 12 km below sea level)
 - ocean plains (2.5 - 4.5 km below sea level)
 - submarine mountains (less than 2.5 km below sea level)

- A6. The lithosphere is composed of
- crust only
 - crust, mantle and outer core
 - top 100 m of sediments and sedimentary rocks
 - crust and uppermost part of the mantle

- A7. Which of the earth's layers has the greatest density?
- crust
 - mantle
 - core

A8. The magnetic field of earth in geologic past is

- unknown, but it is assumed to have been identical to today's.
- known to have been constant through geologic time, due to remanent magnetization of iron-rich minerals in rocks
- known to have experienced polarity reversals, due to remanent magnetization of iron-rich minerals in rocks
- known to have been constant through time, on the basis of theoretical calculations

A9. Within the terminology of plate tectonics, an active margin is

- synonymous with "subduction zone"
- a five-mile radius surrounding an active volcano
- a continental coastline that coincides with a plate boundary
- anywhere on Earth where earthquakes are especially frequent

A10. The mid-oceanic ridges are elevated above the surrounding sea floor because

- ridge rocks are hot and therefore of relatively low density
- the lithospheric plates are thickest at the ridges, so they stand up taller
- rising ocean currents leave a vacuum above the ridge
- ridge rocks are mafic, whereas the ocean basin crust consists of ultramafic rock

B2. Continental Drift and Plate Tectonics

- a) which lines of evidence were cited by Wegener in support of his theory of Continental Drift? (5 points)
- b) Which additional observations and discoveries helped to establish the theory of Plate tectonics? (5 points)

a) shape of continents
distinctive chemistry of oceans / continents
distribution of mountain ranges
" " land fossils
" " rock sequences
" " glacial features } across continents
paleoclimatic evidence

b) rock magnetism → magnetic stripe patterns on ocean floor → VMM hypothesis
→ paleomagnetic reconstructions of continental positions → continents do move

Subsidence / age of oceans → mid oceanic ridges
→ trenches
→ island chains.

B3. Physical Properties of the Earth

- a) Which parts of the earth are solid, which ones are liquid? (3 points)
- b) Which lines of evidence lead geologists to conclude that most of the earth is solid? (3 points)
- c) Where in the earth and through which processes is magma generated? (4 points)

a)

crust	- solid
mantle	- solid
outer core	- liquid
inner core	- solid

b) S-waves pass through most of earth, except outer core
shape of earth - Only spherical, would be oblate if significant portions of earth are liquid.

c) In subduction zones, where wet rock is heated by burying it deep in the mantle. Water in the rocks depresses the melting point \rightarrow wet partial melting.

On mid-oceanic ridges and hotspots where mantle rock rapidly rises to surface. The resulting drop in pressure again depresses the melting point \rightarrow decompression melting

B4. Igneous Rocks

- a) Which properties of igneous rocks are generally used in their classification? (4 points)
b) What can these properties tell us about the history of the rock? Be specific! (6 points)

a) color / chemical or mineralogical composition
crystal size (coarse / fine)

b) crystal size → cooling history of rock
→ rapid or slow cooling
→ volcanic / plutonic settings
(from look!!)

composition → magma composition
→ plate tectonic setting.

B5. Volcanic Hazards

- a) List four hazards of volcanic eruptions. (4 points)
b) For two of these hazards: Describe their effect on the population surrounding the volcano in greater detail. (6 points)

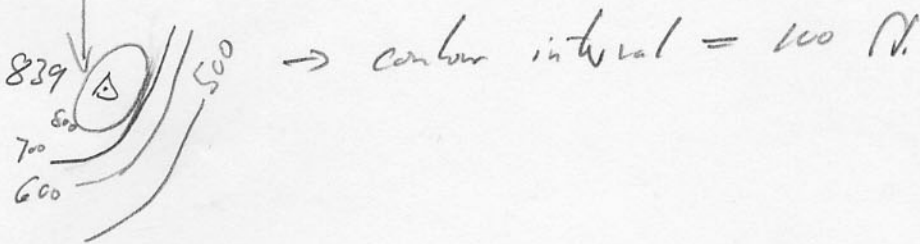
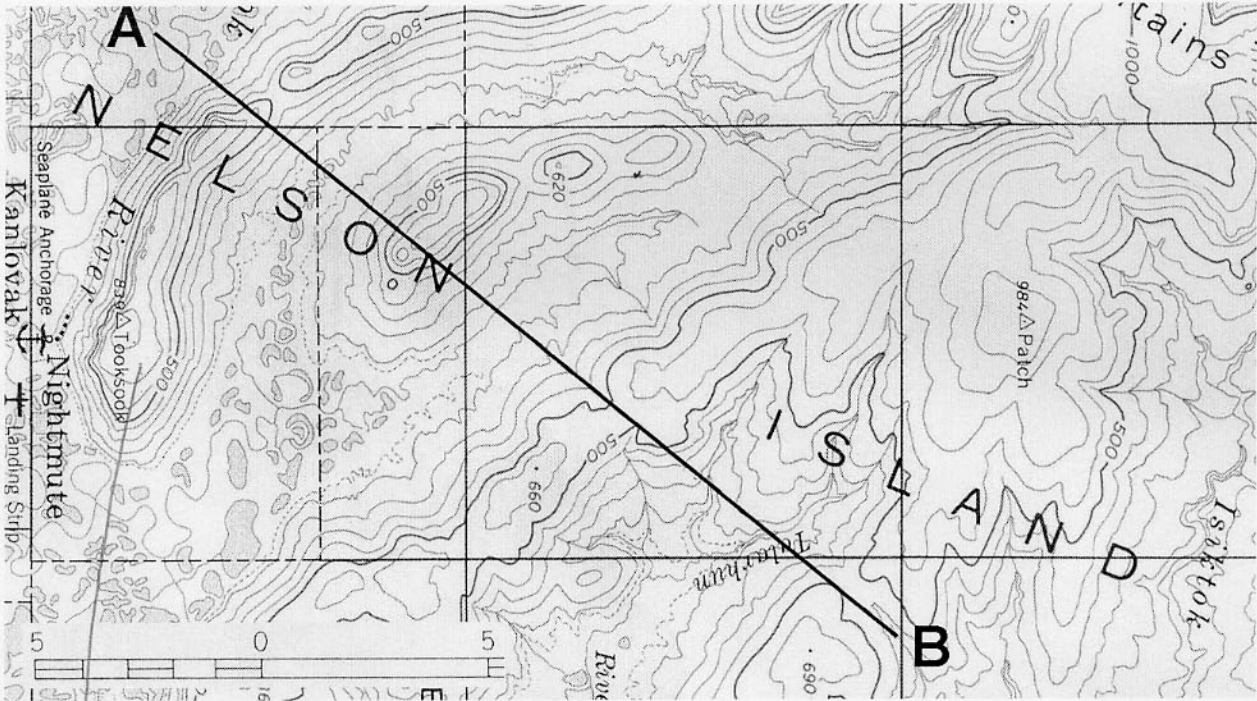
a) lava flows
pyroclastic flows
ash fall
lahars

b) any description will do.
refer to movie...

B6 Maps and Crosssections

The figure below shows a part of the USGS topographic map from Baird Inlet in Alaska. The scale bar gives horizontal distance in miles.

- Determine the contour spacing of the map.
- Using the graph paper provided carefully draw a topographic profile along the line A - B.



Boier Inlet Profile

A elev. a.s.l. (ft)

8
7
6
5
4
3
2
1
0



B

