

NAME:

**THE ENVIRONMENT OF THE EARTH'S SURFACE
FINAL EXAMINATION**

This is a closed-book examination. You have two hours to complete this examination.

Put all of your answers in this examination booklet. Return only the examination booklet to me.

There are 165 total points in this examination.

1

2

3

4

TOTAL:

1 LITERACY [25 points]

For each of the following terms, supply a succinct definition (to fit into the space provided. Each definition should be in the form of a “noun phrase”, not a complete sentence. (Example: the definition of a “stream is “a channelized flow of water across the land surface”.)

ablation

albedo

aquifer

avulsion

base level

bed load

cirque

desert pavement

drainage basin

esker

floodplain

groundwater

hydrograph

infiltration

loess

overland flow

peneplain

phreatic zone

point bar

porosity

river stage

saltation

stream capture

thermocline

weathering

2 TOPOGRAPHY [30 points]

Below is a topographic contour map of a land area with topographic relief.

- (1) [15 points] Draw, with solid curves, the traces of all major and tributary stream valleys.

- (2) [15 points] Draw, with dashed curves, the divides between all of the streams that flow outward across the boundaries of the map. (Do not draw divides between the tributary streams you included in your answer to Part 1.)

3 SHORT ANSWERS [60 points]

Answer each of the following questions in the space provided. Write carefully in complete sentences. Do not include material that is not directly relevant to your answer, even if such material is true.

(1) [20 points] Why is the slope of a beach become steeper with increasing size of the beach sediment?

(2) [20 points] Why is the density of liquid water greater than the density of ice?

(3) [20 points] How does a meandering river respond to slow subsidence of its substrate, and what are the consequences for human use of the floodplain of the river? [By “substrate” I mean the region of the Earth’s crust that underlies the river valley.]

4 SYNTHESIS [50 points]

On a gently rolling land surface on the continent of Envira is a low-to-the ground outcrop of quartz-bearing bedrock that is undergoing weathering. The weathering loosens one of the quartz particles, of sand size (about half a millimeter in diameter).

Eventually, the little quartz particle makes its way to the ocean, where it is deposited and remains for a geologically long time.

Think about the possible pathways that the particle might take on its trip to the ocean, and about the various processes and/or events that might be involved in its travels.

On the following large blank page, draw a diagram that shows all of the possible pathways of travel of the particle. For every step of the way, annotate the diagram, succinctly and carefully. Your annotations should specify the nature of the processes or events, and perhaps any other information that you think is relevant.

Notes:

- Time is not a factor here. The trip might take a short time or a very long time, depending upon speeds of movement and upon duration of periods of rest.
- Let the scope of your consideration range widely in terms of climate: cold or warm, arid or humid. You should make provision for the possibility that the climate could change substantially during the time between first movement and final deposition.