

Return of the ES089g Midterm Test

First of all, don't panic when you see your grade.

What you are seeing is the unadjusted mark which reflects your actual performance on the exam.

The marks will be adjusted significantly (upward) for the entire class and you will be informed of your re-evaluated grade in due course.

Obviously, this exam was too difficult or too involved for the majority of the class to handle adequately and thus, some accommodation must be extended.

The nature of this accommodation will be decided upon when all marks are available.

The marks for the 4 parts of the exam should be indicated on the front of the exam booklet, along with the total out of 70.

Make sure all marks are accounted for in your total (Part 1, Part 2, Part 3, Part 4 first essay, Part 4 second essay).

According to current indications the average was approximately 38%.

Top grade was about 83%.

Over half of the class achieved less than 50%.

No section was particularly well done. Answers to Part 4 improved the grade of many students, though this section was marked quite liberally.

Earth Sciences 089G
MIDTERM EXAMINATION

Part 1. Multiple Choice Questions (Answer All)

Answer the following ten questions by circling the correct or most reasonable response on this sheet (10 marks total).

1. The outermost layer of Earth's geosphere is known as:

-)The hydrosphere
-)The aesthenosphere
-)The exosphere
-)**The crust**
-)The ozone layer

2. Zinc, an element, has an atomic number of 30 and an atomic weight of 65.38. This means it must have:

-)30 electrons, 35 protons, 30 neutrons
-)35 electrons, 35 protons, 38 neutrons
-)38 electrons, 38 protons, 35 neutrons
-)38 electrons, 38 protons, 30 neutrons
-)**30 electrons, 30 protons, 35 neutrons**

3. Migmatites are "mixed rocks" which contain features of both:

-)Pyroclastic and sedimentary rocks
-)**Plutonic and regional metamorphic rocks**
-)Contact metamorphic and diagenetic rocks
-)Regional metamorphic and igneous extrusive rocks
-)Chemical sedimentary and siliciclastic rocks

4. The primary mineral constituents of rocks of mafic and ultramafic (more mafic than mafic) composition necessarily contain the following elements.

-)magnesium, silicon, aluminum, oxygen
-)iron, aluminum, silicon, oxygen
-)silicon, oxygen, iron, manganese
-)**oxygen, magnesium, silicon, iron**
-)aluminum, magnesium, iron, oxygen

5. Consolidated sediment preserving an impression of the outer surface of an ancient organism's remains is known as:

-)a trace fossil
-)an external cast
-)**an external mould**
-)a coprolite
-)a steinkern

6. A sedimentary rock layer A is underlain by a flow basalt layer dated at 255 Ma. Layer A, a quartz-cemented sandstone, lacks fossils which allow it to be dated, however, similar sandstone strata underlying the flow basalt contain fossils of mammal-like reptiles suggestive of a mid to Late Permian (late Paleozoic) age. Layer A is directly overlain by poorly consolidated sandstones which contain dinosaur fossils suggestive of Late Cretaceous (late Mesozoic) age. What can we infer about the age of Layer A?

-)Layer A is older than 255 Ma
-)Layer A is of Cretaceous age
-)Layer A is of Late Permian-Triassic age
-)Layer A is between 255 Ma and 65 Ma old**
-)The age of Layer A can not be determined

7. Fossils may be found in an unaltered state in:

-)Limestones
-)Shales
-)Amber
-)Cherts
-)All of the above**

8. Analysis of a rock sample selected for dating using radiometric techniques revealed that the concentration of the daughter isotope (for the isotope system used) was nearly eight times greater than the concentration of the parent isotope. The parent isotope is known to decay to the daughter isotope with a half-life of approximately 0.5 billion years. This suggests that the sample is at least:

-)500 million years old
-)1 billion years old
-)1.5 billion years old**
-)2 billion years old
-)3 billion years old

9. An igneous rock consisting of the minerals orthoclase (potassium feldspar), quartz, muscovite (mica), hornblende (amphibole), biotite (mica) and plagioclase (in that order of relative abundance) is likely, upon significant physical and chemical weathering, to produce sediment containing:

-)clay minerals, quartz and muscovite**
-)clay minerals, hornblende and iron oxide/hydroxide minerals
-)quartz, clay and ferromagnesian minerals
-)plagioclase, orthoclase and clay minerals
-)orthoclase, quartz and muscovite

10. The process by which sediment becomes a sedimentary rock is known as:

-)petrification
-)carbonization
-)compaction
-)lithification**
-)diagenesis

Significance	Corresponding term
A red gem-quality variety of corundum.	Ruby
A variant of the step cut used primarily for beryl gems.	Emerald cut Emerald (1/2)
A precious gem commonly presented in brilliant cut with four planes of cleavage.	Diamond
Pyrope is a characteristically red variety of this mineral.	Garnet
Resistance of a gem to fracture, cleavage, bending, crushing etc.	Tenacity Durability (1/2) Hardness (0)

Significance	Corresponding term
Minerals with the same composition but different crystal forms.	Polymorphs
The product of stress-induced orientation of mineral grains in regional metamorphic rocks.	Foliation
Process primarily responsible for the destruction of original rock textures during metamorphism.	Recrystallization
Local zone of alteration of country rock in close proximity to a magma chamber/intrusion.	Aureole, metamorphic halo, metamorphic aureole
Type of plate boundary with which regional metamorphism is most commonly associated.	Convergent plate boundary, Destructive plate boundary. Subduction zone (1/2)

Significance	Corresponding term
The flow of material as a result of temperature and/or density variations in fluids.	Convection
Plate tectonic process or setting primarily associated with dehydration melting.	Subduction, Subduction zone
A variety of tectonic boundary lacking significant associated volcanism.	Transform plate boundary, Strike-slip boundary
Tectonic force thought to account for most plate motion.	Slab pull Ridge push (0), Convection (0)
Name of the Supercontinent which formed near the end of the Palaeozoic Era.	Pangea Rodinia (0)

Part 3. Short Answer Questions Part B (Answer All)

Provide answers to fill in the blanks in the following sentences. The number of marks assigned for each answer is provided in brackets following the blanks (20 marks total).

1. The fossil myth primarily associated with St. Hilda of Whitby, England relates to the remains of organisms of the Class _____ (1), also known locally as “_____” (1).

A) Cephalopoda, B) Snakestones

2. Two evaporitic rocks used extensively by the Ancient Romans were _____ (1), and _____ (1).

Rock Salt and Rock Gypsum (Alabaster); Halite/salt (1/2), Gypsum (1/2), Travertine (1/2), Limestone (0), Marble (0)

3. Lines on a topographic map that join points of equal elevation are known as _____ (1).

Contours/Contour lines

4. The “Shells of the Earth” which bound the asthenosphere vertically are known as the _____ (1) and the _____ (1).

Mesosphere (middle Mantle) and lithosphere; crust (0)

5. The high conductivity, malleability and ductility of metals relates primarily to _____ (2).

Metallic bonding or mobile valence electrons (not fixed in orbit around one nucleus) or something similar.

6. Continental lithosphere floats higher on the asthenosphere than does oceanic lithosphere as a result of the _____ (2) and _____ (2) of continental lithosphere.

Greater thickness and lower density; thickness (1), density (1)

7. Three-armed clefts in the Earth’s crust which may develop further to produce new ocean basins are known as _____ (1).

Triple (point) junctions (incipient rift valleys)

8. Chalk is an example of a _____ (1) sedimentary rock.

Biogenic/Biochemical; Bioclastic (1/2), Carbonate (1/2), Fossiliferous (1/2)

9. A carbonate rock formed as a result of the dissolution and reprecipitation of calcite by groundwater, and noted for its characteristic banding is called _____ (1).

Travertine/Flowstone; Limestone (0)

10. Trace fossils which are highly useful in understanding the diets of the ancient organisms which produced them are known as _____ (1).

Coprolites; Fossil dung (1/2)

11. An igneous rock containing evidence of two or more stages of magmatic cooling is said to have a _____ (1) texture.

Porphyritic; with phenocrysts (1/2)

12. Pumice is a volcanic _____ (1) which typically contains numerous pore spaces known as _____ (1).

A) Glass, B) Vesicles

A marking key for Part 4 questions will be provided on the course website.

Please go over this and make sure that your answers were graded fairly, but please don't come to us to quibble about a mark or half mark.

Such additions (or subtractions) are not going to make a significant difference in your overall grade for the course.