

Earth Systems 3209 Midterm Review 2015

Please do not assume that this review sheet containing terms and questions for Earth Systems 3209 is complete in every aspect. You should take time to review all the specific objectives for this course that you were provided with at the beginning of this year, as well as read through all your notes and the text references. **Complete this review before the exam for 10 bonus marks on your lowest test mark!!!**

Unit 1

1) Define the following 24 terms:

Earth Science	mineralogy	outer core
astronomy	paleontology	mantle (asthenosphere)
geology	petrology	lithosphere (crust)
oceanography	seismology	moho
meteorology	stratigraphy	atmosphere
crystallography	volcanology	geosphere
geomorphology	sedimentology	hydrosphere
hydrology	inner core	biosphere

Unit 1 Constructed Response

- 2) Describe at least two aspects of Earth science that make it different from other sciences
- 3) List the 4 different major branches of Earth Science.
- 4) Provide 2 examples describing how Earth Science is related to other scientific fields.
- 5) Describe the formation of the universe using the Big Bang Theory.
- 6) With the aid of 4 diagrams, describe how the solar system originated according to the solar nebula hypothesis.
- 7) Describe the process that resulted in the segregation/ formation of Earth layers.
- 8) With the aid of a labeled diagram, identify the various Earth layers. Include: inner core, outer core, mantle (asthenosphere), lithosphere (crust) and properties of each.
- 9) Compare and contrast the inner and outer core.
- 10) Identify trends in density and temperature as depth increases from the surface to the core.
- 11) Provide at least two examples that describe how Earth is a dynamic (ever changing) planet.
- 12) Explain how the four spheres are interrelated to each other. Use the water cycle to explain. (hydrosphere, atmosphere, biosphere and geosphere)

Unit 2

13) Define the following 29 terms:

uniformitarianism	angular unconformity	index fossil
catastrophism	disconformity	petrification
absolute dating	nonconformity	imprints
relative dating	varves	carbonization
superposition	growth rings	mould
cross-cutting relations	radioactive dating	cast
original horizontality	half-life	trace fossils(e.g., dinosaur eggs, coprolite)
inclusions	isotope	
fossil succession (index fossils)	parent and daughter elements (give examples)	preserved intact (frozen & amber)
unconformity	fossil	

Unit 2 Constructed Response

- 14) With respect to geologic time, describe the philosophies of both James Hutton and James Usher.
- 15) Distinguish between **relative** and **absolute** dating. Give at least three examples of each.
- 16) Be able to construct and interpret cross-sectional diagrams of Earth using geological concepts including: *horizontal, superposition, correlation, cross-cutting relationships, unconformities, inclusions, folding and faulting, metamorphism.*
- 17) Explain radioactive decay and how it relates to radioactive dating (absolute dating). *You must provide the formula for determining radioactive ages, AND also provide two examples using percentage and fraction of PI remaining.*
- 18) Identify and evaluate the sources of error and limitations in estimating radiometric age with radioactive dating. (Loss of daughter, etc.)
- 19) Describe how fossils are used to distinguish geologic time.
- 20) Fossils: Methods of fossilization; *preservation, mineral replacement, mold and casts, and trace fossils.*
- 21) Describe three conditions necessary for fossilization.
- 22) Describe the formation of various types of fossils including: *petrification by replacement, carbonization, mould and cast, preserved intact (frozen, amber), imprints (soft tissue), trace fossils (e.g., dinosaur eggs, coprolite)*
- 23) Become very familiar with the **Geologic Time Scale**;
 - Eons, Eras, Periods, and Epochs, time frame of Eras, etc...
 - distinguish between Precambrian time and the Paleozoic, Mesozoic, and Cenozoic eras
 - list the dominant life forms present at each era from Precambrian to Cenozoic.
 - list the time frame that correlates with the dominant life form on Earth. Ex: Cenozoic - Age of Mammals, etc.
 - Identify and describe two mass extinction events in Earth's history including; Permian Triassic boundary and Cretaceous-Tertiary boundary

Unit 3

24) Define the following 51 terms:

atom	acid test	atom
ion	taste test	Isotope
element	magnetism test	Silicate
compound	double refraction	native mineral
molecule	fluorescence	Mohs hardness scale
ionic compound	phaneritic texture	polymorph
molecular compound	aphanitic texture	mineralogist
metallic compound	glassy texture	crystallographer
silicon-oxygen tetrahedron	vesicular texture	geochemist
crystal shape (form)	porphyritic texture	gemologist
cleavage	Bowen's Reaction Series	rock
fracture	felsic	mineral
hardness test	intermediate	rock cycle
specific gravity & formulas	mafic	weathering
colour test (& issues with it)	mineral	erosion
streak	rock	deposition
lustre (and types)	element	lithification

25) List and define the parts that make up an atom.

26) Identify diagrams and/or graphics of each type of compound:

a) *ionic compound* b) *molecular compound* c) *metallic compound*

27) List the eight most abundant minerals in the earth's crust from highest to lowest concentration.

28) Draw a diagram of the silicon and-oxygen tetrahedron.

29) List the seven different mineral groups in the earth's crust.

30) Describe how to identify/differentiate between the major mineral groups based on mineral formulas. Including:

silicates, carbonates, halides, sulfides, sulfates, oxides, native elements

31) How would you identify an unknown mineral? List the mineral properties that are used for identifying minerals and explain how this is done.

32) Explain why minerals exhibit different mineral properties. Include:

a) *type of bonding involved* b) *elemental composition* c) *internal atomic*

33) Diamond and graphite are polymorphs, What does this mean? Describe why each has such different properties.

34) Distinguish between rocks and minerals. (How are they different?)

35) List the three major rock types found in the earth's crust.

36) Construct a diagram of the rock cycle illustrating how each rock can be recycled into one of the three rock types.

37) On what basis are igneous rocks classified? (*What two properties?*)

38) Describe how mafic igneous rocks differ from felsic igneous rocks based on chemical composition

39) Identify three groups of igneous rocks that have similar chemical compositions based on texture.

40) Construct labeled diagrams/sketches of the following igneous rock textures. Include:

coarse-grained (phaneritic)	glassy (compact and frothy)	porphyritic
fine-grained (aphanitic)	vesicular	

41) Describe how cooling rate and mineral composition determine rock types based on Bowen's reaction series.

42) Explain the difference between the following terms. Include examples and diagrams where possible.

- magma and Lava
- volcanic (extrusive) and plutonic (intrusive)
- basaltic and granitic lava
- Granite and Basalt

41) How does a rock with glassy texture form? Give an example of an Igneous rock with a glassy texture.

42) How does a Plutonic rocks texture differ from a Volcanic rocks texture. Briefly describe how each texture forms in Plutonic and Volcanic rock.

43) In a table format, explain the difference between mafic, intermediate and felsic magmas with respect to the following;

a) color b) temperature c) mineral composition d) kind of rock each forms (example).

44) Identify what rock type makes up Continental Crust and Oceanic Crust. For each, identify the texture, mineral composition, color, and tell if it is a mafic or felsic rock.