

FINAL EXAM: Tuesday May 5, 2009 room 180 4:30PM – 7:00PM

Review Sheet for Final Examination – Geology 1020-002 Historical Geology
Prof. Mojzsis BESC 222A 2-5014

Important information about the Final Exam

- there will be 2.5 hours for you to finish the exam
- it will take place from 4:30 to 7PM
- it will be held in BESC 180, the normal lecture hall of this class
- **the exam will be composed of 50 multiple choice and 4 short answer questions**
- **you must use a #2 pencil to fill in the scantron sheets for the multiple choice part of the exam**
- the short answers are to be written *on* the exam copy itself and *not* on the scantron; **answers on the scantron will not be given credit**
- when you are studying for this exam, be sure to use your homework assignments, **all of which have long been available to you**, as a guide as well as the quizzes, lecture notes and reading from the text
- **use the lecture handouts to supplement this guide!**
- **THIS IS AN OPEN-BOOK, OPEN-NOTES exam**

I sincerely hope that after taking this course, you have a more complete appreciation of the events that led to the establishment of the present geological and biological regime.

Historical geology covers the events and processes in the geological history of the Earth. It is important that you understand the concepts and the relatedness of events and processes. However, it is *not* important for us to get bogged down in the memorization of lists of terms. When we began this course, we asked ourselves: “How has the Earth evolved?” Although we could not cover EVERYTHING, we got a taste at least.

This study guide is (very simply) meant to assist you in reviewing the material and is not meant to be a comprehensive treatment of everything that we have covered. Use it in your review and remember: there is a clear correlation between having done the homework and attending lecture, and obtaining a good grade in this class, or in any class you may take. Recall, neither I nor any other professor “gives” you a grade, we only report to you the results of your work.

A Friendly Reminder: **ANY talking** during the exam could result in your being removed from the room and a grade of **F**. Please, REMEMBER THE CU HONOR CODE.

Readings in the text: follow your course outline for this

Know the following:

1. **The material already covered by the Midterm Review Sheet (use it).**
2. How is the Earth's crust formed? What is the process of partial melting? What is the process of decompression melting? Where do these processes occur?
3. Where does magma that makes the crust come from? What is magma, really? Is the mantle made of magma? If not, what is the mantle?
4. What and where are the oldest parts of the crust yet preserved?
5. What kind of crust is the oldest known? Continental or oceanic?
6. What is a banded iron-formation? How does it form?
7. What do BIFs tell us about the evolution of atmospheric oxygen?
8. How does a stromatolite form? What does it tell us about the nature of Earth's earliest ecosystems?
9. Where and how old are the oldest known sediments? What do they tell us about the origin of life?
10. What is a microfossil? How do these fossils fit in to Darwinistic theory?
11. What are some possible growth models for continental crust?
12. How did the Moon form? What does the bombardment record of the Moon tell us about the environment of the early Earth?
13. How are the atmospheres of Venus, Earth and Mars different?
14. What makes the atmospheres of the inner planets (Mercury, Venus, Earth, Mars) different from that of the outer planets (Jupiter, Uranus, Neptune, Pluto)?
15. Why is the Earth's atmosphere so rich in oxygen?
16. How do planets acquire and lose atmospheres?
17. What is an enzyme? What does a protein do? What is DNA? What is the Phylogenetic Tree of all life?
18. What was the Miller-Urey experiment? How do we use the results of such experiments to know more about the origin of life?
19. What is a comet? Why these objects interesting in terms of the origin of life?
20. What are the major molecular components of life? The major elements composing life (SPONCH)?
21. How could prebiotic molecules have been concentrated on the primitive Earth?
22. Why is it difficult to come up with a definition for life? What kind of metabolic styles are there?
23. Understand that Eukaryotic organisms require oxygen for their metabolic cycles.
24. Be familiar with the Eons, Eras and Periods of the Geologic Time Scale.
25. What is the Hadean? Archean? Proterozoic? Phanerozoic? Mesozoic? Cenozoic? Etc, etc. (you do NOT have to memorize the Geologic periods).
26. What was biologically significant about the Proterozoic – Phanerozoic transition?
27. What is the concept of the Snowball Earth? How did the planet get into such a state and how did it snap out of it? Could we return to a "Snowball" state again?
28. How did the Snowball Earth facilitate the evolution of the biosphere, particularly of animals? When did the first complex animals appear?
29. How is the appearance of the first animals constrained in the sedimentologic record of the Proterozoic?
30. When is it thought that the first Eukaryotes appeared? Why did it take so long for Eukaryotes, and then, multicellular organisms, to appear on Earth?
31. The significance of the Vendian – Cambrian and of the Cambrian Explosion of organisms recognized in the fossil record. Ediacaran fauna.
32. What are the different modes of fossilization? How are some kinds of organism better preserved than others? What kinds of fossilization favor animals over plants and *vice versa*?
33. What was the environment of the Cambrian like?

34. What are some of the important environmental conditions of the Phanerozoic Earth that sets it apart from all previous Eons?
35. What is the significance of the Cambrian Burgess Shale? How old is it? Where is it found? How did it form? Who discovered it?
36. What makes *Trilobite* a good Paleozoic index fossil?
37. What was *Rodinia*? How was it significant for biological evolution?
38. How have mass extinction events throughout the Phanerozoic driven subsequent diversification of the biosphere?
39. How can mass extinctions be blamed on plate tectonics?
40. Key points about the global environments of the Paleozoic and how they led to the kind of biosphere that we have today.
41. What was the most devastating mass extinction in biological history (that we know of)?
42. How did the evolution of the amniotic egg pave the way for the takeover of terrestrial habitats by reptiles? (and therefore, of dinosaurs, birds and mammals).
43. Why did plants and arthropods appear so much earlier (Ordovician) on land but chordates (tetrapods) appeared so late (Devonian/Carboniferous)?
44. What changes occurred in the Devonian landscape with respect to vegetative cover?
45. What was *Pangea*? When did it form? When did it break apart?
46. What is coal? How does it form? Why are most of the coal deposits of the world from the Carboniferous? How is the Carboniferous Period sub-divided in North America?
47. What are some postulated causes of the P/Tr extinction?
48. What happened with *Pangea* at the beginning of the Triassic?
49. When and how did the Atlantic Ocean come to be in the Mesozoic?
50. How and when did Boulder's own Flatirons form? When did the Ancestral Rockies appear?
51. What is the significance of the Solnhofen limestone?
52. Understand key details about the K/T boundary extinction. How did it happen? What are some competing hypotheses?
53. What evidence exists that an impact of an asteroid in present-day Yucatan, Mexico, was responsible for the demise of the dinosaurs?
54. What are the major influences on Earth's climate? What actually energizes the climate?
55. What is the *Jet Stream* and how was it affected by plate tectonics over geologic time?
56. What is a dinosaur? What made them so successful?
57. When was the last time Earth had a single supercontinent?
58. Why are marsupial mammals confined to old Gondwanaland continents?
59. When and how did flowering plants appear?
60. Understand the origin of birds; how are they related to dinosaurs?
61. What are the Milankovitch cycles? How do they operate? What affect do they have on short- and long-term climate? How are ice ages related to these cycles?
62. What is the *monsoon*? How does it operate?
63. How did the vast Alpine-Himalayan Mountain Belt form?
64. What occurred in eastern Africa that promoted the evolution of the savanna grasslands? How does this relate to the evolution of humanity?
65. How is it thought that geology played a role in the origin of humanity?
66. What will the Earth look like in the far future (given current trends in plate tectonics)?