Sample
GenSci 102: Test # 3
Rock Cycle - Part 2

Total points= 164

GenSci 102: Environment: Earth

The Rock Cycle - Part Two
Sedimentary and Metamorphic Rocks

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INSTRUCTIONS:

(A) ***Write your social security number on the Scantron card.*** Your test score will be sent to you via e-mail. If you do not have e-mail, you can see me for your score

(B) Note that your test ***score*** is not your test ***grade***. Check with the posted curve to convert your test score into a grade.

(C) ***Timing:*** you have exactly the class time to take the test, no more.

The questions are a mixture of True/False and Multiple Choice questions. The different kinds of questions are mixed through the test.

- ☞ Multiple choice questions may have 3, 4, 5, or as many as 20 choices. When there are more than 5 choices they are distributed among more than one question number; e.g. question 24 has choices 1-5, question 25 choices 6-10, etc.
- ☞ Different questions may have different values, as indicated with each set of questions.
- ☞ Drawing, diagrams, figure required for certain questions are often at the back of the test. You may pull that sheet off to make it easier to answer questions.

- ☞ Observe that on some of the questions the scoring will be "rights minus wrongs." Such questions are labeled. That is, you get points for a right answer, zero for no answer, and a negative score for wrong answers. Don't guess!

- ☞ Wrong spellings are not part of the test. I do not deliberately make minor errors, or try to be confusing or ambiguous. If something seems strange assume it is an honest mistake and answer the question as best you can.
- ☞ However, questions may be subtle and complex, read them carefully.

Note that your grade for the test will be based on a curve drawn over the distribution of raw scores. I draw the curve by hand, but have no need to have a specific percentage of A's, B's, C's etc. In fact, I would like everyone to do well, but will draw the most fair curve I can based on how everyone in the class does. I ignore the computer generated percentages.

Your raw score will be sent to you via e-mail. The raw score is not your grade, but I will send the curve ranges to you also so you have an idea how you did. Check the bulletin board opposite my office (Miller 233) for the final curve.

WEATHERING AND SEDIMENTARY ROCK PROCESSES

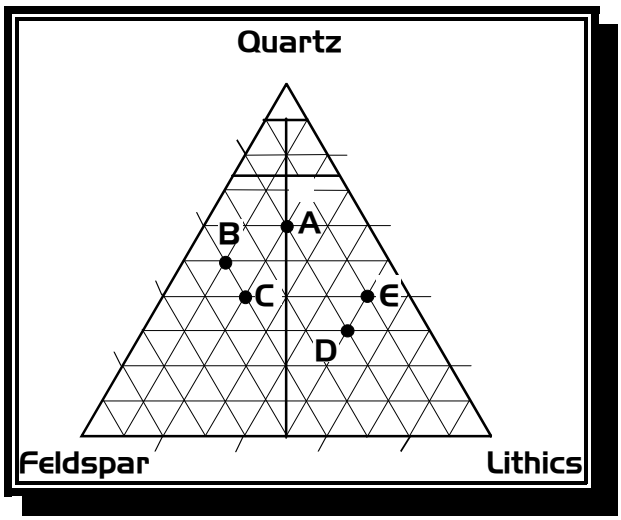
TRUE/FALSE QUESTIONS: 2 points each, 18 points total: "A" is True. "B" is False.

1. T/F. Of the minerals in Bowen's Reactions series, mafic minerals produce iron oxides (limonite and hematite), feldspars produce clays and minerals in solution (such as $CaCO_3$ and NaCl=halite), and quartz undergoes no change.
2. T/F. Although it takes time for chemical weathering to begin, mechanical weathering takes place all the way from the sourceland down to the beach.
3. T/F. Because quartz does not weather silica does not go into solution.
4. T/F. In general, of the cations Fe, Mg, Ca, Na, and K in the rock forming minerals, Fe and K form insoluble minerals, while Ca and Na are the most soluble and readily go into solution.
5. T/F. Among the QFL clastic sedimentary rocks quartz is the only point attractors toward which the system always evolves.
6. T/F. Regardless of the tectonic regime or the parent rock, sedimentary rocks can never end up with different evolutionary products.
7. T/F. A sedimentary environment is not a place because we define them by the processes operating in them.
8. T/F. Depositional environments can never be rearranged, regardless of whether the system is short or long.
9. T/F. In transportation down stream breccia fragments become rounded principally because of mechanical weathering.

READING TERNARY DIAGRAMS

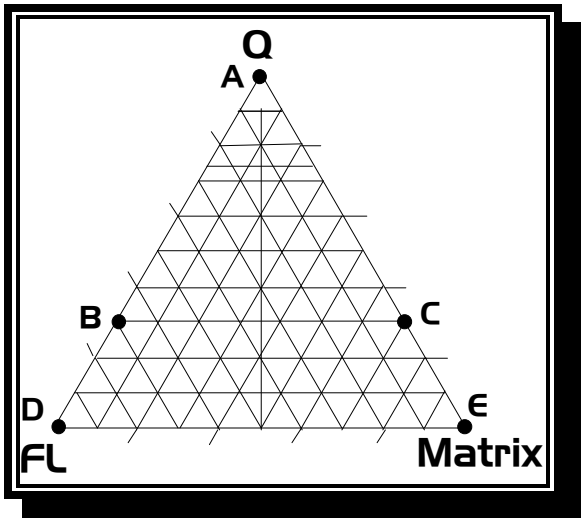
MULTIPLE CHOICE QUESTIONS: QFL DIAGRAM TO THE RIGHT: 3 points each, 12 points total:

10. A rock with 60% quartz, 20% lithics, 20% feldspar would plot at which lettered location on the ternary diagram?
    Location A, B, C, D, E ?
11. A rock with 40% quartz, 20% lithics, 40% feldspar would plot at which lettered location on the ternary diagram?
    Location A, B, C, D, E ?
12. A rock with 30% quartz, 50% lithics, 20% feldspar would plot at which lettered location on the ternary diagram?
    Location A, B, C, D, E ?
13. If the rock in the last question above were a sandstone, its complete name (all components included in the name) would be:
    A Quartz, lithic, feldspathic SS.
    B Feldspathic, quartz, lithic SS.
    C Lithic, quartz, feldspathic SS.
    D Feldspathic, lithic, quartz SS.
    E Lithic, feldspathic, quartz SS.



MULTIPLE CHOICE: Q/FL/Matrix Diagram to right: 3 points each; 12 points total.

14. Composition of a mature sediment would be.
    Location A, B, C, D, E ?



15. **If a sediment starts with a composition of B and undergoes complete weathering it composition would plot at?**
    Location A, B, C, D, E ?

16. **If a sediment starts with a composition of D and undergoes complete weathering it composition would plot at?**
    Location A, B, C, D, E ?

17. **The composition of a mafic igneous rock (basalt/gabbro) would plot at?**
    Location A, B, C, D, E ?

True/false Questions: 2 points each, 6 points total: "A" is True. "B" is False.

18. T/F. A rock from location B more likely comes from a short system than rock C.
19. T/F. A rock from location C more likely comes from a short system than rock E.
20. T/F. A sedimentary rock from location B could have a subarkosic composition.

SEDIMENTARY ROCK EVOLUTION

At the back of the test on the same page are two models we used, "Depositional Environments" and "Sedimentary Rock Evolution." The following questions compare how rocks on the Depositional Environmental diagram relate to rocks on the Sedimentary Rock Evolution model.

TRUE/FALSE QUESTIONS: 2 points each, 24 points total: "A" is True. "B" is False.

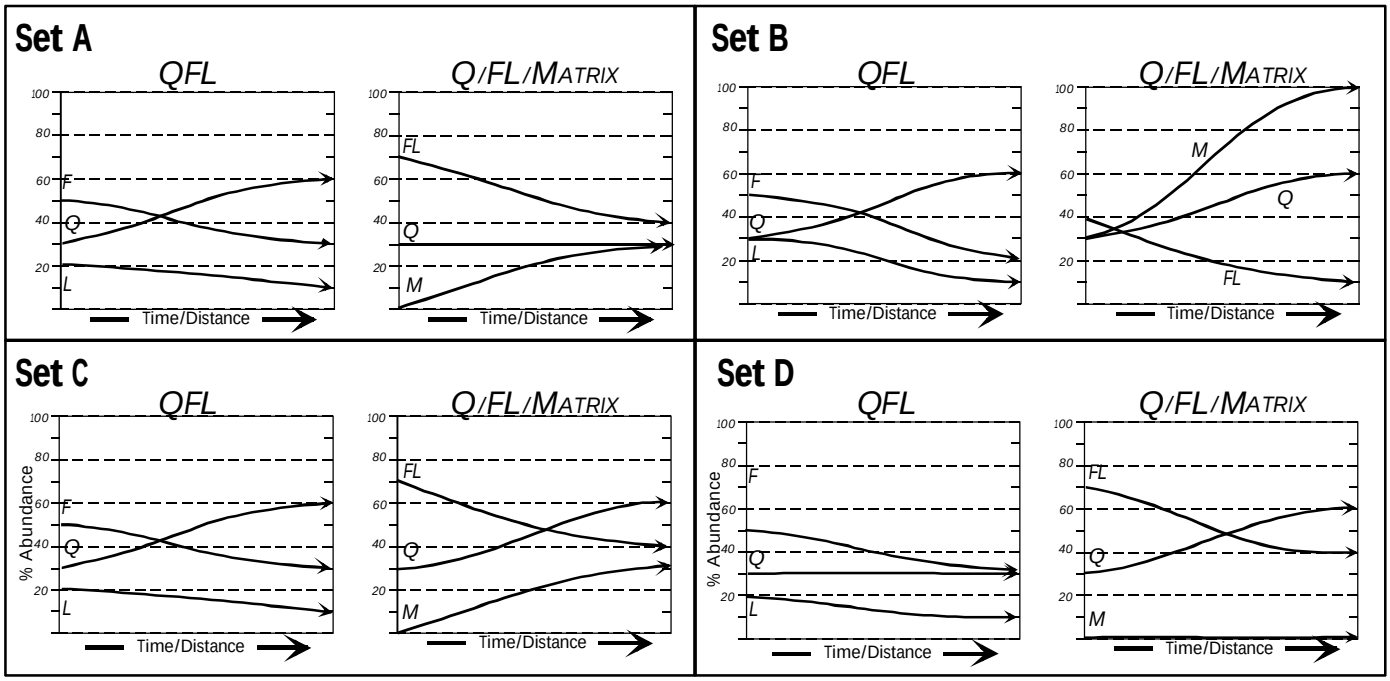
21. T/F. I and E are essentially the same kind of rock even though they have different origins.
22. T/F. Environment 9 is most likely to contain sediment P.
23. T/F. Rock B on the Sedimentary Rock Evolution diagram is most likely going to show up in Depositional Environment 2.
24. T/F. Rock E is more mature than H.
25. T/F. Rocks E and F are likely to be found in similar depositional environments.
26. T/F. Rocks Q and N are likely to be found in the same depositional environment.
27. T/F. Rock Q, being the last rock to form in the system, is likely to have a high quartz content.
28. T/F. Sediment G would most likely be found in depositional environment number 7.
29. T/F. On the Q/FL/Matrix diagram in the lower right, specimen R is more likely to found in environment 13 than environment 7.
30. T/F. On the Q/FL/Matrix diagram in the lower right, specimen U is more mature than specimen V.

31. T/F. On the Q/FL/Matrix diagram in the lower right, specimen W is more likely to be found in depositional environment 9 than 8.
32. T/F. On the Q/FL/Matrix diagram in the lower right, specimen W would be found in position Q on the Sedimentary Rock Evolution diagram.

MULTIPLE CHOICE QUESTIONS: 8 points: Below are percent abundance diagrams from the chart we discussed in class: *"The Multiple Cycle Evolution of Sedimentary Rocks"*

BEGINNING COMPOSITION	ENDING COMPOSITION
Quartz= 30%; Feldspar= 50%; Lithics= 20%	**Quartz= 60%; Feldspar= 30%; Lithics= 10%**

33. Imagine the cycle has a sediment which begins and ends with the compositions in the table above. Which set of diagrams below plots the changing compositions.
A=Set A, B=Set B, C=Set C, D=Set D



4 points:

34. At the back is the block diagram titled "Depositional Environments." The sequence of environments in a long system are which of the following choices (not all environments may be present, but those that are must be in the right order).

A 1, 2, 3, 5, 6, 7, 10, 9, 15
B 2, 3, 7, 6, 5, 10, 9, 17, 15
C 2, 3, 7, 5, 10, 17, 15
D 2, 3, 7, 6, 10, 16, 17
E 3, 2, 7, 5, 10, 17, 15

METAMORPHIC ROCK PRINCIPLES

GENERAL TRUE/FALSE QUESTIONS: 2 points each, 10 points total: "A" is True. "B" is False.

35. T/F. Prograde metamorphism takes place more easily and faster than retrograde metamorphism.
36. T/F. The development of foliation in a metamorphic rock is more strongly controlled by the type of metamorphism than the composition of the parent rock.

37. T/F. All metamorphism results in a change in mineral composition.
38. T/F. How long a rock takes to undergo metamorphism has nothing to do with what kind of rock it will become.
39. T/F. Blueschist and Barrovian metamorphism take place at primarily the same temperatures but different pressures.

TRUE/FALSE QUESTIONS: 2 points each answer; 22 points total: On the last page is the Studies of Metamorphic Grade map we used. The questions below refer to the kinds of rocks present, and the relationships among the rocks.

40. T/F. Rocks K and J will most likely have the same index minerals.
41. T/F. Rock N is most likely to be a hornfels.
42. T/F. Rocks S and X are the same metamorphic rock.
43. T/F. Rocks B and D are both foliated.
44. T/F. Rocks Q and M should both contain chlorite.
45. T/F. Rocks N and M should both contain chlorite.
46. T/F. Rocks Q and X have the same composition.
47. T/F. Rocks C and E will both have gneissic texture.
48. T/F. Rocks C, G, H, and M are all foliated.
49. T/F. Rocks Q, N, and B are all granular.
50. T/F. Rocks W and H will contain the same index minerals.

RIGHTS MINUS WRONGS MULTIPLE CHOICE: 3 points each; 24 points total. For the Studies of Metamorphic Grade map we just used, these questions explore your understanding of metamorphic facies and index minerals. The minerals are listed in alphabetical order.

It is possible for each specimen that none of the 8 choices work in which case you choose "E" for both options.

SPECIMEN A: Indicate the letter for the highest grade index minerals we would most likely expect to find at this location. If there are no index minerals, choose "E" on both lines.

51. A=Biotite, B=Chlorite, C=Epidote, D=Garnet, E=None of these choices

52. A=Kyanite, B=Muscovite, C=Sillimanite, D=Staurolite, E= None of these choices

SPECIMEN B. Indicate the letter for the index minerals we would most likely expect to find at this location. If there are no index minerals, choose "E" on both lines.

53. A=Biotite, B=Chlorite, C=Epidote, D=Garnet, E=None of these choices

54. A=Kyanite, B=Muscovite, C=Sillimanite, D=Staurolite, E= None of these choices

SPECIMEN C. Indicate the letter for the index minerals we would most likely expect to find at this location. If there are no index minerals, choose "E" on both lines.

55. A=Biotite, B=Chlorite, C=Epidote, D=Garnet, E=None of these choices

56. A=Kyanite, B=Muscovite, C=Sillimanite, D=Staurolite, E= None of these choices

SPECIMEN C. On the line write the letter for the texture of the rock at location C
57. *A-banded, B-granular, C-sedimentary bedding, D-slaty cleavage*

SPECIMEN W. On the line write the letter for the metamorphic facies of the rock at location W.
58. *A-amphibolite, B-granulite, C-greenschist*

TECTONIC INTERPRETATIONS OF SEDIMENTARY AND METAMORPHIC ROCKS

These last questions refer to two models we used, "QFL and Tectonic Interpretation" and "Metamorphism and Tectonics" located at the back of the test.
RIGHTS MINUS WRONGS MULTIPLE CHOICE: "QFL and Tectonic Interpretation": 3 points each; 6 points total.

LOCATION X on the QFL is associated with which tectonic situation?
59. *Location A, Location B, Location C, Location D*

LOCATION Y on the QFL is associated with which tectonic situation?
60. *Location A, Location B, Location C, Location D*

RIGHTS MINUS WRONGS MULTIPLE CHOICE: "Metamorphism and Tectonics": 3 points each; 18 points total.

***Location A.* The metamorphism most likely found at this location is which of the following.**
61. A=Amphibolite, B=Blueschist, C=Contact, D=Ecologite, E=None of these
62. A=Granulite, B=Greenschist, C=Hydrothermal, D=Migmatite, E=None of these

***Location C.* The metamorphism most likely found at this location is which of the following.**
63. A=Amphibolite, B=Blueschist, C=Contact, D=Ecologite, E=None of these
64. A=Granulite, B=Greenschist, C=Hydrothermal, D=Migmatite, E=None of these

***Location F.* The metamorphism most likely found at this location is which of the following.**
65. A=Amphibolite, B=Blueschist, C=Contact, D=Ecologite, E=None of these
66. A=Granulite, B=Greenschist, C=Hydrothermal D=Migmatite, E=None of these