

Study Questions: Metamorphic Rocks and Processes

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The quiz about metamorphic rocks and processes will involve questions like the ones that follow.

Note: Whenever you see reference to *Tarbuck*, in the following questions, that means the eText of the textbook by Tarbuck and others, **Earth**

1. During metamorphism, rock is subjected to high heat and significant pressure, but it does not _____. If it did, the formation of the subsequent rock would be an igneous process.
2. Most of the continental crust and nearly all of the lithosphere and mantle are composed of _____ rocks (in the broad sense of the term).
3. Economically valuable ore deposits can be concentrated through the percolation of hot fluids through rock. If the hot fluid is water, the process is called _____ metamorphism.
4. _____ is a system or field of forces directed perpendicular to all surfaces of a given solid object with the same magnitude everywhere. Changing this may cause a change in the object's volume.
5. _____ is a system of forces acting on a surface that may have a different magnitude in different directions. Changing this may cause a change in the object's volume and shape.
6. Increasing the temperature of a rock or fluid would generally _____ (choose one: increase, decrease, not change) the chemical reactivity of the rock/fluid.
7. Increasing the temperature causes atoms to vibrate _____ (choose one: more slowly, more rapidly, the same as before the temperature change).
8. In average continental crust, the Earth's temperature _____ (choose one: increases, decreases, remains constant) as it is sampled from the surface downward toward the base of the crust.
9. The rate of change of Earth's temperature with changing depth is called the _____ gradient.
10. Great changes have occurred in/on Earth during its _____ year history since its formation.
(<https://www.baylor.edu/geosciences/index.php?id=953452#earth>)
11. In the metamorphic process of _____ (choose one: recrystallization, neomorphism/neomineralization, metasomatism), the same types of minerals are present in the rock both before and after metamorphism. An example is the mineral calcite, which dominates the composition of the sedimentary rock *limestone* and the meta-sedimentary rock *marble*.
12. In the metamorphic process of _____ (choose one: recrystallization, neomorphism/neomineralization, metasomatism), new types of minerals grow during metamorphism at the expense of the pre-existing minerals. For example, a shale containing clay minerals may be metamorphosed to produce a schist containing garnet, mica, and other new metamorphic minerals that did not occur in the shale.
13. The metamorphic process of _____ (choose one: recrystallization, neomorphism/neomineralization, metasomatism) occurs in a chemically open system in which atoms are transported in and out of the rock during metamorphism, resulting in changes in the chemical composition of the rock in addition to mineralogical changes.
14. Metamorphism that occurs under warm conditions and modest pressures, often with the active involvement of water, is called _____ (choose one: low intermediate high) grade metamorphism.
15. Metamorphism that occurs under very hot conditions and significant pressures is called _____ (choose one: low intermediate high) grade metamorphism.
16. Metamorphism that occurs due to the *increase* in pressure/temperature is called _____ (choose one: prograde retrograde) metamorphism, because of the sense of going forward into higher P/T conditions.
17. Metamorphism that occurs due to the *decrease* in pressure/temperature is called _____ (choose one: prograde retrograde) metamorphism, because of the sense of going back to lower P/T conditions.
18. _____ metamorphism occurs in the area surrounding a very hot rock body, such as an igneous intrusion.
19. _____ metamorphism occurs through the involvement of hot water circulating through the rock.
20. _____ metamorphism occurs due to the elevation of pressure/stress and temperature as a sediment or rock is buried under the weight of subsequent sedimentary strata.
21. _____ metamorphism affects a broad area, and is commonly associated with the development and erosion of collisional mountain ranges.
22. The layering that develops during metamorphism due to the growth of minerals perpendicular to the greatest stress direction is called _____.
23. The metamorphic rock *gneiss* is an example of a(n) _____ (choose one: low intermediate high) grade metamorphic rock.
24. The metamorphic rock _____ contains visible grains of mica minerals arranged in parallel layers, giving it a shiny luster.
25. The metamorphic rock _____ contains very small (essentially invisible) grains of mica minerals arranged in parallel layers, giving the rock a silky luster. The layers are not generally planar, but are commonly wavy or irregular.
26. A very fine-grained metamorphic rock that breaks/cleaves in highly flat, planar layers is called _____.
27. Before metamorphism, slates were most likely the sedimentary rock _____.
28. Before metamorphism, quartzites were most likely the sedimentary rock _____.
29. Before metamorphism, calcite marbles were most likely the sedimentary rock _____.