EARTH SCIENCE

Assignment # _____

Regents Questions: Rocks and Minerals

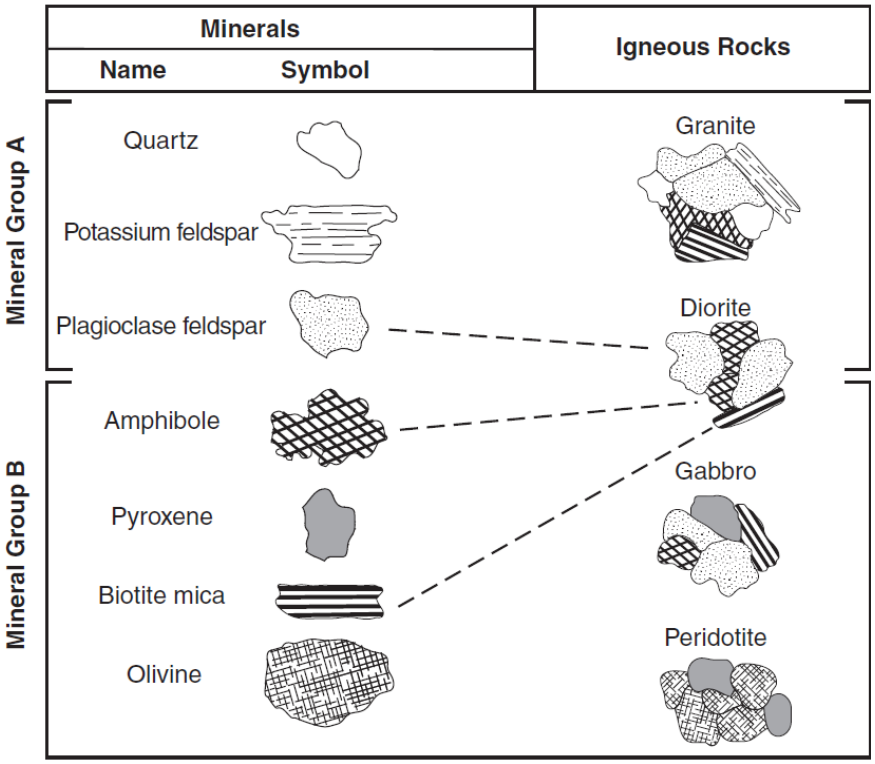
Name:_____Date:_____Period:_____

August 2014

*22 Which New York State landscape region is composed of mostly horizontal sedimentary bedrock and has a high elevation?
(1) Hudson Highlands (2) Manhattan Prong (3) the Catskills (4) Taconic Mountains

23 Which mineral is commonly mined as a source of the element lead (Pb)?
(1) galena (2) quartz (3) magnetite (4) gypsum

Base your answers to questions 77 through 80 on the diagram in your answer booklet and on your knowledge of Earth science. The diagram represents several common rock-forming minerals and some of the igneous rocks in which they commonly occur. The minerals are divided into two groups, *A* and *B*. Dashed lines connect the diagram of diorite to the three minerals that are commonly part of diorite's composition.



77 On the diagram *above*, draw *five* lines to connect the diagram of granite to the symbols of the minerals that are commonly part of granite's composition. [1]

78 Describe *one* characteristic of the minerals in group *A* that makes them different from the minerals in group *B*. [1]

79 Based on the *Earth Science Reference Tables*, identify *one* other mineral found in some samples of diorite that is *not* shown in the diorite sample in the diagram. [1]

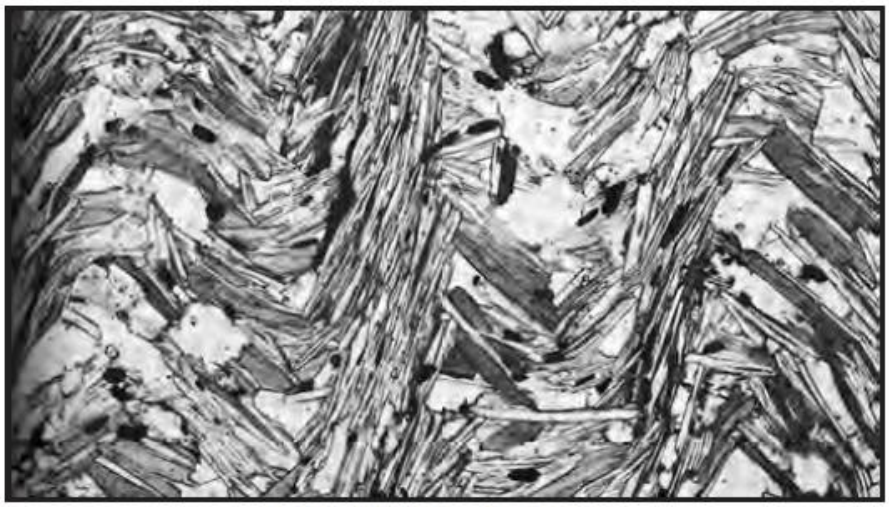
80 A sedimentary rock sample has the same basic mineral composition as granite. Describe *one* observable characteristic of the sedimentary rock that is different from granite. [1]

June 2014

*24 Which New York State landscape region is mostly composed of horizontal sedimentary bedrock at high elevations?
(1) Hudson Highlands (2) Allegheny Plateau (3) Taconic Mountains (4) Atlantic Coastal Plain

25 Which characteristic do samples of the mineral pyroxene normally exhibit?
(1) yellow to amber color (3) cleaves at 56° and 124°
(2) bubbling in hydrochloric acid (4) hardness of 5 to 6

26 The photograph below shows the texture of a rock composed of various minerals as seen through a microscope.



(Magnified 20 times)

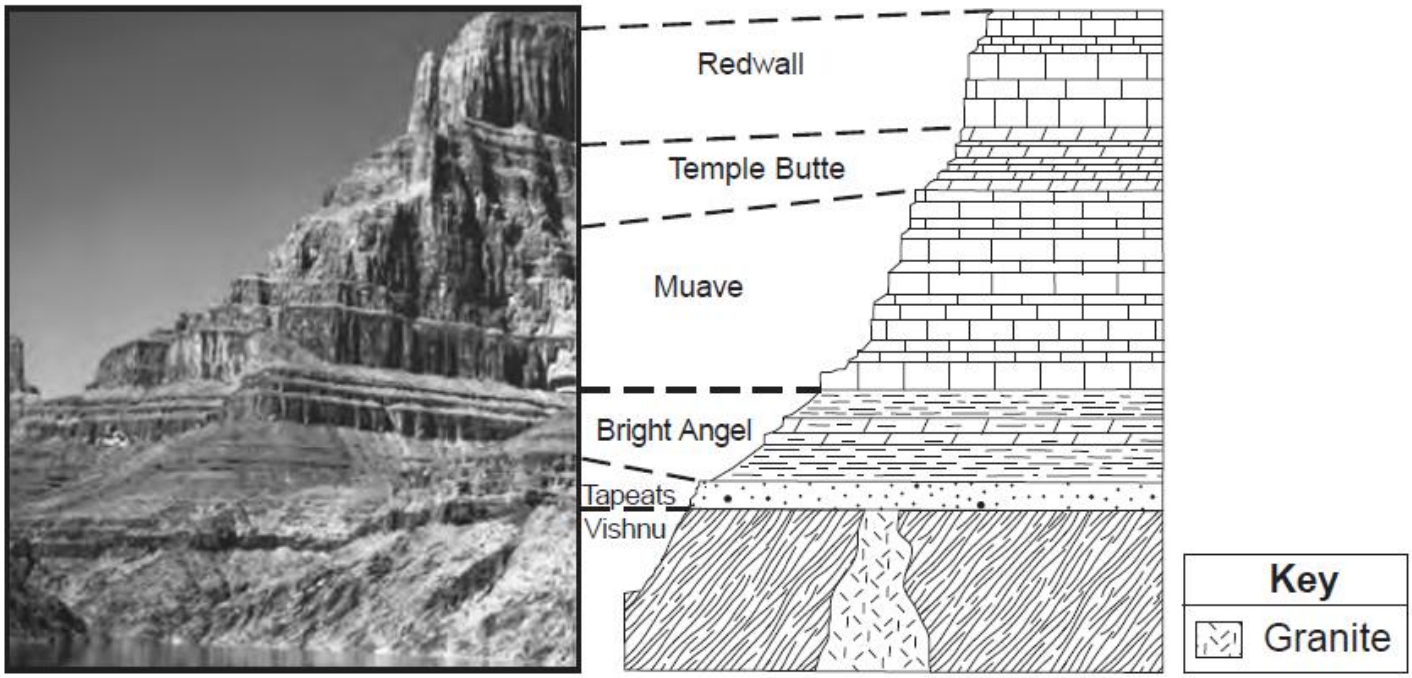
Which rock is most likely shown in the photograph?
(1) sandstone
(2) anthracite coal
(3) dunite
(4) schist

27 Which minerals contain the two most abundant elements by mass in Earth's crust?
(1) fluorite and calcite (2) magnetite and pyrite (3) amphibole and quartz (4) galena and sulfur

28 The photograph below shows an outcrop where a light-colored, igneous rock is cross cut by a dark-colored, igneous rock.

This fine-grained, dark-colored, igneous rock is most likely
(1) rhyolite
(2) diorite
(3) basalt
(4) gabbro

Base your answers to questions 48 through 50 on the photograph and cross section below and on your knowledge of Earth science. The sequence of rock types found in the walls of the Grand Canyon are shown. The names of rock formations are shown and the upper and lower boundaries of each formation are indicated by dashed lines. The rock layers have *not* been overturned.



48 The granite formation was primarily formed by
(1) metamorphism of layered sandstone (3) compaction of precipitated gypsum
(2) solidification of felsic magma (4) cementation of clastic sediments

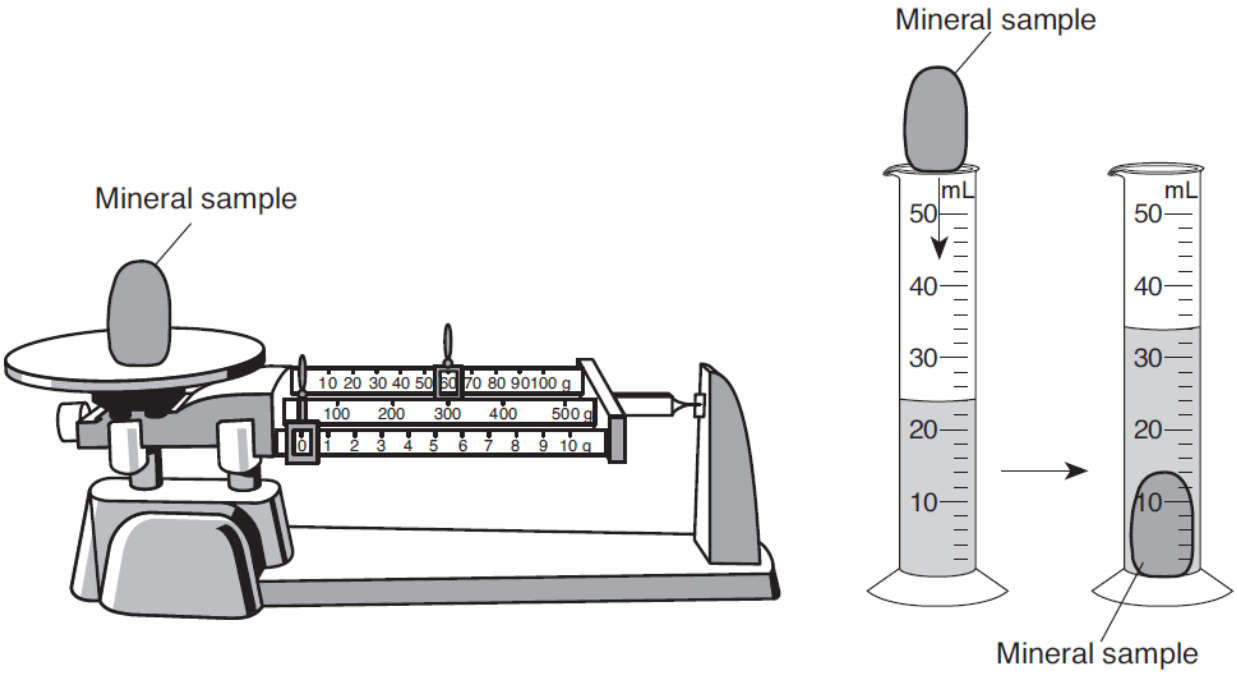
*49 The sequence of rock layers in the cross section provides evidence that the Muave formation is
(1) younger than the Temple Butte, but older than the Bright Angel
(2) younger than both the Temple Butte and the Bright Angel
(3) older than the Temple Butte, but younger than the Bright Angel
(4) older than both the Temple Butte and the Bright Angel

50 If the Vishnu schist had been exposed to greater heat and pressure during metamorphism, it could have formed
(1) gneiss (2) marble (3) quartzite (4) phyllite

January 2014

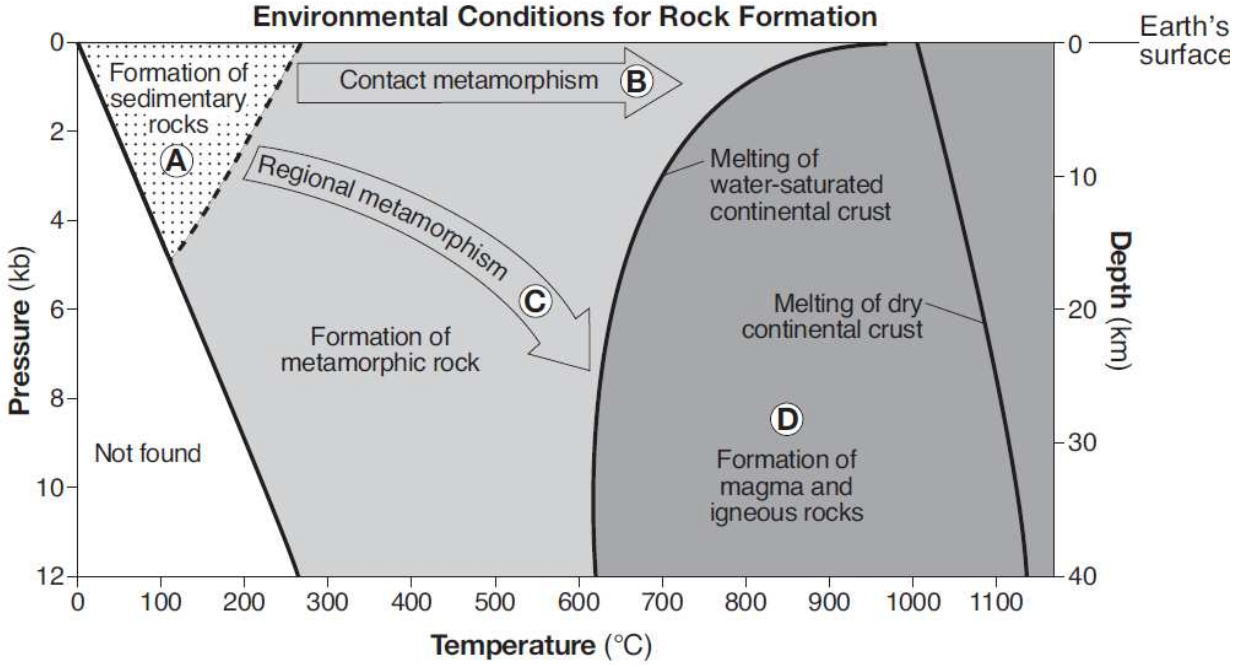
24 The most abundant metallic element by mass in Earth's crust makes up 8.23% of the crust.
Which group of minerals all normally contain this metallic element in their compositions?
(1) garnet, calcite, pyrite, and galena
(2) biotite mica, muscovite mica, fluorite, and halite
(3) talc, quartz, graphite, and olivine
(4) plagioclase feldspar, amphibole, pyroxene, and potassium feldspar

30 The diagram below represents the mass and volume of a mineral sample being measured. These measurements were used to determine the density of the mineral sample.



What is the density of this mineral sample?
(1) 6 g/mL (2) 24 g/mL (3) 34 g/mL (4) 60 g/mL

Base your answers to questions 40 through 42 on the graph below and on your knowledge of Earth science. The graph shows the temperature, pressure, and depth environments for the formation of the three major rock types. Pressure is shown in kilobars (kb). Letters *A* through *D* identify different environmental conditions for rock formation.

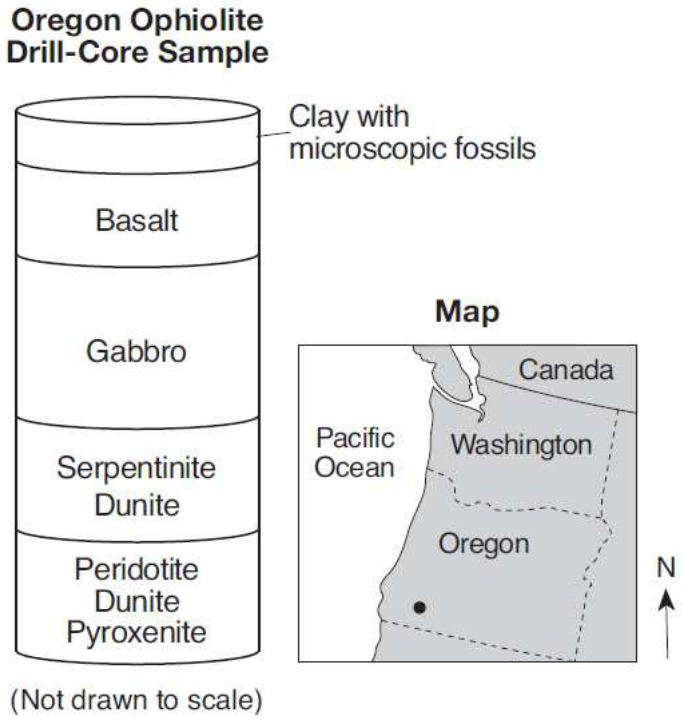


40 Which rock is most likely to form directly from rock material at a depth of 30 km and a temperature Of 1000°C?
(1) quartzite (2) scoria (3) shale (4) granite

41 Which letter represents the environmental conditions necessary to form gneiss?
(1) *A* (2) *B* (3) *C* (4) *D*

42 At what pressure and temperature is sand most likely to be compacted into sandstone?
(1) 2 kb and 150°C (2) 6 kb and 200°C (3) 10 kb and 400°C (4) 12 kb and 900°C

Base your answers to questions 81 through 83 on the passage, diagram of an ophiolite drill-core sample, and map below and on your knowledge of Earth science. The dot on the map represents the location where the ophiolite drill-core sample was taken.



Ophiolites
In some places, segments of oceanic crust, sediment, upper mantle, and rock have been heaved up by tectonic movements onto the edges of continents, where they often become part of mountains. These displaced oceanic lithosphere segments are called ophiolites. They provide an opportunity to study the composition of oceanic lithosphere and are a key feature in recognizing past tectonic plate convergence along subduction zones. Drill-core samples of ophiolites typically have the layering pattern shown in the drill-core sample at left..

81 What are the approximate crystal sizes in basalt and gabbro found in the Oregon drill-core sample? [1]

82 Describe how the mineral composition of dunite is different from the mineral composition of peridotite. [1]

83 Which layer in the ophiolite drill-core sample is composed of sediments? [1]

August 2013

26 Which processes lead directly to the formation of igneous rock?
(1) weathering and erosion (3) heat and pressure
(2) compaction and cementation (4) melting and solidification

33 The table below lists some information about the minerals graphite and diamond.

Data Table

Mineral	Composition	Depth of Formation	Hardness	Electrical Conductor
graphite	carbon	shallow	1	good
diamond	carbon	very deep	10	poor

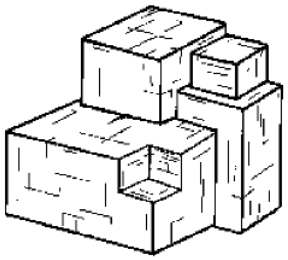
Some properties of diamond are different from those of graphite because diamond
(1) has a different arrangement of atoms (3) has a different composition
(2) forms larger crystals (4) is older in geologic age

Base your answers to questions 34 and 35 on the data table below and on your knowledge of Earth science. The table provides information about four minerals, *A* through *D*.

Data Table

Mineral	Breakage	Hardness	Luster	Color
A	cleavage	2.5	metallic	silver
B	cleavage	2.5	nonmetallic	black
C	cleavage	3	nonmetallic	colorless
D	fracture	6.5	nonmetallic	green

34 The diagram below represents a sample of mineral *A*.



Mineral *A* is most likely
(1) garnet
(2) galena
(3) olivine
(4) halite

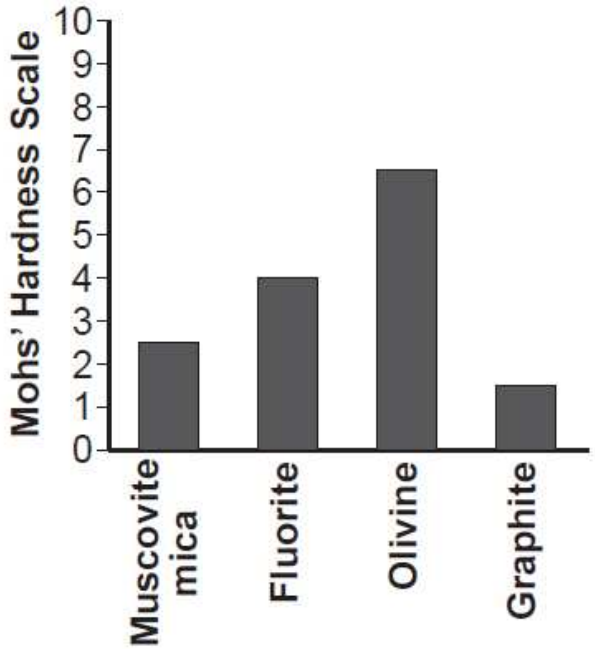
35 Which mineral can scratch *A, B*, and *C,* but can *not* scratch *D*?
(1) talc (2) selenite gypsum (3) fluorite (4) quartz

77 Two rocks, scoria and basalt, have formed from the cooled lava that erupted from the volcano, Nyiragongo. Describe the texture of *each* rock. [1]

82 List *three* minerals that are likely present in granite rock. [1]

June 2013

19 The graph below shows the hardness of four minerals.



Which mineral is hard enough to scratch calcite but is *not* hard enough to scratch amphibole?
(1) muscovite mica
(2) fluorite
(3) olivine
(4) graphite

34 The data table below lists characteristics of rocks *A, B, C,* and *D*.

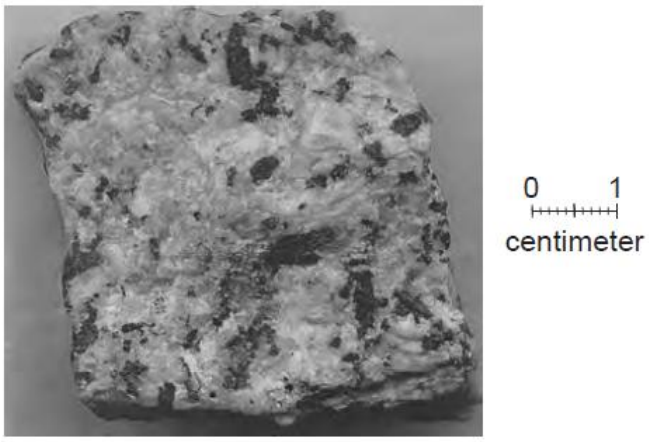
Rock Characteristics

Rock	Texture	Grain Size	Mineral Composition
A	nonfoliated	fine to coarse	calcite, dolomite, carbon
B	banding	coarse	biotite, quartz, plagioclase feldspar
C	bioclastic	microscopic to coarse	carbon, pyroxene, mica
D	foliated	fine to medium	quartz, amphibole, garnet

Which rock is most likely phyllite?
(1) *A* (2) *B* (3) *C* (4) *D*

Base your answers to questions 66 through 68 on the table and photograph below and on your knowledge of Earth science. The table shows the approximate mineral percent composition of an igneous rock. The photograph shows the true-scale crystal sizes in this igneous rock.

Mineral Name	Percentage of Mineral Present
plagioclase feldspar	55%
biotite	15%
amphibole	30%



66 Identify *two* elements that are commonly found in all three minerals in the data table. [1]

67 Identify this igneous rock. [1]

68 Identify *two* processes that formed this rock. [1]