Mineral Resources Economics and the Environment 2nd edition Kesler Test Bank

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CHAPTER 2 - ORIGIN OF MINERAL DEPOSITS

36 questions (asterisk by correct answer)

Plate tectonics:
a) is the process by which plates of magma move about the surface of Earth
b) can account for annual climate changes
c) have been going on since Earth formed 1 million years ago
d) all of the above
e) none of the above*

A rock is:
a) a consolidated mixture of minerals*
b) any concentration of minerals that is mineable
c) always made up of more than one type of mineral
d) a, b and c
e) none of the above

Ultramafic rocks:
a) are rich in Mg and Fe silicates, and probably came from the mantle of Earth*
b) are rich in Na, K and Ca silicates and came from the mantle of Earth
c) are commonly associated with deposits of manganese and potash
d) would be common in bauxite and phosphate deposits
e) none of the above

A hydrothermal fluid is:
a) a water-rich, hot solution found only in the ocean
b) a hot fluid that forms during the smelting of iron ore
c) a cool solution used to dissolve tungsten ore
d) a solution found in hot springs
e) a natural, hot, water-rich solution anywhere in the earth*

A natural concentration of minerals or rocks that can be mined at a profit is:
a) a laterite
b) an ore deposit*
c) a result of sea floor spreading
d) pentlandite
e) none of the above

Ore deposits are mineral deposits:
a) that have been mined
b) that are measured as resources
c) that can be extracted at a profit*
d) that have yet to be cleared for extraction on an environmental basis
e) none of the above

If the average abundance of zinc in the crust is 50 ppm and the density of the average crust is 3 metric tonnes/cubic meter, how many metric tonnes of zinc are in a cubic kilometer of average crust? (Don't be confused by the spelling of tonnes. That is the way to spell a metric ton.)
a) 1500
b) 12500
c) 150000*
d) 250000
e) 500000

The following minerals are known to form placer deposits:
a) gold
b) cassiterite
c) diamond
d) all of the above*
e) none of the above

The most abundant elements in Earth's crust are:
a) oxygen, silicon and aluminum
b) commonly found in silicate minerals
c) not usually mined in the form in which they commonly occur in the crust
d) all of the above*
e) none of the above

Mineral deposits are defined as naturally formed:
a) zones that can be mined at a profit
b) zones where elements or compounds of economic interest have been concentrated by geologic processes*
c) zones where geologic processes permit mining by either open pit or solution methods
d) zones where economic considerations permit mining with minimum impact on the environment
e) zones where subduction allows formation of magmatic solutions to concentrate elements

The cut-off grade of a mineral deposit is:
a) the maximum concentration of a mineral or element in the deposit that can be extracted without engineering complications
b) the smallest concentration of mineral or element that can be extracted at a profit*
c) the largest average concentration of mineral or element present in the deposit
d) the maximum amount of any mineral or element that can be dispersed from a mineral operation
e) none of the above

A deposit with a grade of 2% copper, would contain how many pounds of copper per 2000 pound ton?
a) 10
b) 25
c) 40*
d) 200
e) 500

Meteoric hydrothermal solutions form when:
a) magmas release large amounts of brine into lakes
b) rain water mixes with deeply buried basinal brines
c) brines are expelled from sedimentary basins
d) rain water percolates into the crust where it is heated and rises*
e) none of the above

Mineral deposits form when:
a) geologic processes form unusual concentrations of some elements and/or minerals*
b) elements are dissolved and dispersed by hydrothermal solutions passing through the crust
c) fluid inclusions form during vein deposition
d) magmas intrude large blocks of rock causing explosive eruptions
e) kerogen-rich rock is heated to temperatures of 500°C

Placer deposits form when:
a) flowing water in streams slows down and drops heavy minerals*
b) gold weathers out of veins
c) geysers reach relatively high levels in fault zones
d) all of the above
e) none of the above

When a magma crystallizes minerals that sink to the bottom of the chamber and accumulate in layers, it is undergoing the process of:
a) crystal fractionation*
b) immiscibility
c) vapor separation
d) subduction
e) sublimation

Weathering is:
a) the process by which rocks and minerals are partly dissolved and new minerals are formed at the surface of Earth
b) an important geologic process that forms mineral deposits containing aluminum and nickel
c) the process that forms most soils
d) all of the above*
e) none of the above

Chemical weathering:
a) involves the addition of gold to most rocks to form placer deposits
b) is not common in areas with warm, humid climates and is found, instead, in polar areas where water is frozen all year
c) is the most common geologic process in Earth's core
d) all of the above
e) none of the above*

The importance of CO_2, SO_2 and other atmospheric gases to chemical weathering is:
a) the fact that they form compounds that precipitate in minerals, causing them to decompose
b) their low concentrations, which limit the solubility of iron and copper
c) their reaction with rain water to form acids that dissolve rocks, minerals and other materials*
d) all of the above
e) none of the above

Physical weathering:
a) involves the decomposition of rocks by dissolution in ocean water
b) involves the destruction of rocks by natural processes that break them apart*
c) is important as a source of gases to the atmosphere
d) all of the above
e) none of the above

Organic sedimentary processes:
a) form magmas
b) include formation of potassium-rich skeletal material for many organisms
c) form the material from which oil and natural gas form*
d) are not commonly observed in modern oceans
e) none of the above

A lacustrine environment is:
a) a lake*
b) a river
c) a lava flow
d) a volcano
e) none of the above

Sedimentary basins:
a) contain several types of fluids including water, brines, oil and natural gas
b) contain thick sequences of sediments and sedimentary rocks
c) can form hydrothermal solutions if the waters and brines are heated when the sediments are buried deeply
d) all of the above*
e) none of the above

Seawater hydrothermal solutions:
a) form where seawater is heated by magmas beneath sedimentary basins
b) consist of magmatic water
c) are the most common type of groundwater
d) have been found only in Antarctica
e) are found at mid-ocean ridges where they sometimes form black smokers*

Magmatic hydrothermal solutions:
a) form when water and other fluids are released by sedimentary basins
b) form at the tops of volcanoes where rain is most common
c) are extremely cool and lack dissolved salt
d) all of the above
e) none of the above*

Metamorphic hydrothermal solutions:
a) are released when rocks undergo metamorphism to form minerals that lack water*
b) are formed where igneous rocks are heated by lava flows
c) form placer deposits
d) usually contain extremely high levels of copper and other elements driven from the minerals
e) none of the above

The main types of hydrothermal solutions are:
a) meteoric, magmatic, metamorphic, basinal and seawater*
b) igneous, metamorphic and sedimentary
c) quartz, calcite and galena
d) environmental, engineering and economic
e) none of the above

Darcy's Law:
a) describes the movement of fluids through porous, permeable rocks
b) is used only where the dispersal of elements from minerals is very high
c) says that more water can be forced through a porous, permeable rock by increasing pressure
d) a and b
e) a and c*

Good aquifers:
a) must have a low enough porosity to keep water from flowing out
b) are commonly found at deep crustal levels
c) will store and release large amounts of water*
d) can be contaminated with lead if the aquifer collapses
e) none of the above

The Colorado River:

a) is a major navigational route in the American Southwest
b) flows into the Gulf of California, where it has a large, active delta
c) is an overcommited river, with more water promised to areas in its basin than it usually contains*
d) used to be the major source of water to the Phoenix area via the Central Arizona Project
e) has difficulties with salt concentrations that are caused by dissolving evaporite beds in the banks of the river

Salt water encroachment:

a) occurs most commonly in areas where irrigation has increased the salinity of groundwater
b) is a hazard in Boston where tornadoes cause seawater to push inward along beaches
c) occurs when heavier fresh water is removed from an aquifer, thus permitting lighter seawater to take its place
d) is a problem where waterways connecting the ocean with coastal areas permit saltwater to flow inland and sink into freshwater aquifers*
e) can be limited by the use of wells to remove freshwater from the aquifer

The Ogallala aquifer:

a) is recharged by precipitation in the Rockies and carries water eastward into the Great Plains
b) consists of sands and other porous, permeable sediment that was deposited east of the Rocky Mountains
c) is being depleted by overproduction of groundwater, principally for irrigation purposes
d) all of the above*
e) none of the above

The Los Angeles Metropolitan Water District:

a) controls the distribution of all water that supplies the Los Angeles metropolitan area, as well as communities as far south as San Diego*
b) is in danger of having inadequate supplies because of the failure of desalinization efforts attempted on Pacific Ocean water
c) obtains important amounts of water in pipelines from eastern sources, including the Mississippi and Missouri Rivers
d) controls water supplies throughout the southwestern part of the U.S., including all water from the Colorado River
e) has been unable to use runoff from the eastern Sierra Nevada several hundred miles north of Los Angeles, because of environmental problems

Recharge is:

a) the amount of clay added to pellets to make them stick together
b) a term used to describe electrical power movement during aluminum production
c) the most common process by which reserves are enhanced in oil wells
d) the flow of precipitation into the groundwater system*
e) an important contribution to magmatic hydrothermal solutions

The vadose zone is:

a) found just above the water table,
b) wetted intermittently as water flows downward into the water table
c) not saturated all the time
d) all of these*
e) none of these

Permeability:

a) refers to effective porosity, or the ability of rocks to transmit fluids through them
b) is highest for rocks such as sandstone
c) can be filled if new minerals deposit in pores
d) is important in the production of oil, water and natural gas
e) all of the above*

Short Answer

Although mineral deposits are forming today by natural geologic processes, we refer to them as "non-renewable resources." Why?

Gold is found in sea water and copper is found in average rock. Why do we not use these materials as sources of these metals?