**Study Guide for Advanced Geology Multiple Choice**

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| **Subject** | **Key Points** | **Key Vocabulary** |
| **Time** | **a. relative****- geologic laws****- interpret cross-section: put events in order****- broad overview of changes in life over time****b. absolute****- define half-life****- reflect on Virtual Isochron****- do simple calculations/problems as done in class or lab****- significant ages (see handout); Eras: names, ages,****- relate absolute data to cross-sections (like we did with clicker quiz)** | **Law of superposition****Half-life****Principle of fossil succession****Relative dating****Absolute dating****Radioactivity****Radiometric dating****Radiocarbon dating****Cross-cutting relationships****Unconformity****Principle of original horizontality****Index fossil****Disconformity****nonconformity****Angular unconformity** |
| **Minerals** | **- define****- identifying characteristics****- physical features****- types of minerals****- structure of silicate minerals****- examples of non silicate minerals****- composition of the crust** | **Mineral****Hardness** **Cleavage****Luster****Streak****Silicate Minerals****Crystal form** |
| **Igneous Rocks** | **- what conditions favor the melting of rocks****- describe the grain size, color, and mineralogy of the most common igneous rocks****- describe the general chemistry of the most common igneous rocks****- describe Bowen’s discontinuous and continuous reaction series****- interpret the texture of igneous rocks****- recognize the different types of intrusive features**  | **Extrusive****Intrusive****Phenocryst****Aphanitic texture****Bowen’s reaction series****Glassy texture****Pyroclastic texture****Pegmatitic texture****Mafic** **Ultramafic****Felsic****Volatiles** **Granitic****Basaltic** |
| **Sedimentary Rocks** | **Why study them?****Define/describe beds, clastic****Describe the common clastic, chemical, and biogenic sedimentary rocks.****Recognize common sedimentary structures and describe an environment they form in.****Describe common environments of deposition for sedimentary rocks.** | **Clastic****Organic\*\*\* (biogenic, book says biochemical)****Chemical** **Lithification****Cementation****Compaction****Sediment****Sorting****Environment of deposition****Weathering & Erosion\*\*\*****Cross-bedding****Clastic texture****Mud crack****Ripple mark** |
| **Metamorphic Rocks** | **Describe the factors that influence metamorphism.****Describe the classification of metamorphic rocks.****Describe confining and directed pressure and how they influence foliation.****Describe the changes in a rock during progressive metamorphism.****Describe the foliation and composition of metamorphic rocks.****Describe the locations where metamorphism takes place** | **Contact metamorphism** **Hydrothermal metamorphism****Foliated textures****Gneissic texture****slaty cleavage****porphyroblastic texture****Regional metamorphism****Schistosity****Slaty cleavage****Parent rock****Recrystallization** |
| **Coastal features and processes** | **1. Explain longshore drift.****2. Describe/identify the landscape features made by deposition in a coastal environment.****3. Describe/identify the landscape features made by erosion in a coastal environment.****4. Explain how and where groins, breakwaters and seawalls can cause problems along a beach.** | **Longshore drift****Groin****Breakwater****Seawalls****Berm****Barrier island****Baymouth bar****Jetty** **Tombolo****Submergent coastline****Emergent coastline****Beach** **Estuary****Delta****Spit****Wave-cut cliff****Wave-cut platform****Tidal flat****Marine terrace****Headland** |
| **Glaciers** | **1. Describe the present-day distribution of alpine glaciers, ice sheets and ice caps.****2. Describe the conditions that favor the formation and advance/retreat of glaciers.****3. How do glaciers erode their beds?****4. Describe and identify (erosional and depositional) landscape features of alpine glaciers.****5. What is the difference between till and outwash.****6. What are the types of moraines and recognize them on a map or diagram.****7. What are the landscape features made of stratified drift (outwash) and recognize them on a map, diagram, or photo.****8. Describe the distribution of ice sheets in the recent geologic past.****9. Describe the indirect effects of glaciation (changes in sea level, pluvial lakes).****10. Describe two hypotheses for glaciation.****11. What are some of the parameters associated with the Milankovich cycle?** | **Valley glaciers****Alpine glaciers****Ice sheets****Ice shelves** **Ice caps****Piedmont glacier****Firn****Plastic flow****Basal slip****Zone of fracture****Crevasses****Surges****Zone of accumulation****Snowline****Zone of wastage****Calving****Glacial budget****Zone of fracture****Ablation****Plucking****Abrasion****Rock flour****Glacial striation****U-shaped glacial trough****Hanging valleys****Arete****Horn****Truncated spur****Medial moraine****Lateral moraine****End moraine****Terminal moraine****Recessional moraine****Ground moraine****Drumlin****Kettles****Kame****Esker****Pluvial lake****Outwash plain** **Cirque****Glacial drift****Till** |
| **Groundwater** | **1. Draw an unconfined aquifer and label the zones of aeration and saturation and the water table.****2. Define porosity and permeability.****3. What materials are good aquifers.****4. What materials commonly make aquicludes.****5. Draw a cross-section of a hillside that produces a spring.****6. Describe a setting for a well that would provide water all year long.****7. Draw a confined aquifer and label the recharge area, aquicludes, aquifer, the water table and the potentiometric surface****8. Describe and identify karst features.****9. General characteristics of groundwater in Michigan.** | **Water table****Ground water****Aquifers****Confining beds****Karst****Sinkholes****Solution valleys****Springs****Disappearing streams****Zone of aeration****Zone of saturation****Speleotems****Stalactites****Stalagmites****Artesian wells****Nonflowing artesian well****Flowing artesian well****Recharging** **Zone of saturation****Capillary fringe****Zone of aeration****Gaining stream****Losing stream****Porosity****Permeability****Aquitards****Aquifers****Hydraulic gradient****Hydraulic conductivity/Darcys law?** **Spring****Perched water table****Geysers****Caverns****Well** **Drawdown, cone of depression?**  |
| **Volcanoes** | **1. Be able to distinguish the seven types of volcanoes we describe in class based on shape, size, rock composition, and volcanic material.****2. Be able to recognize or describe types of lava, pyroclasts, or gases.****3. What factor control the violence of volcanic eruptions****4. Describe the distribution of volcanoes.** | **Shield Volcano****Cinder cone****Composite cone****Scoria cone****Stratovolcano****Hotspot****Fissure****Caldera****Volcanic neck****Xenoliths****Pahoehoe flow****Block lava****Pillow lava****Pyroclastic flow****Lahar****Aa flow****Viscosity****Volatiles****Sills****Laccoliths****Batholiths****Continental volcanic arc****Intraplate volcanism****Island arcs** |
| **Earthquakes** | **1. Explain elastic rebound theory.****2. Describe the movement of P- and S-waves. Which is faster. Which travels through solids? Liquids?****3. Explain how earthquakes are located.****4. Compare and contrast earthquake intensity and magnitude.****5. Where are there shallow, intermediate, and deep-focus earthquakes? Relate this to plate tectonics.****6. What are the effects of earthquakes? e.g. fire, etc****7. Explain how earthquakes were used to locate the base of the crust, the lithosphere, the core, and he inner and outer core.** | **Focus****Hypocenter****Faults****Elastic rebound****Aftershocks****Foreshocks****Seismology****Surface waves****Body waves****Primary (P) Waves****Secondary (S) Waves****Long (L) Waves****Epicenter****Intensity** **Magnitude****Modified Mercalli Scale** **Richter Scale****Moment magnitude****Liquefaction****Seiches****Tsunami****Landslide** |
| **Plate Tectonics** | **1. Outline Wegener’s evidence for continental drift****2. Explain why his model was not widely accepted****3. Describe Hess’ sea-floor spreading model****4. What is the evidence for sea-floor spreading****5. Be able to recognize profiles of tectonic boundaries (MORs, trenches) and hot spot volcanoes****6. Know the types (convergent, divergent, and transform ) and characteristics of plate boundaries****7. Provide or locate (classic) examples of each of three types of boundaries****8. Describe the distribution of earthquakes (shallow, intermediate, and deep) , volcanoes (stratovolcanoes, shields) and rock compositions (basalt, andesite, granite) at boundaries****9. Be able to determine the relative motion between two locations.** | **Continental drift** **Pangaea****Oceanic ridge system****Seafloor spreading****Geomagnetic reversal****Normal polarity****Reverse polarity****Convergent boundaries** **Divergent boundaries****Transform fault boundaries****Mid-ocean ridges****Trenches****Hot spot volcanoes****Spreading centers****Rift valley****Deep-ocean trench****Hot spot volcanoes****Volcanic island arc****Slab pull****Ridge push****Slab suction****Mantle drag****Plate resistance****Lithosphere****Asthenosphere** |
| **Streams** | **1. What are the global reservoirs for water?****2. What is the largest reservoir for freshwater?****3. Describe the hydrologic cycle.****4. Given a cross-section of a stream channel, show the area of maximum water velocity and explain why the water moves at different speeds.****5. Use the discharge equation to solve for an unknown parameter.****6. What is a hydrograph? Be able to read a hydrograph. What are they used for?****7. Be able to read and interpret a flood-frequency curve.****8. What is base level? What is the base level of the Grand River? Trace the path of water from the Grand River to the ocean.****9. How is grain size and velocity related to erosion of particles?****10. Describe how steams erode their channels.****11. Describe how steams transport material.****12. Given a map that shows streams draw a line around a drainage basin.****13. What are 4 types of stream patterns and what do they indicate about the underlying geology?****14. Identify and describe features of stream valleys/floodplains.****15. Tell a braided stream from a meandering stream.****16. Be able to recognize a terrace.** | **Hydrologic cycle****Laminar flow/turbulent flow (Which?)****Sheet flow****Infiltration capacity** **Discharge****Longitudinal profile****Hydrograph** **Base level****Graded stream****Dissolved load****Suspended load****Bed load****capacity****Settling velocity****Sorting****Alluvium****Bars** **Point bars****Playfair’s Law****Braided stream****Flood plain** **Mouth** **Back swamps****Yazoo tributaries****Natural levee****Alluvial fans****Deltas****Terrace****Drainage basin****Meander****Cutoff****Oxbow lake****Meander scar****Dendritic pattern****Radial pattern****Rectangular pattern****Trellis drainage pattern****Floods****Recurrence interval** **Return period**  |

**BE ABLE TO PLACE ROCKS IN THEIR SUBGROUPS: Sedimentary (clastic, chemical, biogenic), Metamorphic (foliated, non-foliated) AND KNOW THE SIGNIFICANCE OF THEIR TEXTURES**

**KNOW THE ROCK CLASSIFICATION CHARTS**

**Sedimentary: Table 7.1, p. 214; Figure 7.17, p. 227 Metamorphic: Figure 8.12, p. 255 (8th edition)**

**Tips:**

**1. Which of these would best be asked about by diagrams, graphs, or photographs?**

**2. Which diagrams in the book match these specific topics?**

**3. How did I ask questions on these topics on the old exam.**

**4. Review your quizzes.**

**Tips:**

**1. Which of these would best be asked by diagrams or graphs?**

**2. Which diagrams in the book match these specific topics?**

**3. Which homework questions match these specific topics?**

**4. How did I ask questions on these topics on old exam?**

**5. What lab activities support these lecture topics?**