ES104 Quiz 3 Study Guide – Summer 2024

Quiz 3 (20 Pts) Monday July 15, 2024

RECOMMENDED STUDY TECHNIQUES

1) review the "How to Study Physical Science" guide available on the web site.
2) use the concepts below as a guide to help you focus on your notes
3) memorize terms and concepts (make flash cards, rewrite definitions 100 times, etc.)
4) go back over the labs and make sure you can do the tricks / skills
5) review some of the important figures in your lab manual and text
6) go back over the previous study guides; review Canvas Practice Questions
7) be able to link the terms to concepts, and the concepts to Earth processes
8) Go to the class website and view all "Slide Shows/Figures / Overheads to Accompany Class Notes"
    - Plate Tectonics
    - Seismology / Earthquakes
    - Volcanism / Igneous Activity

Week 2 - Plate Tectonics

Mineral
Element
Rock Cycle
Rock Types
Igneous
    - e.g. basalt
    - e.g. granite

Sedimentary
    - e.g. sandstone

Metamorphic
Magma
Lava
Weathering
Sediment
Volcano
Earthquake
Seismology
Crust
Oceanic
Continental
Lithosphere (Plate)
    - Crust
    - Upper Mantle
    - Asthenosphere
    - Outer Core
    - Inner Core

Plate Tectonics
Plate Boundaries
    - Convergent
    - Divergent
    - Transform
    - Convergent

Subduction
    - Subduction Trench
    - Volcanic Arc (e.g. Cascades)
    - Plate Destruction

Divergent
    - Seafloor Spreading
    - Mid-Oceanic Ridge

Transform Fault
    - e.g. San Andreas
    - e.g. Offset Mid-Ocean Ridge

Alfred Wegner
Continental Drift
Jig-Saw Fit of Continents
    - Pangaea
    - Match-up of Fossils
    - Match-up of Geology

Modern Evidence
    - Paleomagnetism
    - Seafloor Stripes
    - Normal Polarity
    - Reverse Polarity
    - Seismic Distribution
    - Volcanic Distribution
    - Hot Spots
    - Hot Spot Tracks / Hawaiian Islands
    - Seamounts

Subduction Zone Types
    - Oceanic-Oceanic
        - e.g. Japan
    - Oceanic-Continental
        - e.g. Cascades
    - Continental-Continental
        - e.g. Himalayas

Plate Motion Rates
    - 1-10 cm/yr

Continental Rifting
    - e.g. Red Sea

Plate Driving Mechanism
Internal Heat
Radioactive Source
Heat Exchange
Mantle Convection
Convection cells
rising hot rock
sinking cool rock
Ridge Push
Trench Pull
Density Driven

Week 3 - Earthquakes

earthquake
epicenter
focus
wave refraction
wave reflection
s-wave shadow zone
p-wave shadow zone
seismic risk

seismic hazard
p wave
s wave
compressional wave
shear wave
surface wave
love wave
San Andreas Fault
fault creep
stick-slip
fault
blind fault
seismic waves
source of earthquakes
normal fault
reverse fault
strike slip fault
fault strand
fault zone
fault segment
ductile deformation
elastic deformation
brittle deformation
elastic rebound
foreshocks
aftershocks
main shock
wave form
wavelength
frequency
amplitude
body waves
surface waves
longitudinal waves
primary waves
shear waves
transverse waves
seismograph
seismogram
first p-wave arrival
first s-wave arrival
p wave velocity
s wave velocity
surface wave velocity
epicenter / triangulation
Mercalli Scale
earthquake intensity
earthquake magnitude
Richter Scale
seismicity
tsunami
ground shaking
earthquake / landslides
liquefaction

Week 3 – Pacific Northwest Earthquake Hazards
Oregon / Pacific Northwest
PNW earthquake hazards
subduction zone earthquakes
crustal earthquakes
volcanic earthquakes
paleoseismology
last PNW big event = 300 yr
tsunami deposits (sand)
bay mud
coastal uplift
coastal subsidence
marsh submergence
tsunami cycle
Risk Factors
GPS / ground motion
hazard
risk
alluvium
bedrock
groundwater
Monmouth hazards
Willamette Valley hazards
saturated sediments
ground shaking

Week 3 – Volcanism
volcanic eruptions
explosive eruption
quiescent eruption
temperature
silica content
gas content
magma viscosity factors
- >temp, < viscosity
- <temp, > viscosity
- >silica, > viscosity
- <silica, <viscosity
- >gas, > explosiveness
- >viscosity, > explosiveness

products of volcanic eruptions
- lava – pyroclastics - gas
- low silica lava = basaltic
  - pahoehoe / aa
- high silica lava = rhyolitic

volcanic gases
- water vapor
- carbon dioxide
- hydrogen sulfide

pyroclastic materials
- fine ash
- pumice
- cinders
- blocks / bombs

anatomy of volcano
- crater
- caldera
- magma chamber
- central vent
- flank eruption

volcano types
- shield (e.g. Newberry, Hawaii)
- cinder (e.g. Lava Butte)
- stratovolcano (e.g. Mt. Hood)

collapsed caldera (Crater Lake)
Intrusive Igneous Bodies
- dikes
- sills
- laccoliths
- batholiths
- stocks
- volcanic necks

Skills and Concepts

Can you sketch the interior of the Earth?

Can you complete basic unit calculations from English to Metric and vice versa?

Can you calculate density?

If given conversion factors, can

you work a unit conversion problem?

Which direction does heat flow and why?

Why does a hot air balloon rise? Why do hot rocks rise? Why does magma rise, Why do their cold counterparts sink?

What types of geologic features are found at what types of plate boundaries? (e.g. volcano, earthquake, mountains, volcanic islands?)

Can you draw and label a cross-section of a subduction zone? a seafloor spreading center?

How do we know that Hawaii is located over a hotspot? What is a hot spot ?

What is the difference between continental drift and plate tectonics?

How did the theory of plate tectonics evolve?

Can you draw a diagram of the plate tectonic setting of the Pacific Northwest?

Can you associate / match plate tectonic setting to geologic - geographic areas, as discussed in class?

Can you calculate the rate of plate motion in cm/yr?

If given a seismography with arrival times of P-S-surface waves, can you locate the geographic epicenter of an earthquake on a map?

Based on topographic map pattern, can you identify the difference between a shield volcano and a stratovolcano?

Based on observing images and diagrams, can you identify basic volcanic and igneous features such as cinder cones, stratovolcano, shield volcanoc, ash deposits, lava flows, aa vs. pahoehoe flows, dikes, sills, batholiths