

## ES106 Mid-Term Study Guide

BRING A SCANTRON, PENCILS, PENS, AND CALCULATOR TO THE EXAM!

### RECOMMENDED STUDY TECHNIQUES

- 1) Follow 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) review your homework questions and answer sheets
- 7) Read over the figures and text in the chapters listed on the syllabus.
- 7) study until you're sick of it, then study some more until you pass out
- 8) change your socks and drink plenty of water
- 9) clean your room....

**I WOULD STUDY A MINIMUM OF 10-12 HOURS IF I WANTED TO DO WELL ON THE MIDTERM EXAM!**

### Key Words

#### *Introduction*

Earth System Science  
astronomy  
geology  
oceanography  
meteorology  
oceanography  
environmental spheres  
lithosphere  
inner core  
outer core  
mantle  
crust  
atmosphere  
hydrosphere  
biosphere  
Earth visualization  
rotation  
revolution  
exponential notation  
scientific notation  
metric system  
metric unit conversion  
energy  
heat  
matter  
temperature

degree F  
degree C  
degree K  
solid  
liquid  
gas  
evaporation  
freezing  
condensation  
sublimation  
heat gain  
heat loss  
convection  
conduction  
radiation  
heat flow  
second law of thermodynamics  
three driving mechanisms  
gravity  
geothermal heat  
solar energy

#### *Basic Science Review*

hypothesis  
theory  
hypothesis testing  
observation  
experiment  
law

matter  
elements  
compounds  
atoms  
molecules  
nucleus  
protons  
neutrons  
electrons  
atomic no.  
atomic mass  
atomic charge  
atomic charge balance  
isotope  
speed  
velocity  
 $V=d/t$   
weight  
 $F=mg$   
force  
potential energy  
kinetic energy  
thermal energy  
conservation of energy  
energy transformation  
heat flow  
heat absorption  
heat emitters

*Intro to Hydrosphere*

atmospheric moisture  
oceans  
surface water  
ground water  
ice  
global ice  
hydrologic cycle  
heat capacity  
surface tension  
dipolar water molecule  
capillarity  
evaporation  
advection  
convection  
ocean evaporation  
land evaporation  
biosphere  
transpiration  
evapotranspiration  
runoff  
infiltration  
vegetative interception  
ice sheets  
oceans  
springs  
soil moisture  
atmospheric moisture  
fresh water storage

*Chemical Bonds / Chem of*

*Water*

atoms  
isotopes  
oxygen isotopes  
carbon isotopes  
ion  
cation  
anion  
complex ion  
dissolved ions in water  
molecules  
compounds  
mixtures  
atomic forces  
bonding forces  
octet rule  
stable-8 configuration  
valence shell

water  
electron shells  
lewis dot model  
atomic no.  
atomic mass  
no. protons  
no. neutrons  
no. electrons  
ionic bonding  
metallic bonding  
covalent bonding  
dot-model reactions  
aqueous solutions  
solute  
solvent  
saline solution  
salinity  
sheath of hydration  
dissolution  
concentration  
mass percent  
parts per thousand  
parts per million  
parts per billion  
molarity  
mole  
avagadros no.  
molality  
density  
hydrogen bonds  
polar covalent bonds  
viscosity  
weight density

*Heat Energy*

phase changes  
states of matter  
solid  
liquid  
gas  
plasma  
molecular kinetic energy  
heat energy  
internal vibrational energy  
floaters  
sinker  
gravity-driven density contrast  
temperature  
degree C

water vapor  
degree F  
degree K  
absolute zero  
heat flow  
high temp to low temp  
second law of thermodynamics  
heat - volume expansion  
cooling-volume contraction  
volume-density relationships  
heat loss  
heat gain  
heat transfer  
conduction  
convection  
radiation  
heat absorber  
heat reflector  
insulator  
convection cells  
evaporation  
condensation  
melting  
freezing  
sublimation  
calorie  
latent heat of melting  
latent heat of vaporization

*Intro to Oceanography /*

*Seafloor*

Ocean distribution  
plate tectonics  
seafloor  
seafloor volcanism  
seafloor basalt  
ocean crust  
mid-ocean ridge system  
divergent plate boundary  
paleomagnetism  
normal polarity  
reverse polarity  
seafloor stripes  
deep ocean trench  
magnetic reversals  
magnetic minerals  
bathymetry  
continental shelf  
continental slope  
continental rise  
abyssal plain  
deep sea canyons  
submarine fans  
tides  
tidal bulge  
spring tides  
neap tides  
diurnal tidal fluctuation  
lunar gravity  
global sea level  
hydrothermal vent  
hotspot tracks  
guoyots  
passive margins  
active margins  
marine sediment  
clastic sediment  
chemical sediment  
biochemical sediment  
composition of seawater  
dissolved ions  
salinity  
parts per thousand  
parts per million  
thermohaline circulation  
temp-density relations  
salinity-density relations

sonar  
sound velocity  
waves  
wind-driven waves  
storm surge  
fetch  
wavelength  
amplitude  
period  
frequency  
wave height  
tsunami  
wave base  
wave velocity  
surf zone  
breaker  
longshore current  
wave refraction  
rip current  
density-driven circulation  
wind-driven circulation  
coriolis effect  
clockwise vs. counter clockwise  
equatorial currents  
western boundary currents  
subtropical  
ekman spiral  
thermohaline circulation  
upwelling  
Gulf Stream  
California Current  
Kuroshira Current

## Key Concepts and Problem Solving Skills

Can you convert from English to metric system units?

Can you do unit algebra?

Do you know the difference between mass, volume, length, time, velocity, density?

Can you re-arrange an equation to solve for the unknown variable?

Can you draw and label the hydrologic cycle?

Can you calculate concentrations in mass percent, ppt, ppm, ppb, molarity?

Do you know how much a mole of an element or compound weighs?

Do you know how many atoms are in 1 mole of an element?

Can you explain all of the processes involved with the phase change of water from solid to liquid to gas?

Can you sketch the water molecule and explain the chemical bonding involved?

Can you read the periodic chart and determine the basic characteristics of atoms of elements?

Can you determine whether an element forms a cation or anion? and what the charge is? and why?

Do you understand the concept of valence electrons and how they control atomic bonding?

Do you know the types of heat transfer mechanisms?

Can you list 4 or 5 unique properties of water?

Can you list 4 or 5 sources of point and nonpoint water pollution sources?

Do you know everything else that we talked about, but I've forgot to mention here?

Do you know the basic composition of seawater?

Can you list the 4 most abundant ions contained in seawater?

do you know the approximate concentration of salts in the ocean?

Can you sketch the hydrologic cycle and label it?

Do you know the mechanisms by which ocean currents are formed?

Do you know how ocean waves are generated? What are the controlling factors?

Do you know the direction and type of currents off the west coast of the U.S.? how about the east coast?

How are tides generated?

Can you determine the depth to the seafloor if given the velocity of sound and travel time?

Can you list the three sources of ocean sediment?

Can you draw a profile sketch of the seafloor from on the continent to offshore in the abyssal plain?

Can you draw a sketch of a mid-ocean ridge?

Do you understand magnetic reversals and seafloor stripes?