**Science 111** **Fall 2008**
**Exam #3 Study Guide** **Dr. Alexander Dzyubenko**

## Exam #3 is Monday, November 3 at 9:30 pm.
## Closed book, closed note.

Chapter 7:

Terms: Thermal Energy, Temperature, Absolute Zero, Heat, Thermodynamics, Specific Heat Capacity, Calorie
Concepts: First Law, Second Law, Celsius Scale, Kelvin Scale, Thermal Expansion
Questions: 1, 4, 5, 10, 11, 12, 27, 28, 29, 32, 36
Exercises: 5, 9, 14, 15, 16, 17, 21, 26, 27, 30, 36

Chapter 8:

Terms: Conduction, Convection, Radiation, Evaporation, Sublimation, Boiling, Condensation, Freezing, Melting, Heat of Fusion, Heat of Vaporization
Concepts: Heat Transfer, Newton's Law of Cooling, Change of Phase
Questions: 1, 2, 3, 6, 9, 16, 20, 21, 23, 26, 27, 28, 30, 33, 34, 35, 37, 38, 39
Exercises: 1, 2, 5, 9, 11, 15, 16, 21, 25, 27, 28, 30, 31, 33, 45

Exam 3 Cheat Sheet

law of gravity $F = G\, m_1\, m_2 / d^2$
weight (old) = mg
weight (new) = support force
$g = 10\ m/s^2$ $a = F_{net}/m$ $G = 6.67 \times 10^{-11}$

1 cal = 4.187 J 1 Cal = 1000 cal
Specific heat c $c_{water} = 1\ cal/(g\ °C)$
Specific heat equation $Q = m\, c\, \Delta T$
Q = heat added or removed, m = mass, $\Delta T$ = temperature change
First law: conservation of energy
Second law: heat never spontaneously goes cold to hot
Heat transfer: conduction, convection, radiation
Newton's law of cooling: rate of cooling is proportional to $\Delta T$
Phase changes: evaporation, condensation, boiling or vaporization, melting, freezing, sublimation, deposition
Latent heat L $L_{water,boiling} = 2256\ J/g$ $L_{water,freezing} = 334\ J/g$
Latent heat equation $Q = mL$