Your Number _____

Name: Garett Cross

Practice Problems for Test 1
Fall 2015

. PETROLEUM ENGINEERING 310

Ground Rules

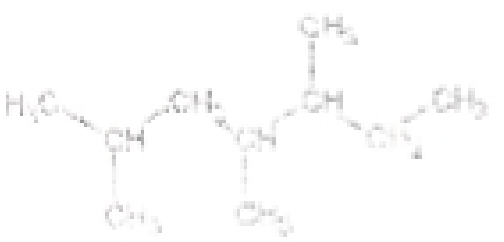
Allowed:

Forbidden:

Only interpretation questions are allowed, stand up and/or wave your hands and the TA's or myself will assist you.

NOTE: The real exam will be shorter that this, but this is a good representation of the type of problems you may have.

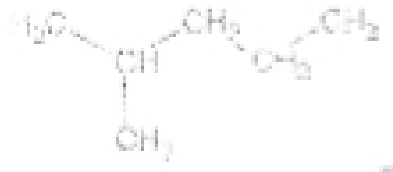
1. Name the following chemicals using the IUPAC rules (other molecules with the same level of complexity may be included):



2,4,5 - trimethyl heptane

1,4 - dimethyl cyclohexene

propene



2 - methyl pentane

2. Draw the structural formula for 3-methyl decane (or others)

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3. Indicate what is wrong with the following formula... (check for consistency) .. think about Z

4. Provide an example of an intensive property and one example of a system:

intensive property: density
system: fish bowl

If half of the water is removed from the bowl, the density of the water removed and still in the bowl are the same as before the water was removed

Sulfur compounds in oil (petroleum) poisons catalysts in refining	X	
Composition is an example of an extensive property		X
To define the state of a ternary mixture you need to provide: pressure, temperature, and the mass fraction of the lighter component		X
Calcium Chloride is a good example of a covalent bond		X
The benzene molecule has three double bonds		X
A reservoir producing a dry gas cannot produce water		X
The methane composition of a two component mixture existing in two phases is: 0.3 for the gas phase and 0.6 for the liquid phase		X

8. You decided to go camping and wanted to find out how much liquid propane is left in a used cylinder. The weight of this cylinder when it is full and empty is 80 pounds and 20 pounds respectively. Currently it weighs 50 lb. If the densities of liquid and vapor propane at 70 °F are: 30.19 lb/ft^3 and 1.15 lb/ft^3 respectively. Determine:

(a) Volumetric percentage of the propane liquid phase left the cylinder

60 lbm initial

30 lbm present

$\frac{60\ lbm}{30.198\ lbm/ft^3} = 1.987\ ft^3$

$x + y = 1 \rightarrow 1 - x = y$

$x(30.19) + y(1.15) = 30/(1.987\ ft^3)$

$30.19x + 1.15 - 1.15x = 15.095$

$(29.04)x = 13.945$

$x = 48.0\%$

(b) Mass fraction of liquid propane in the cylinder

(c) What's the volume of the cylinder excluding propane... Imagine that with propane is a bulk volume and without propane (which is occupying the pore space) you are evaluating the volume of the material. Assume it's made of iron (density is 491 lb/ft^3)

b) $(30.19\ lb/ft^3) \times (.48) \times (1.987\ ft^3) = 28.79\ lbm$

$\frac{28.79\ lbm}{30\ lbm} = \boxed{96.0\%}$

c) 20 lb container without propane

$\frac{20\ lb}{491\ lb/ft^3} = \boxed{.0407\ ft^3}$