Chem 30A Spring 2005

QUIZ #3
(15 Min)

Weds Jun 8th

INTERPRETATION OF THE QUESTIONS IS PART
OF THE EXAM – DO NOT ASK FOR THE
QUESTIONS TO BE EXPLAINED TO YOU

***DO NOT OPEN THIS EXAM UNTIL INSTRUCTED TO DO SO***

ONLY ONE QUESTION ON THIS EXAM WILL BE GRADED

BY PLACING AN 'X' IN THE APPROPRIATE BOX BELOW, INDICATE
WHICH QUESTION YOU WOULD LIKE US TO GRADE

Q1     Q2

(IF NO BOX IS MARKED, WE WILL GRADE Q1)
(IF BOTH BOXES ARE MARKED, WE WILL GRADE Q1)
(IF IT IS AMBIGUOUS WHICH BOX IS MARKED, WE WILL GRADE Q1)

I can’t believe it! Reading and writing actually paid off!
- Homer Simpson
Q1: Answer the questions below by circling either True or False (2 points each) –

a. Tertiary alkyl halides do not undergo S_N2 reactions.  

b. A carbon-iodine bond is stronger than a carbon-fluorine bond.  
c. E2 and S_N1 reactions share a common carbocation intermediate.  
d. Doubling both the concentration of the nucleophile and the electrophile in an S_N2 reaction doubles the rate of the reaction.  
e. The methyl thiolate anion (MeS^-) is more nucleophilic than dimethyl sulfide (Me_2S).  
f. The E1 elimination reaction requires an antiperiplanar relationship between the leaving group and the beta-H atom.  
g. Skeletal rearrangements are sometimes observed in S_N1 and E1 reactions.  
h. *tert*-Butyl chloride undergoes S_N1 solvolysis in aqueous ethanol more rapidly than it does in water.  
i. (R)-2-Iodopentane reacts with potassium acetate in dimethylformamide to give (R)-2-acetoxy-pentane as the major product.  
j. *n*-Propyl fluoride (CH_3 CH_2 CH_2 F) has a higher boiling point than propane (CH_3 CH_2 CH_3).  
k. 2-Bromopropane reacts with sodium ethoxide in ethanol to give 2-ethoxy-propane as the major product.  
l. The Hofmann elimination observed with some quaternary trimethyl-ammonium salts (R–N(CH_3)_3)^+ proceeds with syn stereospecificity.  
m. S_N1 reactions are often favored over E1 reactions at higher reaction temperatures.  
n. Methyl halides undergo E2 reactions when treated with very strong bases.  
o. S_N2 reactions of secondary alkyl bromides with NaI proceed slower in water than in acetone.

BONUS QUESTION

Draw the major product of the E2 elimination reaction shown below (5 points) –

```
\begin{center}
\begin{tikzpicture}
  \node[draw, rounded corners] (A) at (0,0) {
    \begin{tikzpicture}
      \node (B) at (0,0) {Me};
      \node (C) at (1,0) {Br};
      \node (D) at (1.5,-0.5) {Me};
      \node (E) at (0.5,-0.5) {Ph};
      \node (F) at (0.5,-1) {Me};
      \node (G) at (1.5,-1) {Br};
      \draw (B) -- (C) -- (D) -- (E) -- (F) -- (G);  
      \end{tikzpicture}
  \end{tikzpicture}
  \end{tikzpicture}
\end{center}
```

an excess of NaOEt

EtOH
Chem 30A Spring 2005

QUIZ #3
(15 Min)

Weds Jun 8th

INTERPRETATION OF THE QUESTIONS IS PART OF THE EXAM – DO NOT ASK FOR THE QUESTIONS TO BE EXPLAINED TO YOU

***DO NOT OPEN THIS EXAM UNTIL INSTRUCTED TO DO SO***

ONLY ONE QUESTION ON THIS EXAM WILL BE GRADED

BY PLACING AN ‘X’ IN THE APPROPRIATE BOX BELOW, INDICATE WHICH QUESTION YOU WOULD LIKE US TO GRADE

| Q1 | Q2 |

(IF NO BOX IS MARKED, WE WILL GRADE Q1)
(IF BOTH BOXES ARE MARKED, WE WILL GRADE Q1)
(IF IT IS AMBIGUOUS WHICH BOX IS MARKED, WE WILL GRADE Q1)

I can’t believe it! Reading and writing actually paid off!
- Homer Simpson
Q1: Answer the questions below by circling either True or False (2 points each) –

a. Tertiary alkyl halides sometimes undergo $S_N2$ reactions.  True  False
b. A carbon-iodine bond is weaker than a carbon-fluorine bond  True  False
c. E1 and $S_N1$ reactions share a common carbocation intermediate  True  False
d. Doubling both the concentration of the nucleophile and the electrophile in an $S_N1$ reaction doubles the rate of the reaction.  True  False
e. The methyl thiolate anion (MeS$^-$) is less nucleophilic than dimethyl sulfide (Me$_2$S).  True  False
f. The E1 elimination reaction does not require an antiperiplanar relationship between the leaving group and the beta-H atom.  True  False
g. Skeletal rearrangements are never observed in $S_N1$ and E1 reactions.  True  False
h. tert-Butyl chloride undergoes $S_N1$ solvolysis in aqueous ethanol less rapidly than it does in water.  True  False

i. (R)-2-Iodopentane reacts with potassium acetate in dimethylformamide to give (S)-2-acetoxy-pentane as the major product.  True  False

j. $n$-Propyl fluoride (CH$_3$CH$_2$CH$_2$F) has a lower boiling point than propane (CH$_3$CH$_2$CH$_3$).  True  False

k. 2-Bromopropane reacts with sodium ethoxide in ethanol to give 2-ethoxy-propane as the minor product.  True  False

l. The Hofmann elimination observed with some quaternary trimethyl-ammonium salts (R–N(CH$_3$)$_3$)$^+$ proceeds with anti stereospecificity.  True  False

m. $S_N1$ reactions are often favored over E1 reactions at lower reaction temperatures.  True  False

n. Methyl halides never undergo E2 reactions.  True  False

o. $S_N2$ reactions of secondary alkyl bromides with NaI proceed faster in water than in acetone.  True  False

**BONUS QUESTION**

Draw the major product of the E2 elimination reaction shown below (5 points) –
Q2 Afghanistan  China  Madagascar  Ethiopia  Spain
Egypt  Germany  Syria  Turkey  Ireland
Brazil  Iran  Columbia  Somalia  Mongolia
Poland  Peru  France  Bolivia  Tanzania
Finland  Argentina  Sweden  Swaziland  Norway

Name the countries labelled 1–10 (they are 10 of the 25 countries listed at the top of the page) 3 pts each –

1________________  2________________  3________________  4________________  5________________
6________________  7________________  8________________  9________________  10________________

BONUS – name five countries (without using any of the 25 listed above) through which the equator passes (1 pt each):
A________________  B________________  C________________  D________________  E________________