CHEM 2325 Exam 2 Name:

October 22, 2019 UTEP ID #:

If required, the Exam 2 retake homework will be due Friday, October 25, before 5 pm through <http://organic.utep.edu/quiz>, no exceptions or excuses. Put your name on these sheets so that you can recover your class answers. Expect an email from me this evening. ***Put your name and ID on your scantron and exam sheets. Show your picture ID as you turn everything in.***

1. How many ones are in the adjacency matrix of caffeine? 
2. 20 b. 24 c. 28 d. 32 e. not a.-d.
3. In analogy to cumulenes, the following compound is? 
4. *E* b. *R* c. *S* d. *Z* e. not a.-d.
5. What is the -energy diagram of the Friedel-Craft reaction intermediate? 

a.  b.  c.  d.  e. not a.-d.

1. Which compound is most stable, gives off the least heat of hydrogenation or combustion?

a.  b.  c.  d.  e. all will give off the same heat

1. Acetone (propanone) absorbs above 200 nm because its HOMO-LUMO gap orbitals are what type of pair?

a. bonding-bonding b. bonding-nonbonding c. bonding-antibonding d. nonbonding-antibonding e. not a.-d.

1. What is the major product of the following reaction? 

a.  b.  c.  d.  e. not a.-d.

1. What is the major product of the following reactions? Chiral products are racemic.

a.  b.  c.  d.  e. not a.-d.

8.-12. Classify the following as: a. aromatic b. antiaromatic c. nonaromatic d. not a.-c. Answer may be repeated.

8.  9.  10.  11.  12. 

1. Complete the third resonance structure to determine which bond is longest?



1. Which compound will react slowest with HNO3/H2SO4?

a.  b.  c.  d.  e. 

1. At which position will fuming H2SO4 substitute fastest on the following compound? 
2. What is the major product of the following reaction? 

a.  b.  c.  d.  e. not a.-d.

1. The conversion of a carbonyl to a methylene using Zn/HCl, N2H4/KOH, or HS(CH2)3SH/H+ following by H2/Ni is a how may electron reduction?

a. 2 b. 3 c. 4 d. 5 e. not a.-d.

18.-20. Match the following reaction sequences to a product on the right. Steps are separated by commas. Assume any necessary workup. Answers may be repeated. Hint: All products shown are hydroxybenzoic acids.

1. phenol + NaOH, CO2
2. benzoic acid + HNO3/H2SO4, H2/Pd, NaNO2/H+, CuOH
3. minor product of chlorobenzene + HNO3/H2SO4, NaOH, H2/Pd, NaNO2/H+, CuCN, H3O+

a.  b.  c.  d. not a.-c.

1. Which ipso substitution proceeds by a benzyne mechanism?

a.  b.  c.  d.  e. 