## CHEMISTRY 233 MIDTERM EXAM CHEMISTRY DEPARTMENT 60 MIN

NAME ....XXXXXXXXXXX. $\qquad$ SECTION $\qquad$ .REGISTRATION No. $\qquad$
I. Circle the correct answer in each of the followings:
> Which of the following compounds would be most reactive to ring bromington?

a)

b)

c)

d)

e)
> Which of the following is not a nucleophile?
a. $\mathrm{NH}_{3}$
b. $\mathrm{H}_{2} \mathrm{O}$
c. $\mathrm{CN}^{-}$
d. $\mathrm{Cl}_{33}{ }^{\circ}$
e. $\mathrm{NH}_{4}{ }^{+}$
$>$ If the observed optical rotation of annknown sample is zero, which of the following conclusion(s) is (are) true
I. The sample is a mesg fornpound
II. The sample is a pere enantiomer
III. The samplexis racemic mixture
a. I only
c. III only
d. I and III only
e. I and II only
> Which of the following reactions proceeds with inversion of configuration at the carbombearing the leaving group?
a ER only
b. E1 only
c. $S_{N} 2$ only
d. $S_{N} 1$ only
e. $\mathrm{S}_{\mathrm{N}} 1$ and E 1 only

The observed rotation for 100 mL of an aqueous solution containing 2 g of sucrose, placed in a 2 -decimeter sample tube, is $+2.66^{\circ}$ at $25^{\circ} \mathrm{C}$. What is the specific rotation of sucrose?
a. $+41.5^{\circ}$
b. $+66.5^{\circ}$
c. +1.66
d. $+100^{\circ}$
e. $332^{\circ}$
> When 3-iodo-3-ethylpentane is reacted with methanol, the major organic product is an -------- that is generated through -------- mechanism.
a) alkene, E2
b) alcohol, E1
c) ether, $\mathrm{S}_{\mathrm{N}} 1$
d) ether, $S_{N} 2$
e) ether, E1
> The intermediate in the nitration of benzaldehyde is

a)

b)

c)

d)

e)
$>$ The slowest step of an $S_{N} 1$ reaction involves:
a. combination of a nucleophile with the carbocation to githe product.
b. attack of the nucleophile on the substrate.
c. loss of a proton from the nucleophile to give twereduct.
d. breaking the bond between the carbon ant the leaving group to give a carbocation.
> The product(s) of the following reaction is

a) I only
b) II only
c) III only
d) equallamounts of I and III
e) equall amounts of II and III

Which of the following is not correct representation of relative nucleophile strength?
a. $\mathrm{HO}^{-}>\mathrm{HS}^{-}$
b. ${ }^{-} \mathrm{NH}_{2}>\mathrm{F}^{-}$
c. $\mathrm{I}^{-}>\mathrm{Br}^{-}$
d. $\mathrm{CH}_{3}^{-}>\mathrm{HO}^{-}$
e. $\mathrm{CH}_{3} \mathrm{O}^{-}>\mathrm{CH}_{3} \mathrm{OH}$
II. Complete the following:
$\lambda$ The number of stereogenic centers are present in


- Consider the reaction of $\left(\mathrm{CH}_{3}\right)_{3} \mathrm{CBr}$ and $\mathrm{H}_{2} \mathrm{O}$. Will the reaction rate, (increases, decreases, not affected) when the concentration of $H^{H}$ increases.
- Write the configuration of the indicated atom


人 The Name of


人 Name of

III. Give the structure of each of the following:
^ The transition state of the $\mathrm{S}_{\mathrm{N}} 2$ reaction of $\mathrm{CH}_{3} \mathrm{CH}_{2} \mathrm{Br}$ with $\mathrm{OH}^{-}$

人 a diastereomer of



1 2,3-dibromobutane which is optically inactive

- polar aphotic solvent

- Stereoisomer


IV. Complete the following equation, indicate the stereochemistry:


