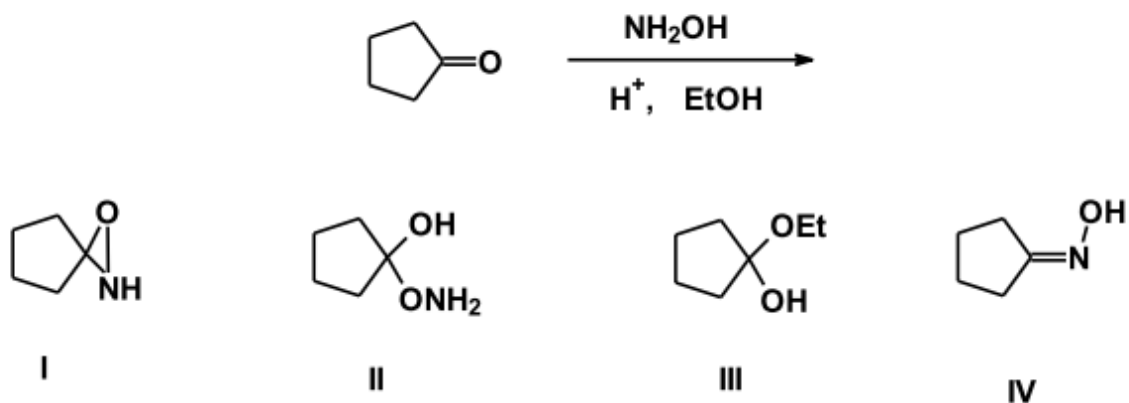


3. Indicate the major product in the following reaction.

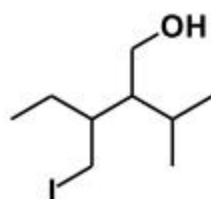


- A. I;
- B. II;
- C. III;
- D. IV.

9. Which of the compounds listed below is chiral?

- A. *Trans*-1,2-dibromocyclohexane;
- B. *Cis*-1,2-dibromocyclohexane;
- C. *Cis*-1,4-dibromocyclohexane;
- D. *Trans*-1,4-dibromocyclohexane;
- E. All of these.

13. What is the name of the following compound according to the IUPAC rules?



- A. 3-(iodomethyl)-2-isopropyl-pentan-1-ol;
- B. 4-iodo-3-ethyl-2-isopropyl-butan-1-ol;
- C. 1-iodo-2-ethyl-3-isopropyl-butan-4-ol;
- D. 1-(iodomethyl)-2-isopropyl-pentan-5-ol;

22. Indicate the pair of molecules / ions of planar square symmetry:

- A. BeF_4^{2-} , $\text{Ni}(\text{CN})_4^{2-}$;
- B. AlCl_4^- , HgI_4^{2-} ;
- C. $\text{Pt}(\text{H}_2\text{O})_4^{2+}$, HgI_4^{2-} ;
- D. $\text{Ni}(\text{CN})_4^{2-}$, XeF_4 .

28. Concentrations of $\text{Ag}(\text{NH}_3)^+$ and $\text{Ag}(\text{NH}_3)_2^+$ complexes are equal for excess concentration of NH_3 equal to (summary stability constants for complexes of Ag^+ with NH_3 : $\beta_1 = 10^{3.4}$, $\beta_2 = 10^{7.4}$):

- A. 10^{-1} M;
- B. 10^{-2} M;
- C. 10^{-3} M;
- D. 10^{-4} M.

34. The total energy (relativistic) of a particle with mass equal to the rest mass of proton is circa (velocity of light in vacuum: 300 000 km/s):

- A. 10^{-10} J;
- B. 10^{-6} J;
- C. 10^{-2} J;
- D. 10^2 J.

43. Nitrogen, N_2 , has the following properties (marked with a, b, c and d characters):

- a. melting point (for pressure = 10^5 Pa) : 63.2K
- b. boiling point (for pressure = 10^5 Pa) : 77.4 K
- c. triple point : 0.127×10^5 Pa, 63.1 K
- d. critical point : 33.5×10^5 Pa, 126.0 K

45. The equilibrium constant of the esterification reaction proceeding between the acetic acid and ethanol at the temperature T is equal to 4.0. How many grams of water should be added to a mixture of 1.0 mol of acetic acid and 2.0 moles of ethanol if the yield of this reaction is equal to 50%:

- A. 99;
- B. 9.0;
- C. 19.8;
- D. 36.

58. Which group of hydrogen atoms (in the following compound) should appear at a highest ppm in the ^1H NMR spectrum?

A. I;

B. II;

C. III;

D. IV.

