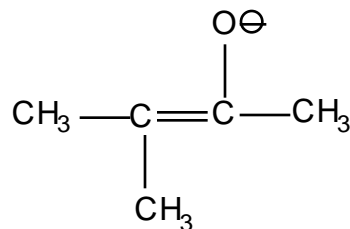
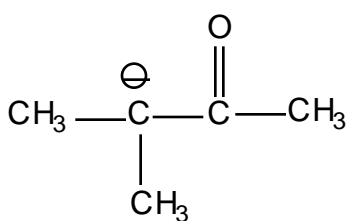
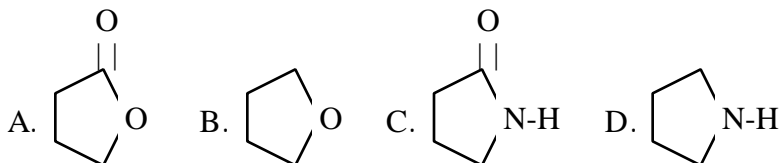


1. What is the relationship between the structures shown?

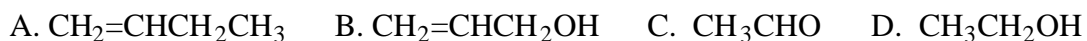


- A. resonance forms
 B. the same compounds
 C. different compounds
 D. isomers
2. Which of the following molecules is trigonal planar?
 A. NH_3 B. CHCl_3 C. CO_2 D. BF_3

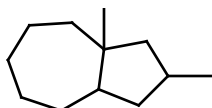
3. Which of the following compounds is an ester?



4. Which of the following molecules is the LEAST soluble in water?

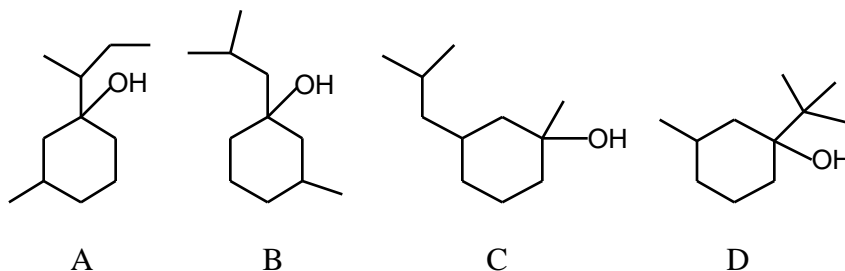


5. What is the name of the compound shown?

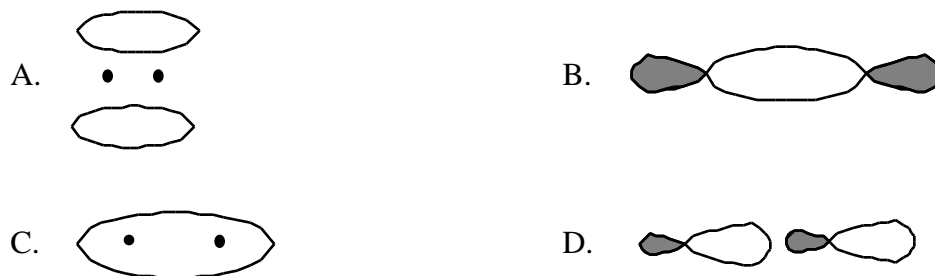


- A. 1,3-dimethylbicyclo[5.3.0]nonane
 B. 1,3-dimethylbicyclo[5.3.1]nonane
 C. 1,8-dimethylbicyclo[5.3.0]nonane
 D. 1,9-dimethylbicyclo[5.3.0]nonane

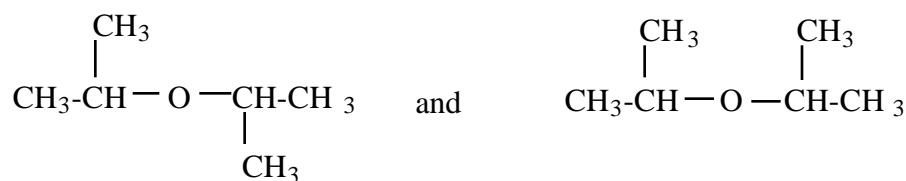
6. Which of these is 3-isobutyl-1-methylcyclohexanol?



7. Which of these is a sigma bonding orbital arising from two sp^3 hybridized atomic orbitals?

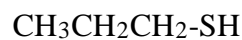


8. What is the relationship between the structures shown?



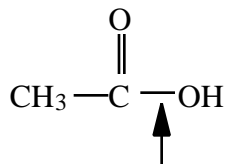
- A. different compounds that are isomers
- B. different compounds that are not isomers
- C. resonance structures
- D. the same compound

9. The compound shown will form hydrogen bonds with:

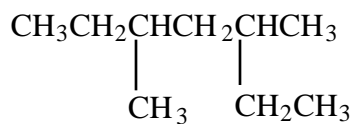


- A. other molecules like itself, but not water.
- B. water, but not other molecules like itself.
- C. both water and other molecules like itself.
- D. neither water nor other molecules like itself.

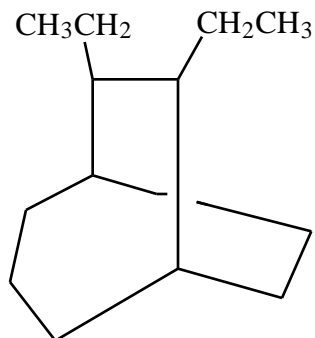
10. Describe the indicated bond in terms of the overlap of atomic orbitals (in the order C, O).
(**Note:** the unshared electrons are not shown; you must determine their location.)



- A. sp^3-sp^2 B. $sp-sp$ C. sp^2-sp^3 D. $sp-sp^3$
11. What is the IUPAC name of the following compound?

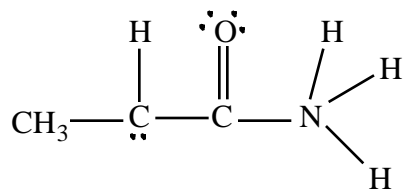


- A. 3,5-dimethylheptane
B. 3,5-dimethylnonane
C. 2-ethyl-4-methylhexane
D. 5-ethyl-3-methylhexane
12. What is the name of the following compound?



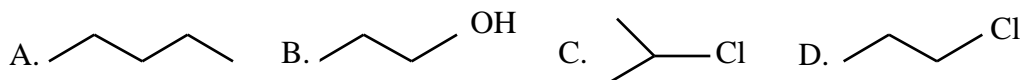
- A. 8,9-diethylbicyclo[3.2.2]nonane
B. 6,7-diethylbicyclo[3.2.2]nonane
C. 2,3-diethylbicyclo[3.2.2]nonane
D. 1,2-diethylbicyclo[3.2.2]nonane

13. What is the total charge of the following species ?

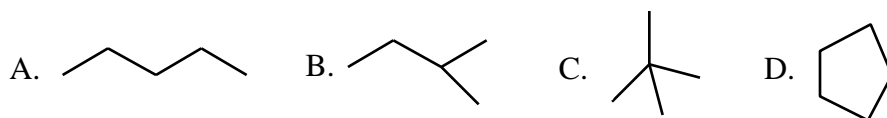


- A. +1 B. +2 C. 0 D. -1

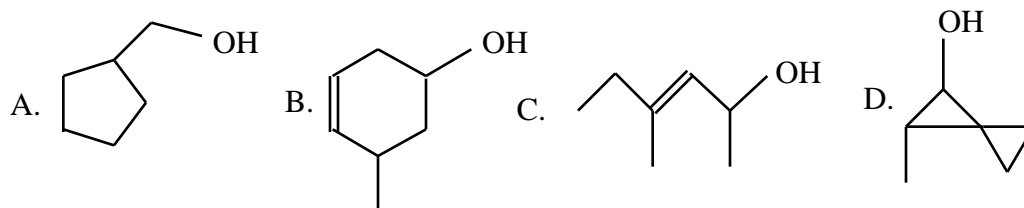
14. Which of the following has the HIGHEST boiling point?



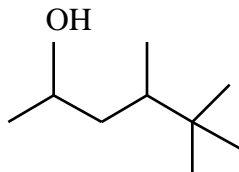
15. Which of these molecules has the MOST 1° hydrogens ?



16. Which of the following is an isomer of cycloheptanol ?

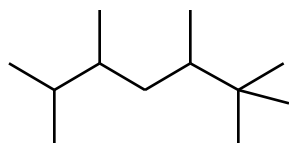


17. What is the IUPAC name of the following molecule ?



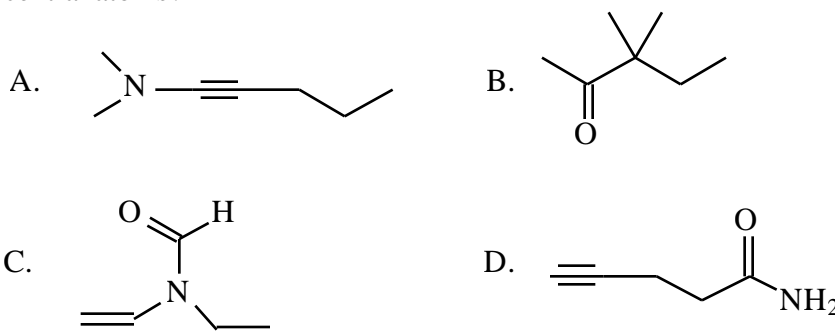
- A. 2,2,3-trimethyl-5-hexanol B. 1,1,1,2-tetramethyl-4-pentanol
C. 4,5,5-trimethyl-2-hexanol D. 4,5,5,5-tetramethyl-2-pentanol

18. Which of these is a condensed formula for the compound whose structure is shown?

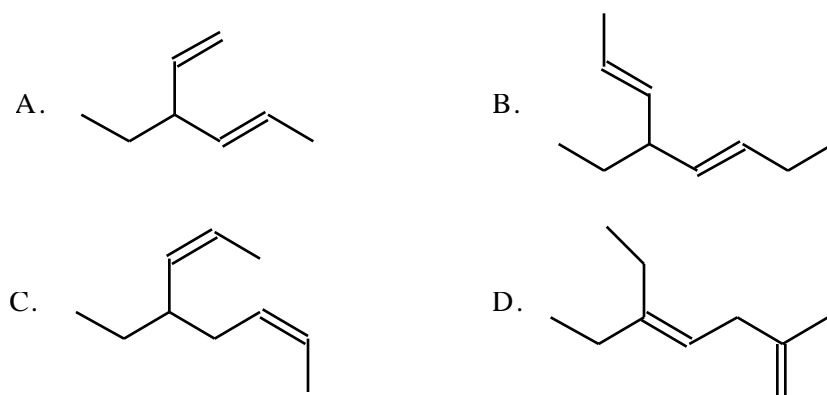


- A. $(\text{CH}_3)_2\text{CH}_2\text{CH}_2(\text{CH}_3)\text{CH}_2\text{CH}_2(\text{CH}_3)\text{CH}_2(\text{CH}_3)_3$
B. $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)\text{C}(\text{CH}_3)_3$
C. $(\text{CH}_3)_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$
D. $(\text{C}_3\text{H}_7)\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)\text{C}(\text{CH}_3)_3$

19. Which of the following structures does NOT have tetrahedral geometry around any of its central atoms?



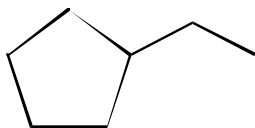
20. Which of the following structures contains ONLY *trans* double bonds?



21. Which of the following statements is FALSE?

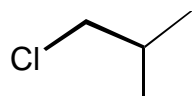
- A. Both neopentyl chloride and isobutyl chloride are primary alkyl halides.
B. Both isopropyl bromide and isobutyl bromide are secondary alkyl halides.
C. Neither isopropyl iodide nor *tert*-butyl iodide is a secondary alkyl halide.
D. Neither *sec*-butyl chloride nor isopropyl bromide is a primary alkyl halide.

22. For the following structure, there are ____ 1°, ____ 2°, and ____ 3° hydrogens.



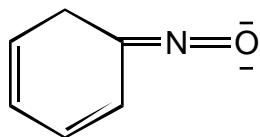
- A. 3, 8, 1 B. 3, 8, 2 C. 3, 10, 1 D. 3, 10, 2

23. Give the common name of the following compound.



- A. isobutyl chloride
B. isopropyl chloride
C. *tert*-butyl chloride
D. *sec*-butyl chloride

24. Which of the statements about the molecule shown is TRUE?



- A. The geometry of N is trigonal planar.
B. The formal charge on O is -1.
C. The hybridization of N is sp^2 .
D. The formal charge on the N is +1.
25. Which of the following is a *trans* isomer?

