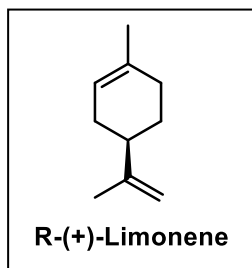
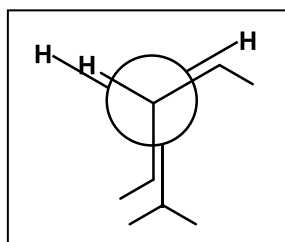




1. What is the molecular formula of the noted compound below? (5 PTS)



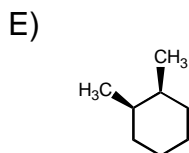
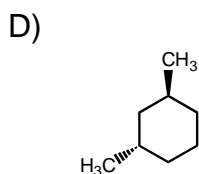
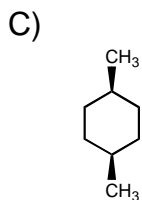
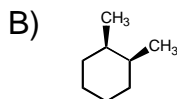
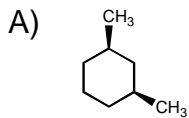
- a)  $C_{12}H_{12}$   
b)  $C_{10}H_{15}$   
c)  $C_{10}H_{22}$   
d)  $C_9H_{20}$   
e)  $C_{10}H_{16}$
2. What is the name of the molecule given in the Newman projection? (5 PTS)



- a) 3-ethyl-2-methylhexane  
b) 2-methyl-4-ethylpentane  
c) 3-(1-ethyl)-3-methylheptane  
d) 4-ethyl-2-methylhexane  
e) 3-methyl-5-ethylhexane
3. From the Newman projection above, draw out the molecule in linear, stick form. (10 PTS)



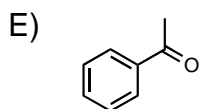
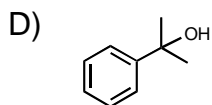
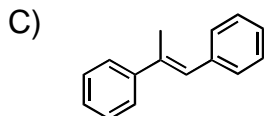
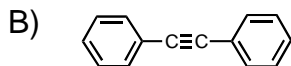
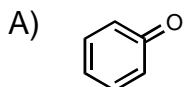
4. Which of the following could have **both** methyl groups in an **equatorial** orientation? (5 PTS)



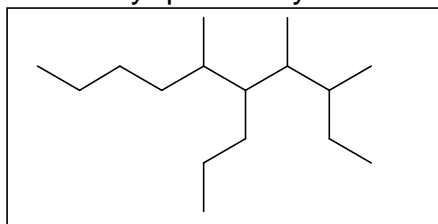
5. From question #4 above, draw the chair conformer of compound D) in the most stable form. Denote whether the methyl group relationship is *cis* or *trans*. (10 PTS)



6. Which one of the following structures is incorrect? (5 PTS)

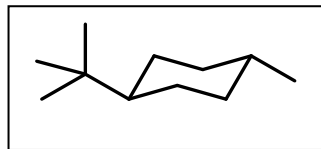


7. How many quaternary carbons are in the following molecule? (5 PTS)



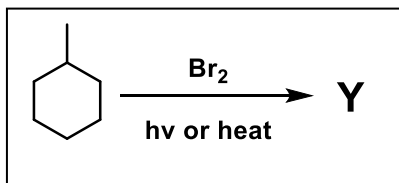
- A) They might all be quaternary carbons
- B) 0
- C) 2
- D) 5
- E) 4

8. What would be the proper name of the following: (5 PTS)

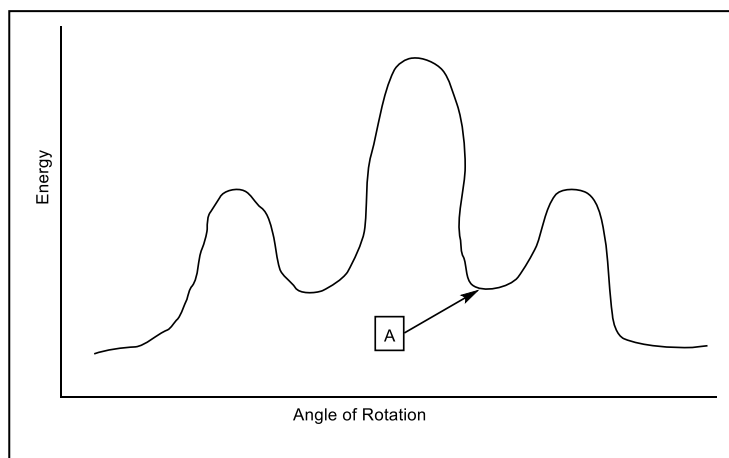


- A) *cis*-1-tert-butyl-4-methylcyclohexane
- B) *trans*-1-isopropyl-4-methylcyclohexane
- C) axial, equatorial-1-tert-butyl-4-methylcyclohexane
- D) *cis*-1-isopropyl-4-methylcyclohexane
- E) *trans*-1-tert-butyl-4-methylcyclohexane

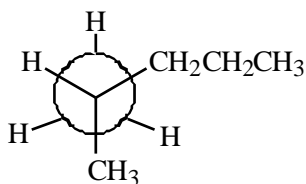
9. What is the major product **Y** of the following reaction? Draw a detailed mechanism using half arrows and the Headings: Initiation, Propagation, Termination. Be very detailed for full marks. Illegible writing will be marked with a 0. Take the whole page below to draw out your answer. **(10 PTS)**



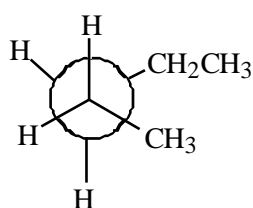
10. Consider the potential energy diagram for rotation about the C2–C3 bond in pentane. The position marked "A" most likely corresponds to which of the following Newman projections? (5 PTS)



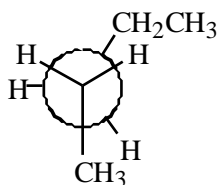
A)



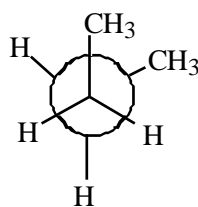
D)



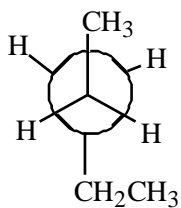
B)



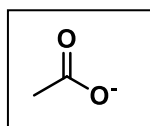
E)



C)

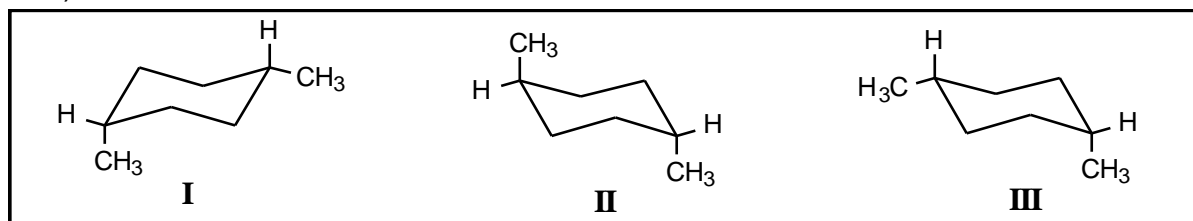


11. How many different resonance structures can be drawn for acetic acetate (shown below)? (5 PTS)



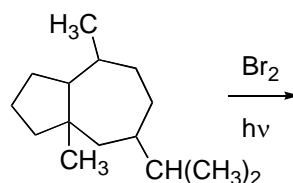
- A) 6  
 B) 4  
 C) 2  
 D) 5  
 E) 3

12. Which of the following structures represent *cis*-1,4-dimethylcyclohexane? (5 PTS)



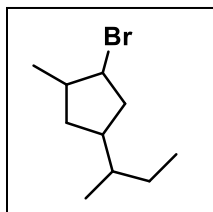
- A) all of the above
- B) I & II
- C) none of the above
- D) II & III
- E) I & III

13. How many different products will result if radical **monobromination** of the following compound only occurs at 3° carbons. Hint: Monobromination means one bromine per 3° carbon = 1 compound. A compound will not under dibromination. (5 PTS)



- A) 6
- B) 4
- C) 0
- D) 1
- E) 3

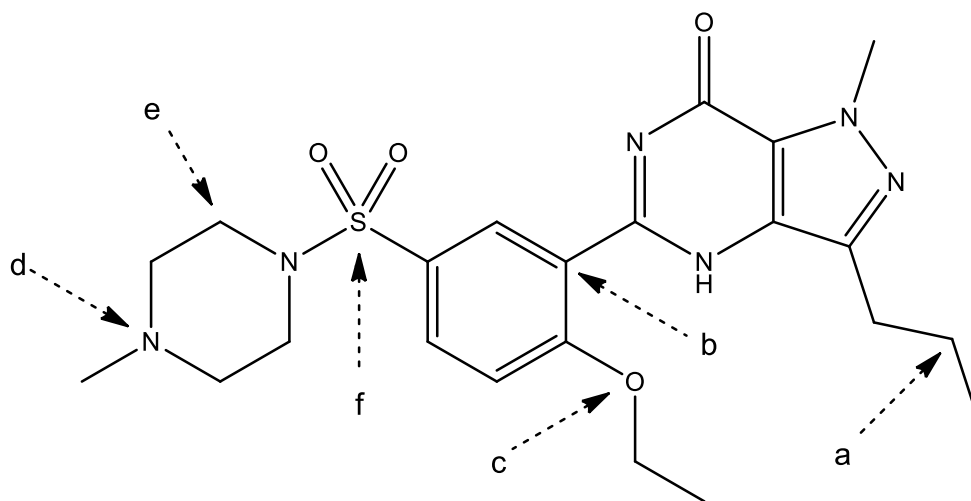
14. What is the correct name for the following molecule? (5 PTS)



- A) 1-chloro-3-methyl-4-propylcyclopentane
- B) 1-bromo-2-methyl-4-(1-methylpropyl)cyclopentane
- C) 1-bromo-2-methyl-4-(1-methylpropyl)cyclobutane
- D) 3-bromo-2-methyl-5-(1-methylpropyl)cyclohexane
- E) 3-bromo-4-methyl-(1-methylpropyl)cyclopentane

15. In the molecule below, what type of group is labeled as d? (5 PTS)

- A) 1° amine
- B) 2° amine
- C) 3° amine
- D) amide
- E) ether

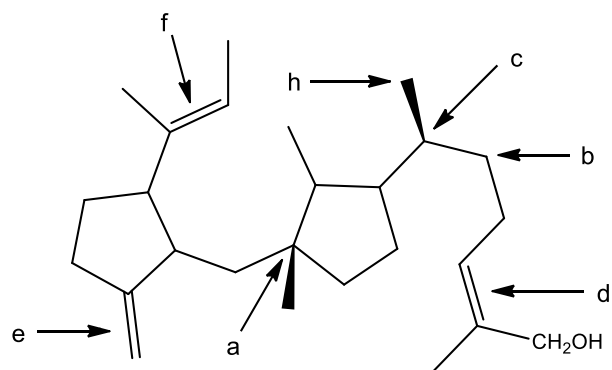


16. Using compound above, what type of functional group is labelled c? (5 PTS)

- A) ether
- B) ketone
- C) aldehyde
- D) alcohol
- E) ester



17. How many chiral centers are present in this molecule? (5 PTS)



- A) 2
- B) 3
- C) 4
- D) 5
- E) 6