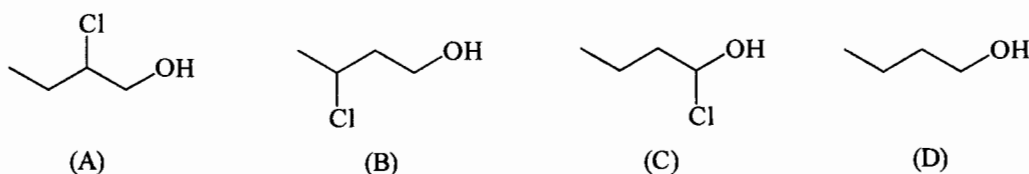


※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

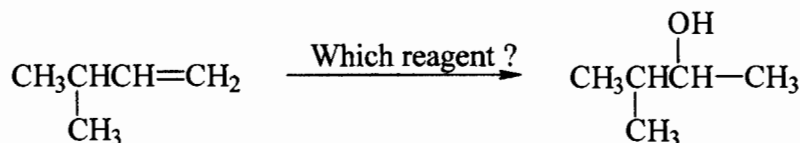
1-40 (2 points for each); 41-45 (4 points for each)

1. The correct IUPAC name for the following structure is.  $\text{CH}_3\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_2\text{CH}=\text{CH}_2$
- (A) 5-hexen-3-ol (B) 1-hexen-4-ol  
 (C) 3-hydroxy-5-hexene (D) Isohexen-3-ol  
 (E) 4-hydroxy-1-hexene

2. Which of the following alcoholic proton (OH) is expected to be the most acidic?

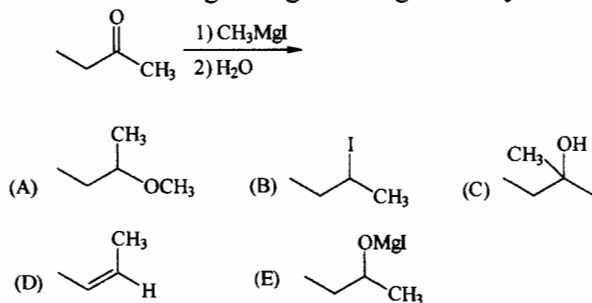


3. Which is the best reaction sequence to use if one wants to accomplish an alcohol synthesis shown below?

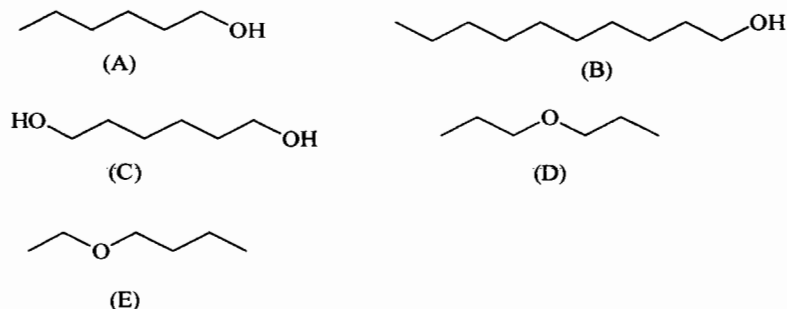


- (A) NaOH/H<sub>2</sub>O (B) KMnO<sub>4</sub>/H<sub>2</sub>O (C) i) Hg(OAc)<sub>2</sub>/H<sub>2</sub>O; ii) NaBH<sub>4</sub>  
 (D) i) BH<sub>3</sub>; ii) H<sub>2</sub>O<sub>2</sub>/HO<sup>-</sup> (E) none of the above

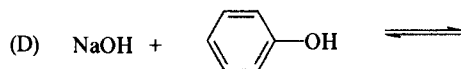
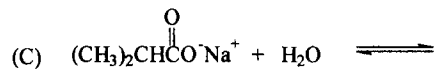
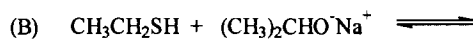
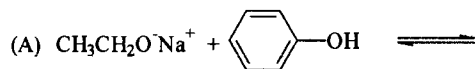
4. The following transformation using a Grignard reagent will yield:



5. Which of the following compounds is expected to have the greatest solubility in water?

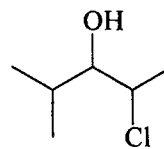
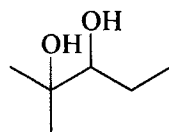
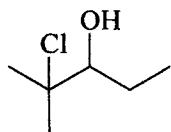
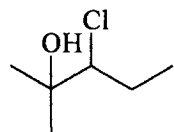
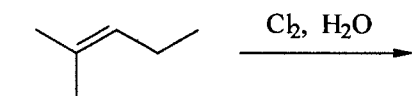


6. Which of the following acid-base reactions is expected to favor the reactant side (left side)?

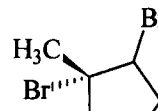
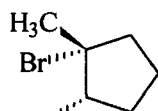
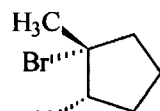
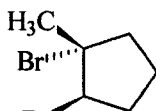
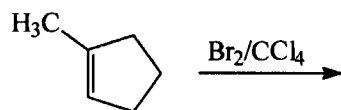


(E) They all favor the right side

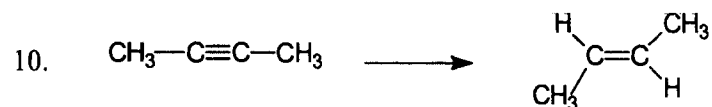
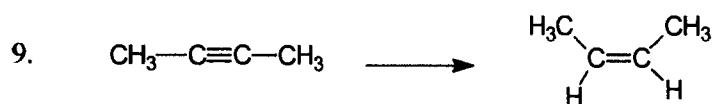
7. Which product is expected from the following reaction?



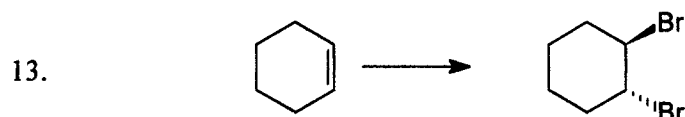
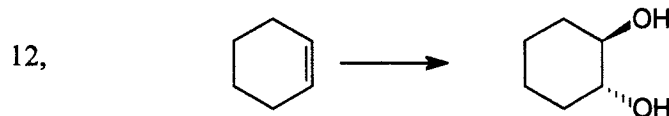
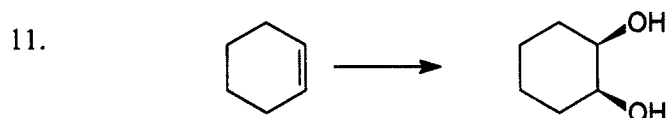
8. Predict the major organic product expected from the following reaction:



9-13. Which reagent would allow the formation of each desired product?

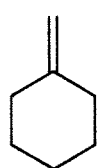


- 1)  $\text{H}_2/\text{Pt}$
- 2)  $\text{H}_2\text{O}, \text{H}^+$
- 3)  $\text{H}_2/\text{Pd}/\text{Quinoline}$
- 4)  $\text{Na}/\text{NH}_3(\text{liq})$
- 5) i)  $\text{HCl}$ , ii)  $\text{H}_2/\text{Pt}$ , iii)  $\text{NaOCH}_3$

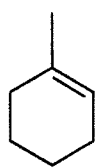


- 1)  $\text{H}_2\text{O}$ ,  $\text{NaOH}$
- 2)  $\text{KMnO}_4/\text{NaOH}$
- 3)  $\text{OsO}_4/\text{H}_2\text{O}_2$
- 4)  $\text{O}_3$ , then  $(\text{CH}_3)_2\text{S}$
- 5)  $\text{H}_2\text{O}$ ,  $\text{H}_2\text{SO}_4$
- 6) i)  $\text{CH}_3\text{CO}_2\text{OH}$ , then ii)  $\text{H}_3\text{O}^+$
- 7) 2  $\text{HBr}$
- 8)  $\text{Br}_2$
- 9)  $\text{Br}_2/\text{H}_2\text{O}$

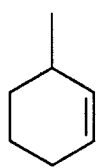
14. Which of the following compounds is expected to released the least amount of heat upon hydrogenation with one mole of  $\text{H}_2$ ?



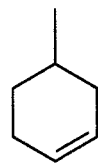
(A)



(B)



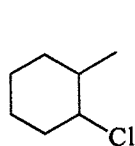
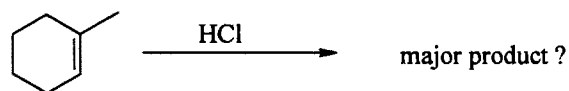
(C)



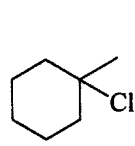
(D)

(E) None

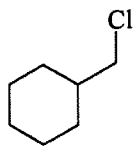
15. The major product for the following reaction is:



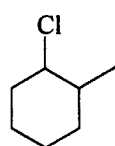
(A)



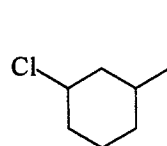
(B)



(C)

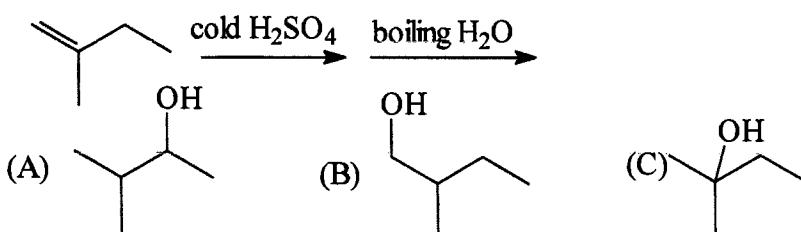


(D)



(E)

16. Predict the major product for the following reaction:



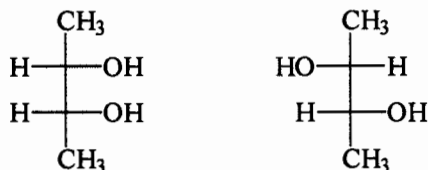
(A)

(B)

(C)

(D) The reaction can not proceed

17. The relationship between the following two structures is:

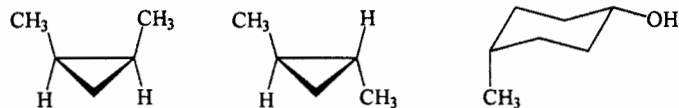


- (A) enantiomers    (B) diastereomers    (C) structural isomers  
 (D) identical    (E) none of the above

18. Which of the following alkyl halides would undergo  $S_N2$  reaction most rapidly?

- (A)  $CH_3CH_2-Br$     (B)  $CH_3CH_2-Cl$     (C)  $CH_3CH_2-I$   
 (D)  $CH_3CH_2-F$     (E) they react at the same rate

19. Which of the following molecules is chiral ?

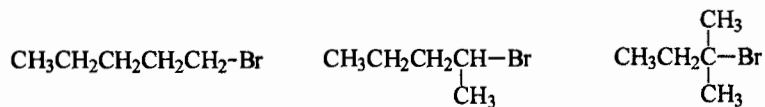


- (A)                      (B)                      (C)



- (D)                      (E)

20. Which of the following alkyl halides would you expect to undergo  $S_N1$  reaction most rapidly?

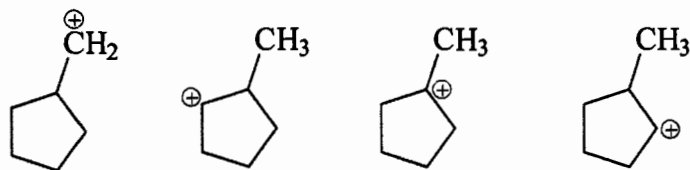


- (A)                      (B)                      (C)

(D) They will not undergo  $S_N1$  reaction

(E) They react at the same rate

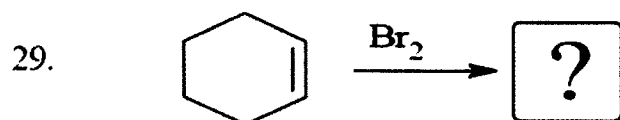
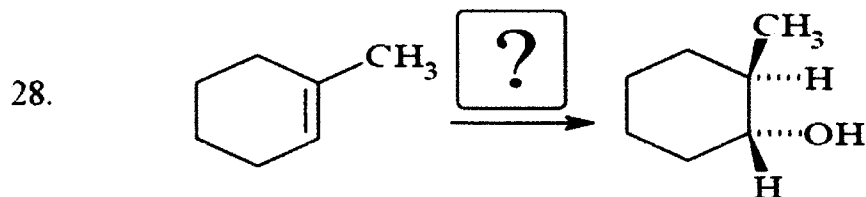
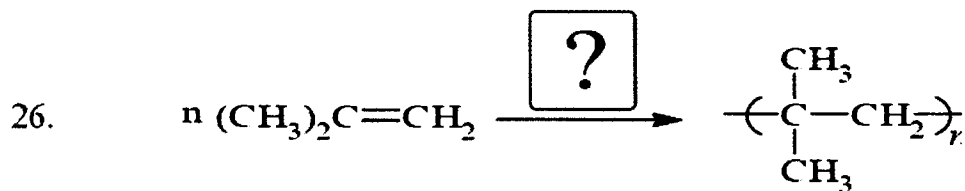
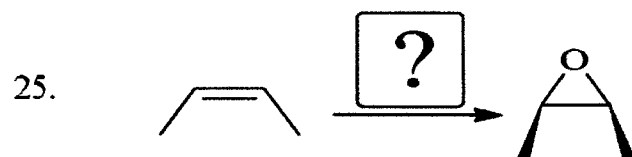
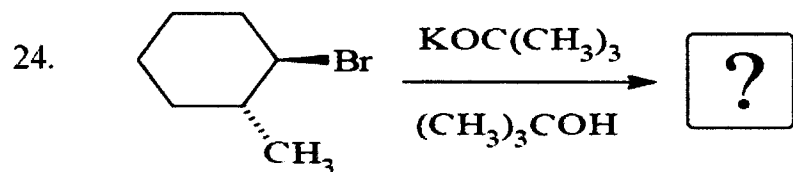
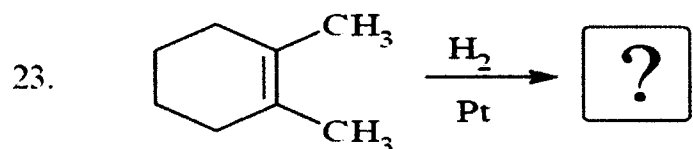
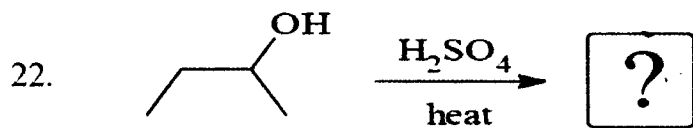
21. Predict which of the following carbocations has the highest energy.

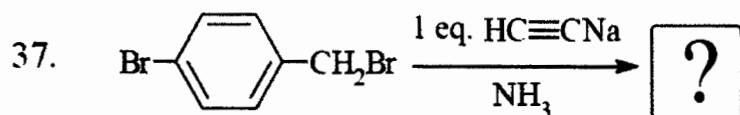
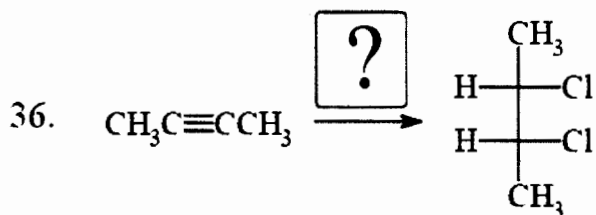
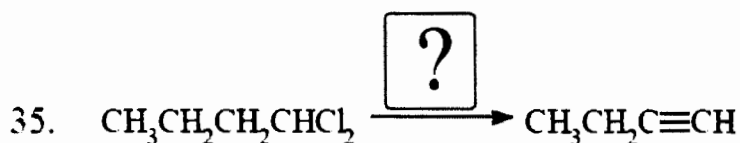
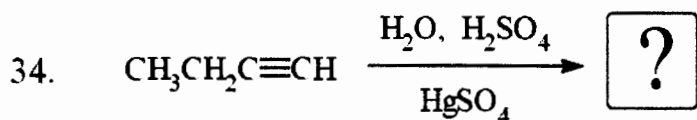
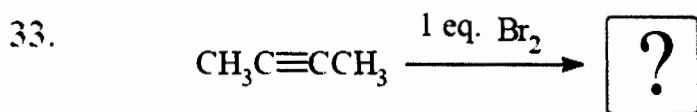
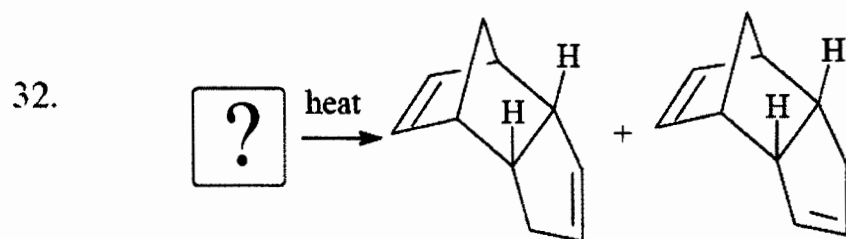
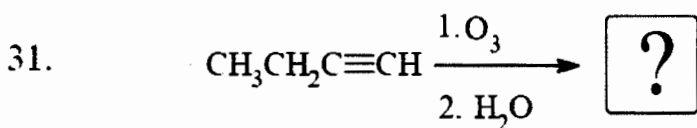
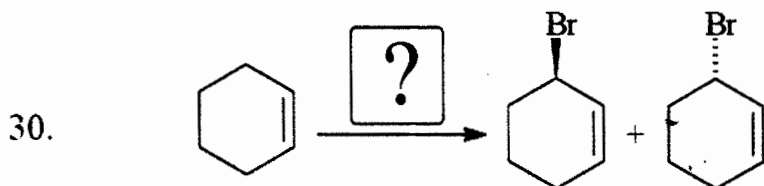


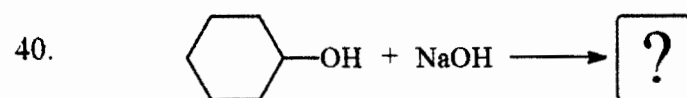
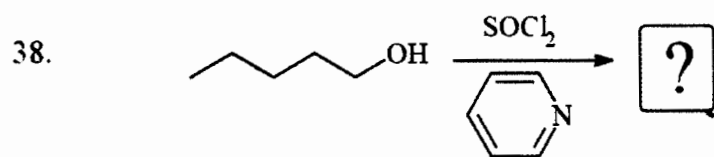
- (A)                      (B)                      (C)                      (D)

(E) All are equally stable

22-40 For each of the following, supply a structural formula for major organic product(s) or reagents; if no reaction occurs, write N.R.







41-45. Match the compounds on the right with the spectral data on the left by writing its letter on the line to the left of the spectral data.

