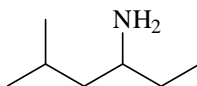
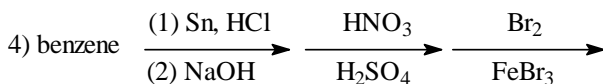
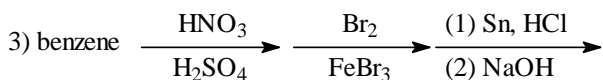
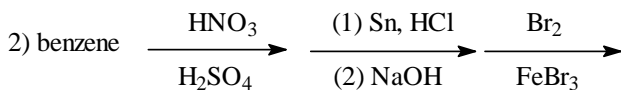
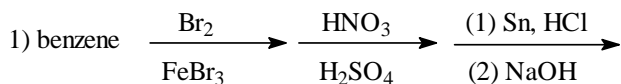


1. What is the IUPAC name of the following compound?



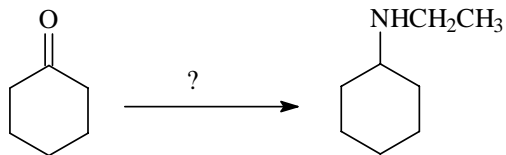
- 1) 2-methyl-4-hexanamine                      2) 2-methyl-4-aminohexane  
3) 5-methyl-3-hexanamine                      4) 5-methyl-3-aminohexane
2. To convert a nitrile to a primary amine you must:
- 1) hydrolyze it with water.  
2) oxidize it with chromic acid.  
3) reduce it with hydrogen or lithium aluminum hydride.  
4) substitute it with an alkyl halide.
3. Which one of the following synthetic routes gives the best yield of *meta*-bromoaniline starting with benzene?



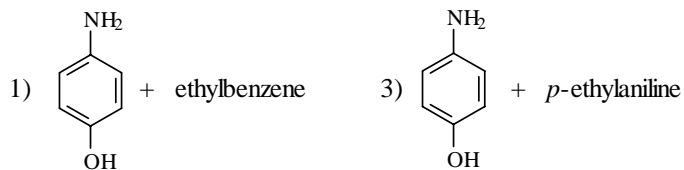
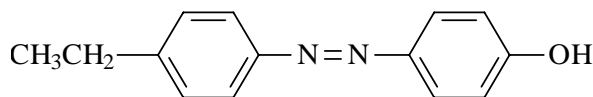
- 1) 1                      2) 2                      3) 3                      4) 4
4. Which one of the following forms a diazonium ion on being treated with  $\text{NaNO}_2$  in aqueous  $\text{HCl}$ ?
- 1) *para*-nitrotoluene                      2) ethylamine  
3) *N,N*-dimethylaniline                      4) triethylamine



9. Which of the following reagents can convert cyclohexanone to *N*-ethylcyclohexylamine as shown below?

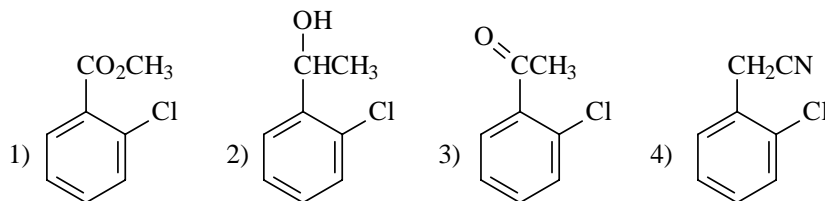
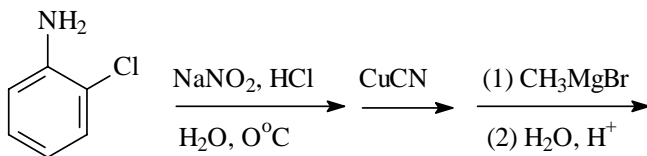


- 1)  $\text{CH}_3\text{CH}_2\text{NH}_2$  and  $\text{H}_2/\text{Pt}$
  - 2)  $\text{LiAlH}_4$  followed by  $\text{H}_2\text{O}$  and then  $\text{CH}_3\text{CH}_2\text{Br}$
  - 3)  $\text{CH}_3\text{CH}_2\text{Br}$  and  $\text{NH}_3$
  - 4)  $\text{CH}_3\text{CH}=\text{O}$  and  $\text{NH}_3$
10. Which of the following would be the starting reagents needed to make the azo compound shown below?



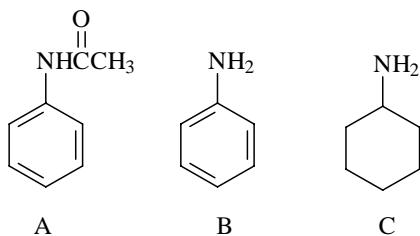
- 1) 1                      2) 2                      3) 3                      4) 4

11. What is the product of the reaction series shown below?

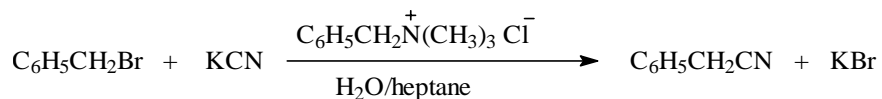


- 1) 1                      2) 2                      3) 3                      4) 4

12. Rank the following three compounds in decreasing order of basicity.



- 1) C>A>B                      2) C>B>A                      3) B>A>C                      4) B>C>A
13. In the following two-phase reaction, the catalyst works by:



- 1) transferring  $\text{CN}^-$  from the aqueous phase to the organic phase containing  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$ .
- 2) transferring  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$  from the organic phase to the aqueous phase containing  $\text{CN}^-$ .
- 3) removing  $\text{Br}^-$  from the organic phase to the aqueous phase.
- 4) removing  $\text{K}^+$  from the organic phase to make cyanide ion more nucleophilic.