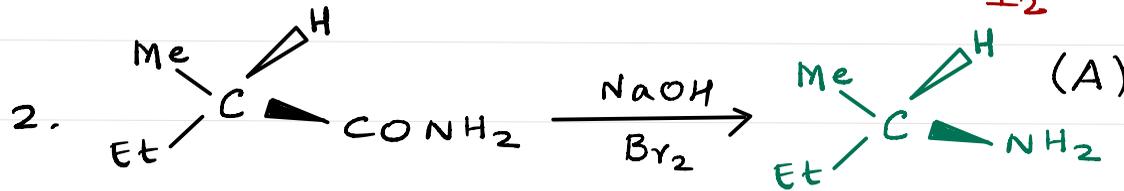
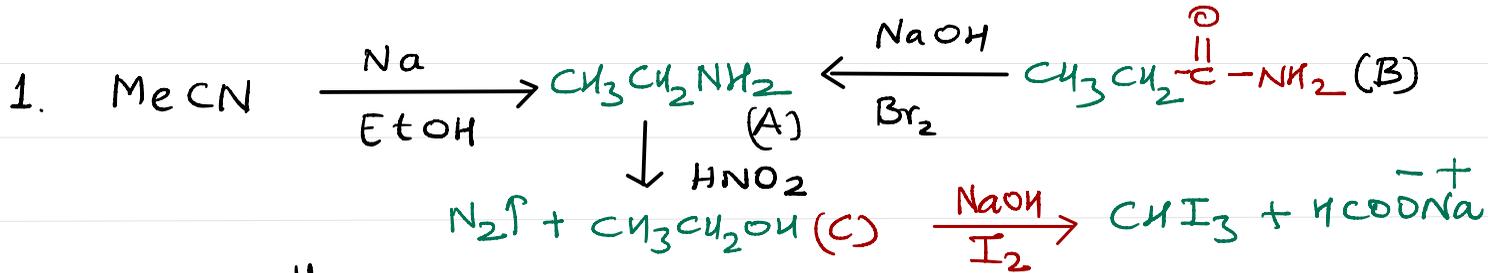
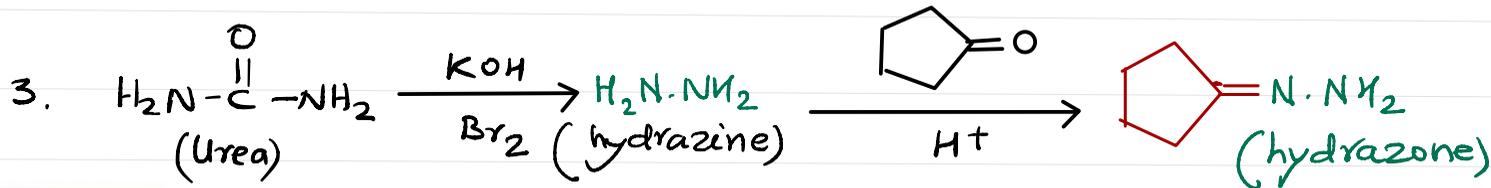
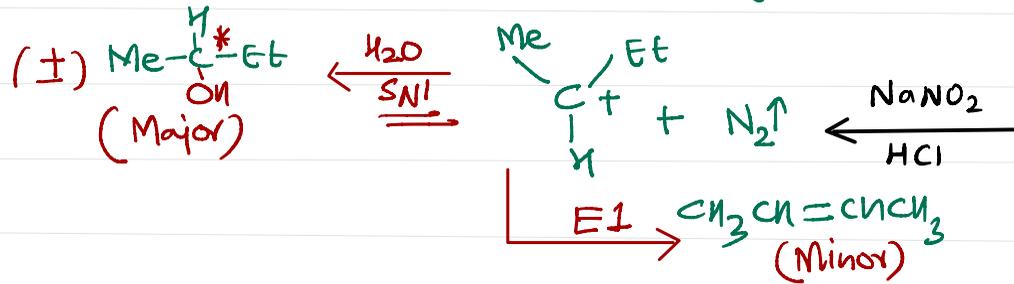
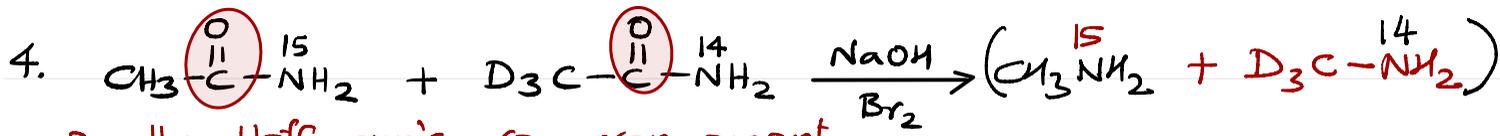


## Solutions to Home Worksheet-1

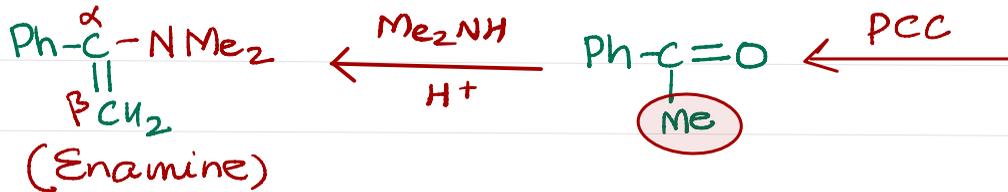
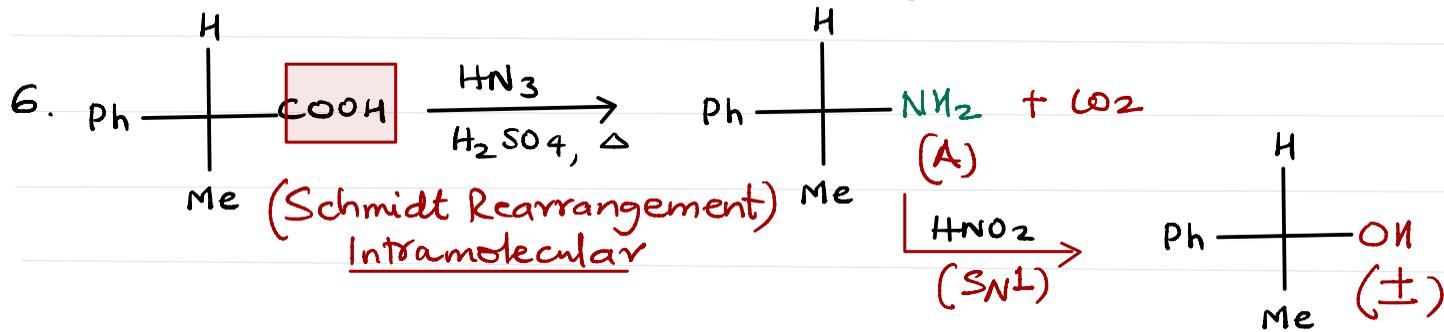
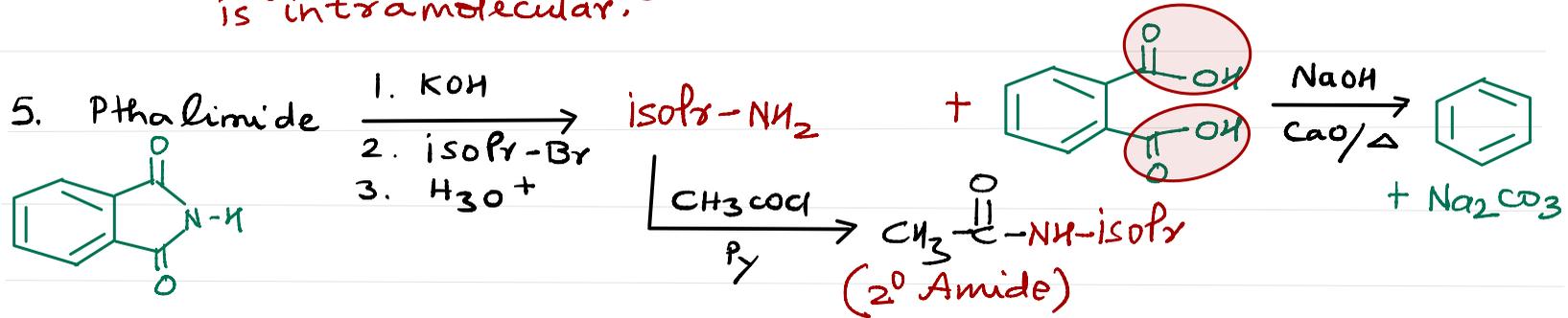


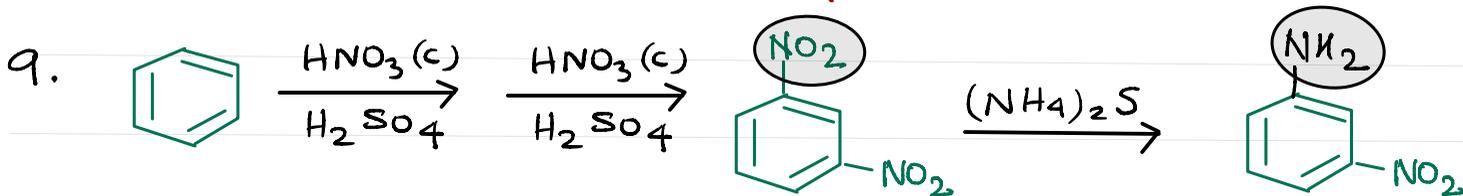
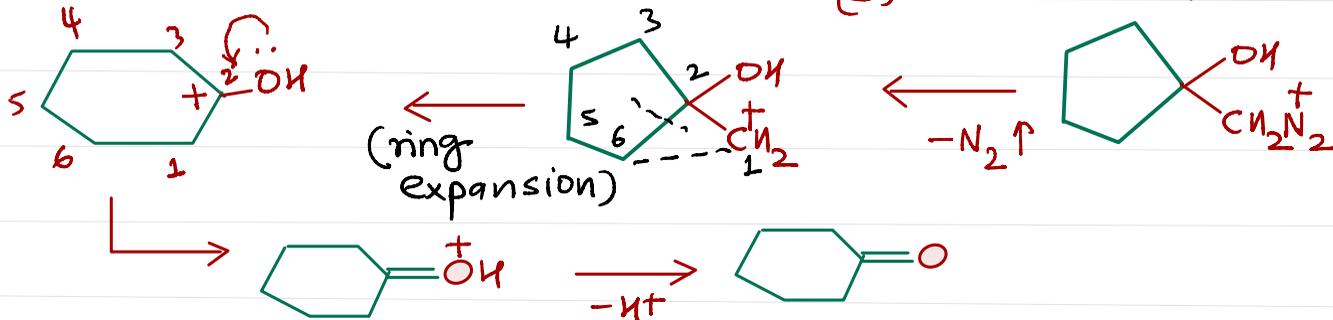
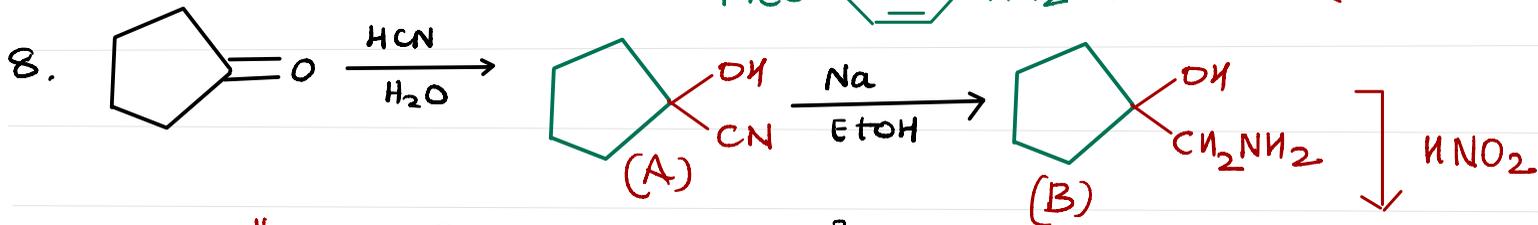
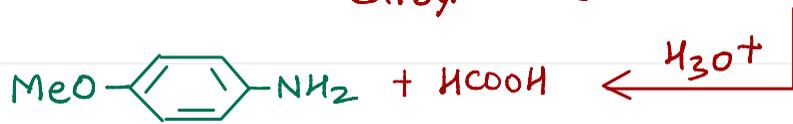
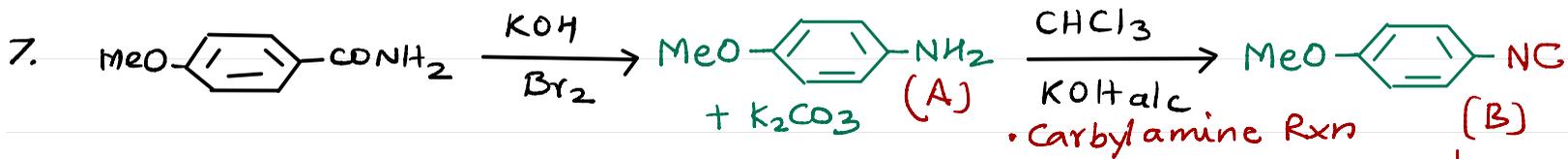
As the reaction is intramolecular, stereochemistry remains same.



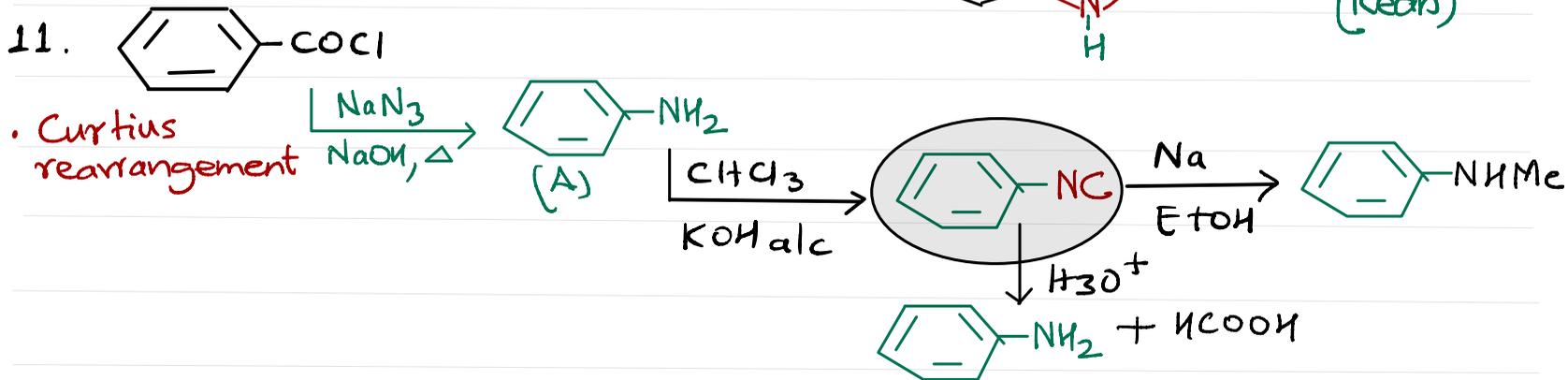
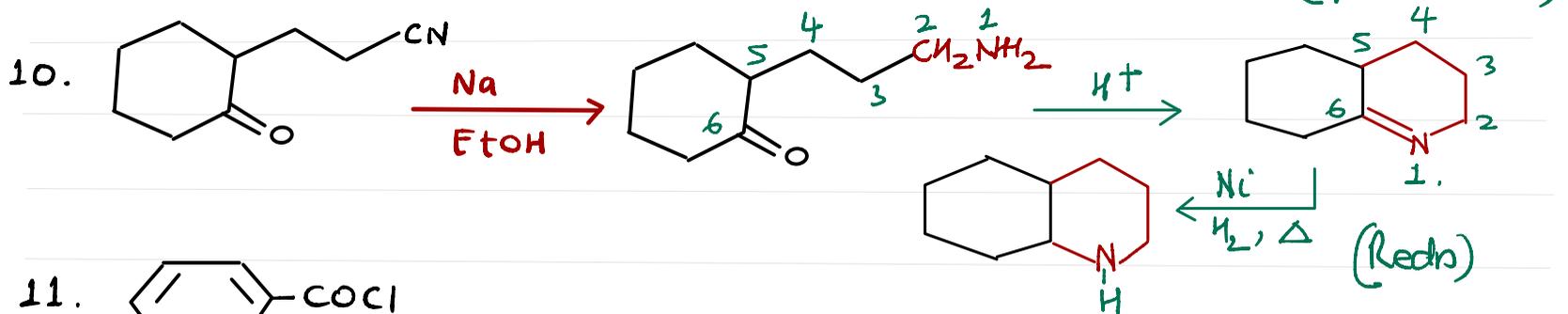
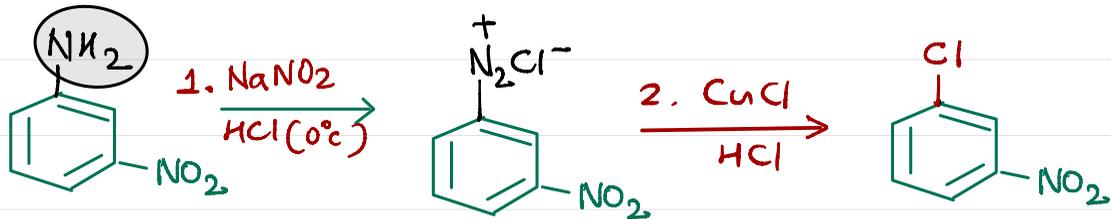


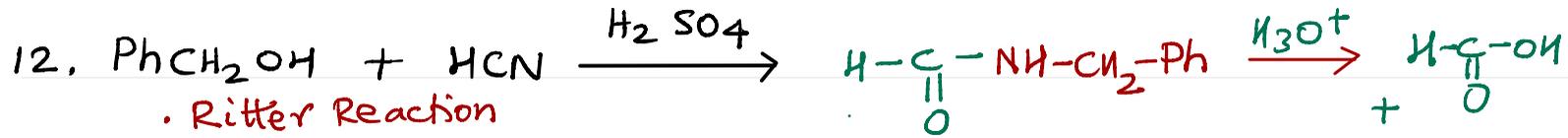
Recall: Hoffmann's rearrangement is intramolecular.



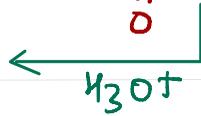
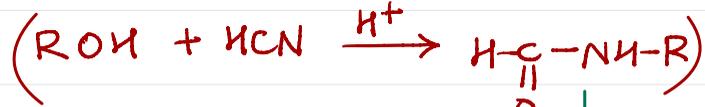


contd....



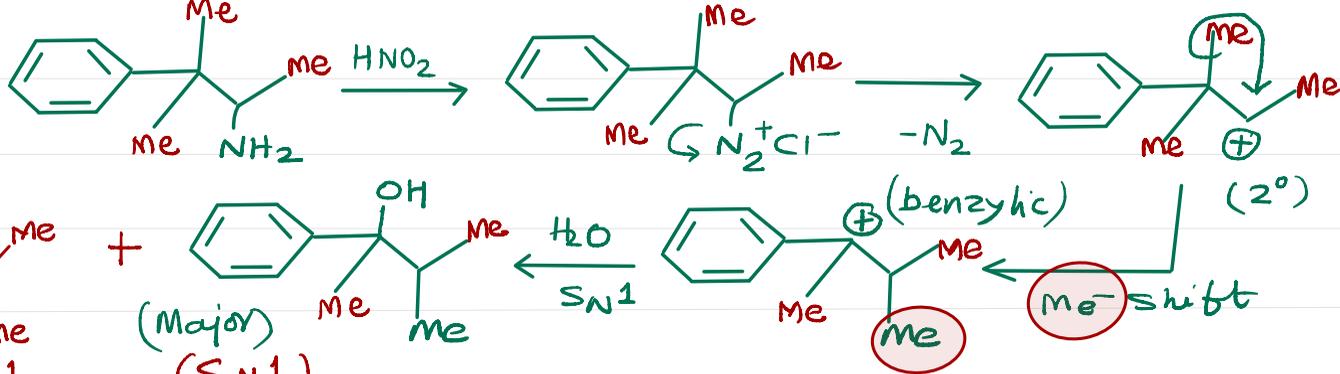


• Ritter Reaction



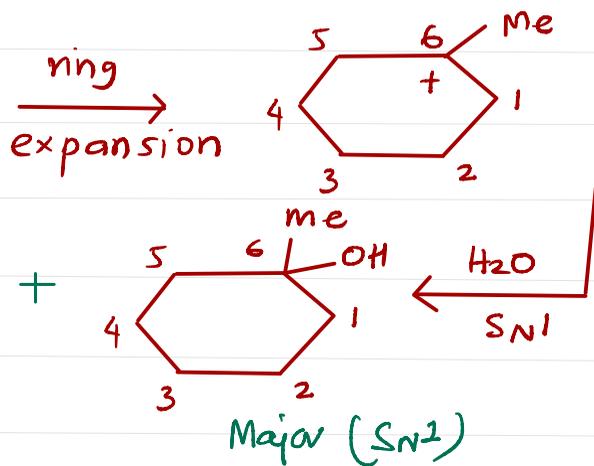
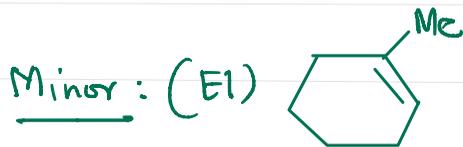
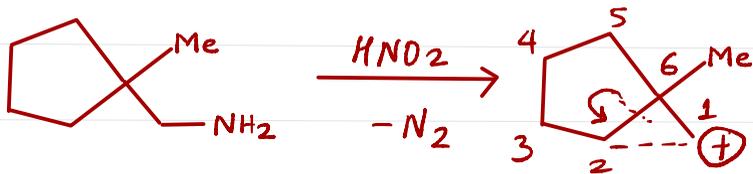
13.

①.

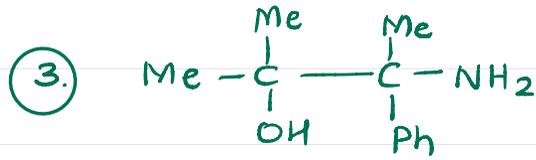


(Imp: highly stable)

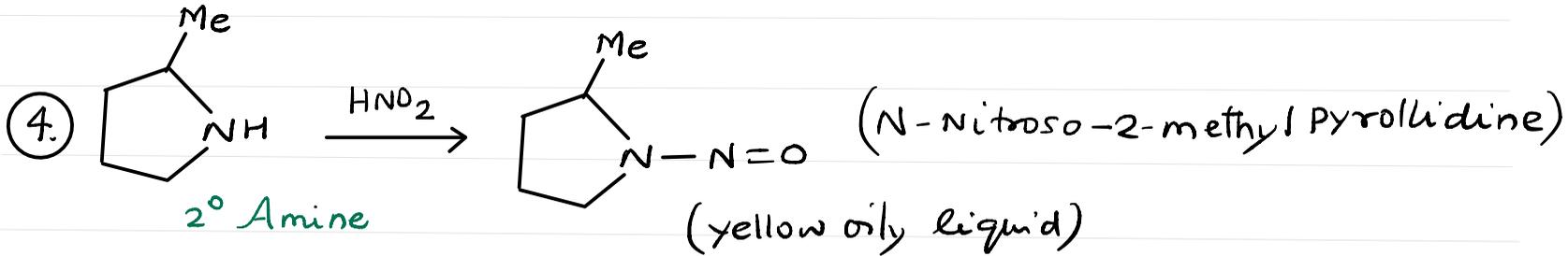
②.



⊙ In this reaction; usually  
S<sub>N</sub>1 dominates over E1



(visualise rearrangement like in Pinnacol-pinnacolone rearrangement)

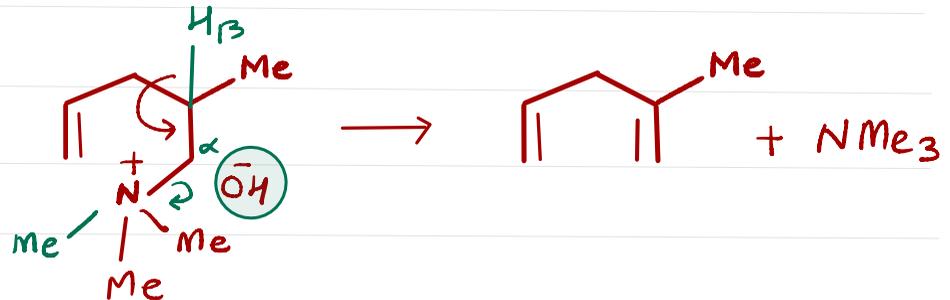
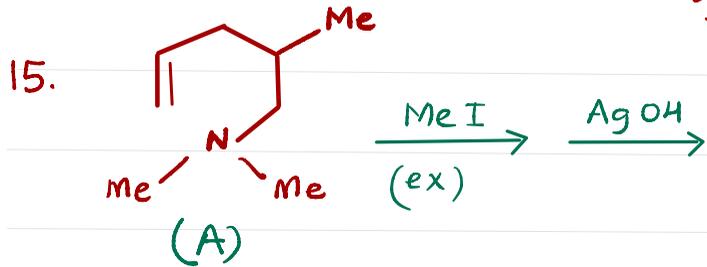
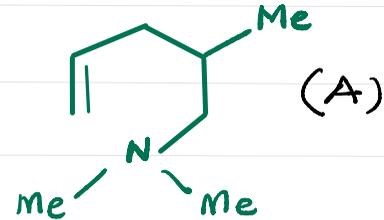
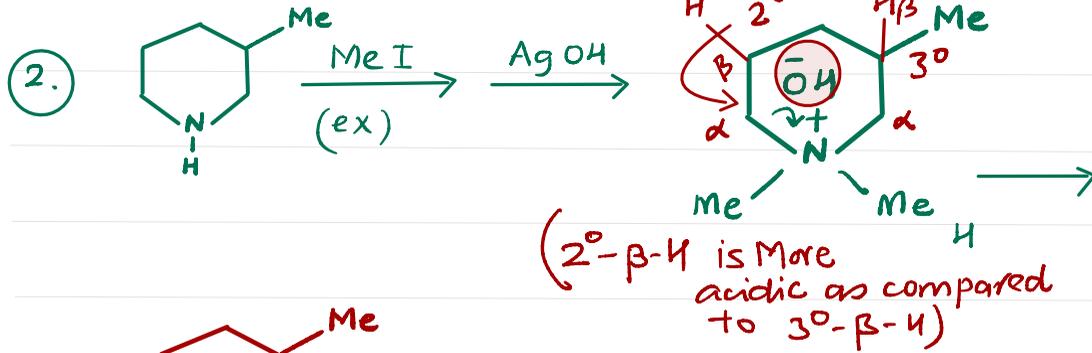
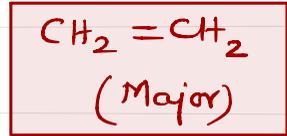


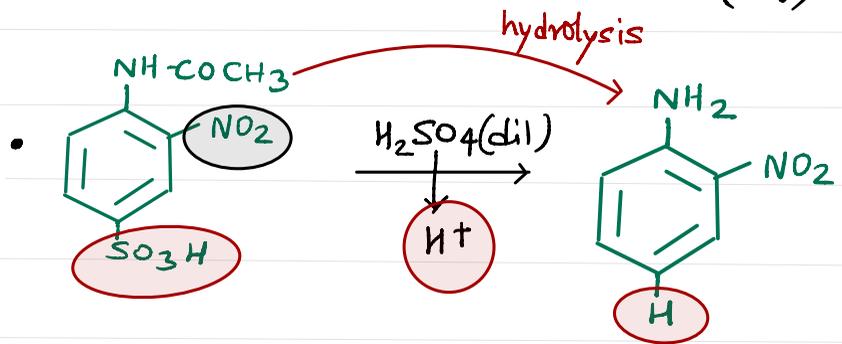
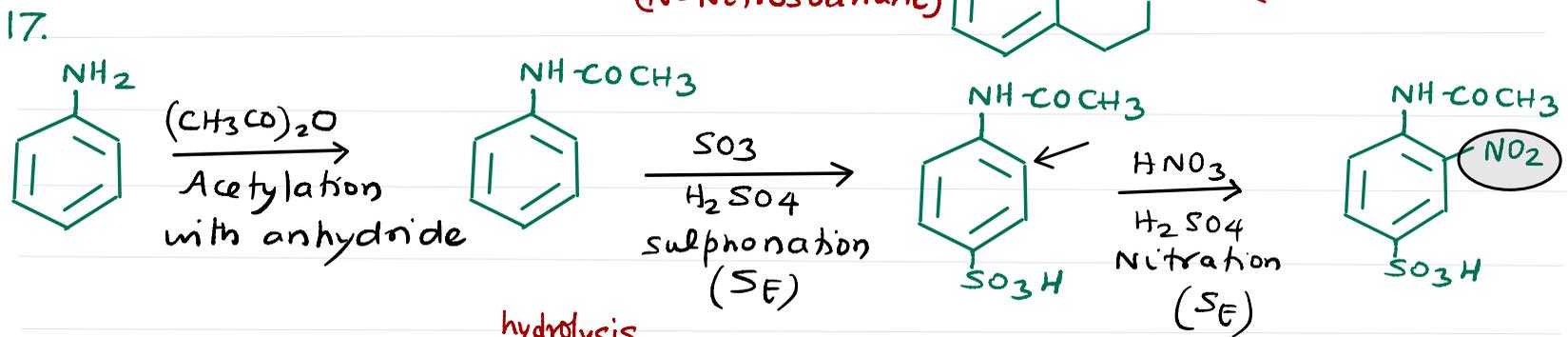
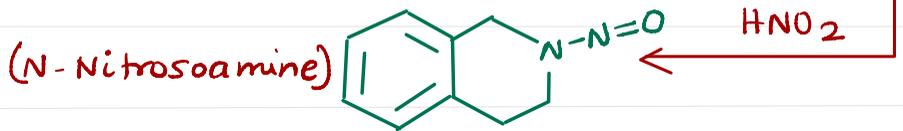
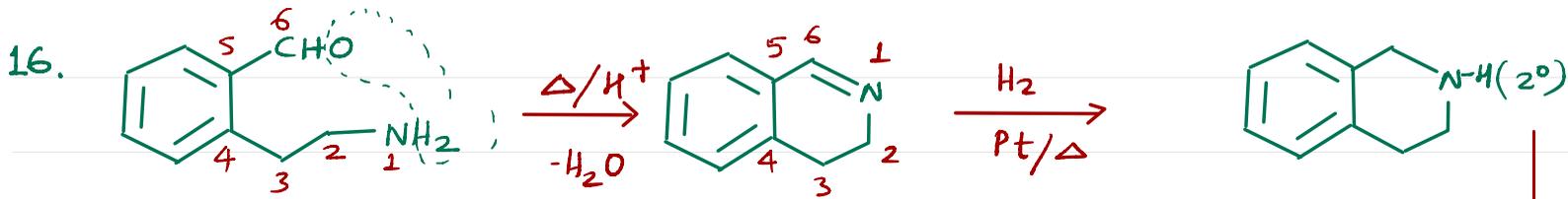
14. Identify A, B, .....



$1^\circ\text{-H}$  is More acidic

Very IMP



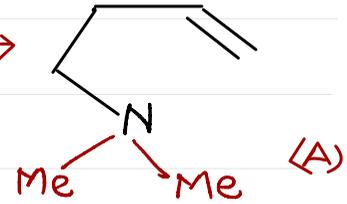
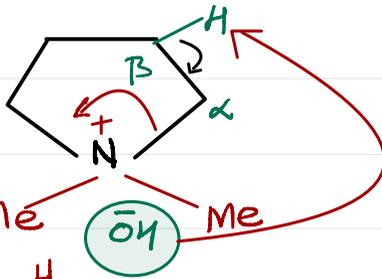
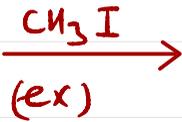
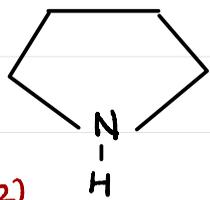


+ CH<sub>3</sub>COOH

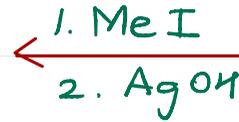
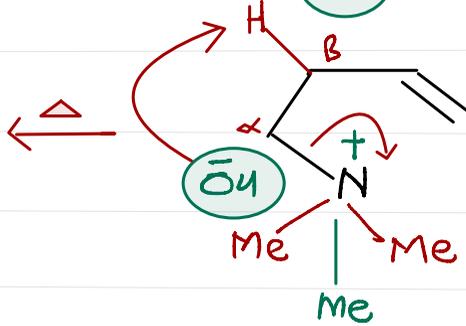
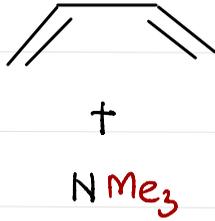
- an electrophile  $\text{H}^+$
- will do ipso : SE Rxn
- SO<sub>3</sub>H as leaving group.  $\rightarrow \text{SO}_3 \uparrow$

18.

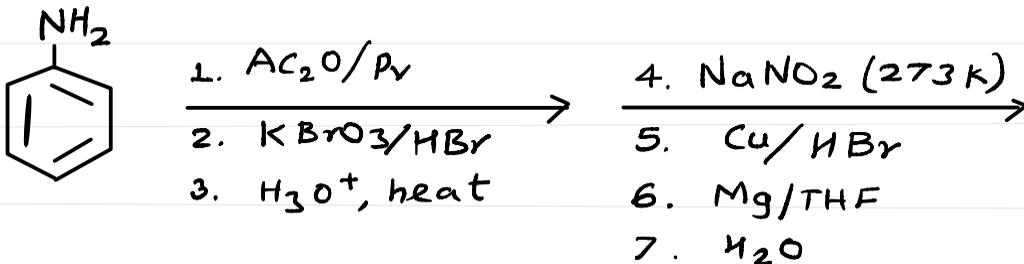
• Similar to Q14(2)



(B)



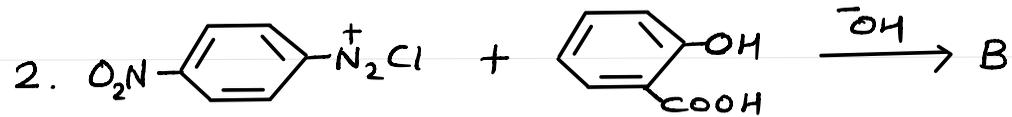
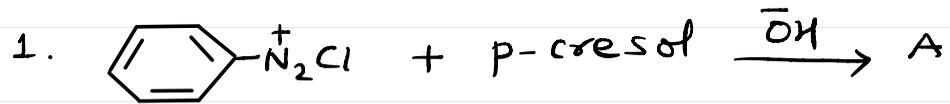
1. Identify the end product.



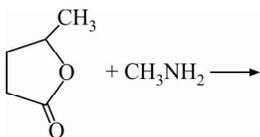
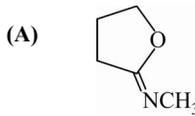
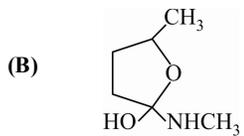
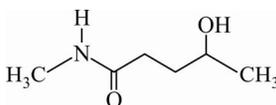
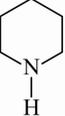
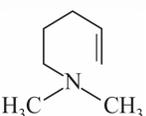
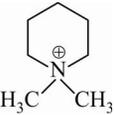
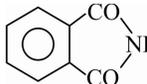
2. Do the following conversions: (involving diazonium cation)

1. Aniline to 1,3,5-Tribromobenzene
2. Benzene to m-dibromobenzene
3. p-Bromobenzoic acid from benzene
4. m-Chlorophenol from benzene
5. p-Hydroxybenzoic acid from benzene

### 3. Identify A, B



Choose the correct Alternatives for each of the following questions. Each Question has ONE correct Alternative, however those marked with (\*) may have MORE THAN ONE correct Alternatives.

- \*1. Which of the following can react with acetyl chloride ?  
 (A)  $(\text{CH}_3)_3\text{N}$  (B)  $(\text{CH}_3)_2\text{NH}$  (C)  $\text{C}_2\text{H}_5\text{NH}_2$  (D)  $\text{C}_2\text{H}_5\text{OH}$
- \*2. Which of the following reaction(s) can give an amine ?  
 (A)  $\text{R}-\text{C}\equiv\text{N} + \text{H}_2\text{O} \xrightarrow{\text{H}^+}$  (B)  $\text{R}-\text{X} + \text{NH}_3 \xrightarrow{\text{alc.}}$   
 (C)  $\text{R}-\text{CH}=\text{NOH} + [\text{H}] \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{Na}}$  (D)  $\text{RCONH}_2 + 4[\text{H}] \xrightarrow{\text{LiAlH}_4}$
- \*3. Which of the following can act as an ambident nucleophile ?  
 (A)  $-\text{ONO}$  (B)  $-\text{OCH}_3$  (C)  $-\text{CN}$  (D)  $-\text{CNO}$
4.  +  $\text{CH}_3\text{NH}_2 \longrightarrow$  Identify the product in given reaction :  
 (A)  (B)  (C)  (D) None of these
5. Identify the end product (C) :   $\xrightarrow[\text{excess}]{\text{CH}_3\text{I}}$  A  $\xrightarrow[\text{Ag}_2\text{O}]{\text{moist}}$  B  $\xrightarrow{\Delta}$  C  
 (A)  (B)  (C)  (D) 
6. A compound X with seven carbon atoms on treatment with  $\text{Br}_2$  and  $\text{KOH}$  gives Y, Y gives carbylamine test and upon diazotisation and coupling gives azo dye. X is :  
 (A)  $\text{C}_6\text{H}_5\text{CONH}_2$  (B)  $\text{CH}_3-(\text{CH}_2)_5-\text{CONH}_2$   
 (C)  $(\text{CH}_3)_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CONH}_2$  (D)  $\text{CH}_3-\text{O}-\text{C}_6\text{H}_4\text{NH}_2$
7.   $\xrightarrow{\text{KOH}}$  A  $\xrightarrow{\text{C}_2\text{H}_5\text{Br}}$  A  $\xrightarrow[\text{H}^+]{\text{HOH}}$  C + D  
 C and D in the above sequence are :  
 (A) Benzoic acid + aniline (B) Phthalic acid + ethylamine  
 (C) Phthalic acid + ethyl alcohol (D) Benzoic acid + ethylamine
8. The Compound having the lowest boiling point is :  
 (A) 2-propanamine (B) Ethylmethanamine (C) 1-propanamine (D) N, N-dimethylmethanamine
9. The end-product in the reaction sequence would be : n-propyl amine  $\xrightarrow{\text{HNO}_2}$  A  $\xrightarrow{\text{PCl}_5}$  B  $\xrightarrow{\text{NH}_3}$  C  
 (A) Ethyl cyanide (B) Ethyl amine (C) n-propyl amine (D) Isopropyl amine
10. In the reaction sequence A  $\xrightarrow{\text{SnCl}_2/\text{HCl}}$  B  $\xrightarrow{\text{NaNO}_2/\text{HCl}}$  C  $\xrightarrow{\text{H}_2\text{O}/\Delta}$   $\text{C}_6\text{H}_5\text{OH}$ , A, B and C are :  
 (A) Benzene, nitrobenzene, aniline (B) Nitrobenzene, aniline and diazonium cation  
 (C) Nitrobenzene, diazonium cation, aniline (D) Benzene, amino compound, aniline

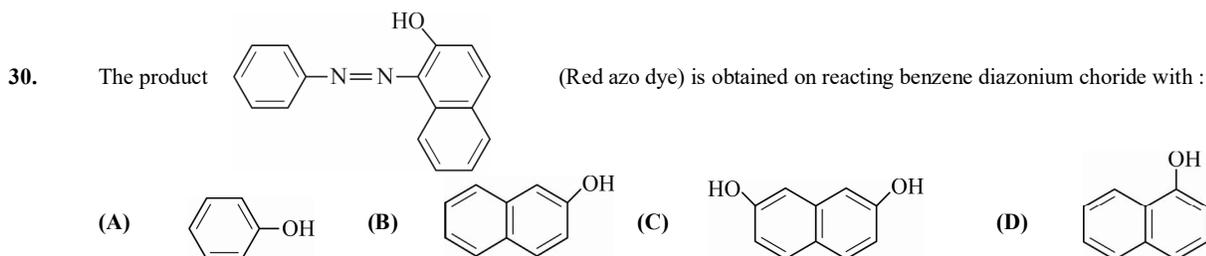
11. Reactants of reaction I are :  $\text{CH}_3\text{CONH}_2$ ,  $\text{KOH}$ ,  $\text{Br}_2$  ; Reactants of reaction II are :  $\text{CH}_3\text{COCl}$ ,  $\text{NaN}_3$ ,  $\text{KOH}$   
The intermediate species of reaction-I and reaction-II are respectively :
- (A) Nitrene, bromamide anion (B) Alkyl isocyanate, alkyl isocynate  
(C) Carbene, nitrene (D) Alkyl azide, alkyl isocyanate
- \*12. Which of the following amine(s) respond to carbylamine reaction :
- (A) Ethylamine (B)  $(\text{CH}_3)_2\text{NH}$  (C)  $\text{CH}_3\text{NH}_2$  (D) Phenylamine
- \*13. Which of the following compounds will dissolve in an alkali solution after it has react with sulphonyl chloride ?
- (A)  $(\text{C}_2\text{H}_5)_2\text{NH}$  (B)  $(\text{CH}_3)_2\text{N}-\text{C}_6\text{H}_5$  (C)  $\text{CH}_3\text{NH}_2$  (D)  $\text{C}_6\text{H}_5\text{NH}_2$
14. How many isomeric amines with formula  $\text{C}_7\text{H}_9\text{N}$  contain a benzene ring ?
- (A) Two (B) Three (C) Four (D) Five
- \*15. Reaction of  $\text{RCONH}_2$  with a mixture of  $\text{Br}_2$  and  $\text{KOH}$  gives  $\text{RNH}_2$  as the main product. The intermediate(s) involved in the reaction is :
- (A)  $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{NHBr}$  (B)  $\text{R}-\text{NHBr}$  (C)  $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{NBr}_2$  (D)  $\text{RNHCOO}^-$
16. The bromination of aniline in water produces :
- (A) 2-bromoaniline (B) 4-bromoaniline  
(C) 2, 4, 6-tribromoaniline (D) 2, 6-dibromoaniline
17. Benzenediazonium chloride on reaction with aniline in weakly basic medium gives :
- (A) diphenyl ether (B) p-aminoazobenzene  
(C) chlorobenzene (D) benzene
- \*18. Which of the following statements is correct ?
- (A) Replacement of halogen by  $\text{NH}_2$  in alkyl halides is a Nucleophilic substitution reaction  
(B) Aryl halides show more reactivity as compared to alkyl halides in the replacements of halogen by the  $-\text{NH}_2$  group  
(C) During the replacement of halogen by  $-\text{NH}_2$  group, ammonia is taken in large excess so as to avoid the formation of  $2^\circ$  and  $3^\circ$  amines  
(D) Tertiary alkyl halides generally undergo elimination instead of the replacement of halogen by  $-\text{NH}_2$  group
- \*19.  $\text{CH}_3\text{CH}_2\text{NH}_2$  is soluble in :
- (A) Dilute  $\text{HCl}$  (B)  $\text{CuSO}_4$  solution (C)  $\text{AgNO}_3$  (D)  $\text{NaOH}$
- \*20. Which of the following statements is(are) correct ?
- (A) Primary amines show intermolecular hydrogen bonding  
(B) Secondary amines show intermolecular hydrogen bonding  
(C) Tertiary amines show intermolecular hydrogen bonding  
(D) Amines have lower boiling points as compared to those of alcohols and carboxylic acid of comparable molar masses.
21. Consider the following reaction,  $\text{C}_6\text{H}_5\text{NH}_2 + \text{CHCl}_3 + \text{KOH} \xrightarrow{\Delta} (\text{A}) \xrightarrow{\text{H}^+ / \text{H}_2\text{O}} (\text{B}) + (\text{C})$ . The compounds (B) and (C) are :
- (A)  $\text{C}_6\text{H}_5\text{COOH}$  and  $\text{NH}_3$  respectively (B)  $\text{C}_6\text{H}_5\text{NH}_2$  and  $\text{HCOOH}$  respectively  
(C)  $\text{C}_6\text{H}_5\text{NH}_2$  and  $\text{H}_2\text{O}$  respectively (D) None of these

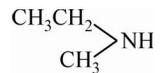
**ASSERTION & REASON QUESTION :**

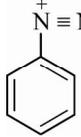
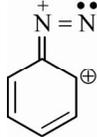
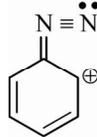
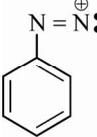
These questions contains, Statement-I (assertion) and Statement-II (reason).

- (A) Statement-I is True, Statement-II is True ; Statement-II is a correct explanation for Statement-I.  
(B) Statement-I is True, Statement-II is True ; Statement-II is NOT a correct explanation for Statement-I.  
(C) Statement-I is True, Statement-II is False  
(D) Statement-I is False, Statement-II is True.
22. **Statement-I :** Conversion of alkyl halides into alkyl cyanide or isocyanides is a Nucleophilic substitution reaction.  
**Statement-II :** When an alkyl halides is treated with alcoholic solution of  $\text{AgCN}$ , alkyl cyanides are formed as major product.
23. **Statement-I :** In Hoffmann bromide reaction, the amine formed has one carbon atom less than the parent  $1^\circ$  amide.  
**Statement-II :** N-methyl acetamide undergoes Hoffmann bromamide reaction.

24. **Statement-I :** Nitrobenzene does not undergoes Friedel-Craft's alkylation.  
**Statement-II :** Nitrobenzene is used as solvent in laboratory and industry.
25. **Statement-I :** Carbylamine reaction involves the reaction between 1° amine and chloroform in basic medium.  
**Statement-II :** In carbylamine reaction,  $-\text{NH}_2$  group is converted into  $-\text{NC}$  group via reaction with carbene intermediate.
26. **Statement-I :** Benzonitrile is prepared by the reaction of chlorobenzene with potassium cyanide.  
**Statement-II :** Cyanide ( $\text{CN}^-$ ) is a strong nucleophile.
27. **Statement-I :**  $\text{PhNH}_2$  is less basic than  $\text{EtNH}_2$ .  
**Statement-II :** The lone pair in  $\text{PhNH}_2$  is in conjugation with  $\pi$  electrons of benzene ring.
28. **Statement-I :**  $\text{PhCONH}_2$  gives Hoffmann's rearrangement faster than  $\text{CH}_3\text{CONH}_2$ .  
**Statement-II :** Phenyl group has a better migratory aptitude than methyl group.
29. **Statement I :** Benzylamine is more basic than aniline.  
**Statement II :** Phenyl group is electron releasing group.



- \*31.  $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NH}_2 \xrightarrow[\text{Br}_2]{\text{NaOH}} \text{P}$ . An aqueous solution of (P).
- (A) will turn blue litmus to red (B) will have no effect on litmus  
 (C) will turn red litmus to blue (D) will give effervescence of inert gas with  $\text{HNO}_2$
32. Which of the following should be most volatile ?
- I.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$  II.  $(\text{CH}_3)_3\text{N}$   
 III.  IV.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (A) II (B) IV (C) I (D) III
- \*33. Aniline is less basic than :
- (A)  $\text{NH}_3$  (B)  $\text{CH}_3\text{NH}_2$  (C) N-methyl aniline (D) *p*-nitroaniline
- \*34. In Gabriel synthesis, organic halides used during synthesis may be :
- (A) Benzyl chloride (B) Allyl chloride (C) 1° Alkyl halide (D) 3° alkyl halide
35. Arrange the following in the correct order of their basic character in gaseous phase :
- I.  $\text{NH}_3$  II.  $\text{RNH}_2$  III.  $\text{R}_2\text{NH}$  IV.  $\text{R}_3\text{N}$
- The correct choice is :
- (A)  $\text{IV} > \text{III} > \text{II} > \text{I}$  (B)  $\text{III} > \text{IV} > \text{II} > \text{I}$  (C)  $\text{III} > \text{II} > \text{IV} > \text{I}$  (D)  $\text{I} > \text{II} > \text{III} > \text{IV}$
36. For the conversion of Aniline to N-Methyl aniline, the reagent used is :
- (A)  $\text{CH}_3\text{I}$  (B)  $\text{C}_6\text{H}_5\text{Cl}$  (C)  $\text{CH}_4$  (D)  $\text{CH}_3\text{NH}_2$
- \*37. Which of the following compound will dissolve in an alkali solution after it has undergone reaction with Hinsberg reagent ?
- (A)  $(\text{C}_2\text{H}_5)_2\text{NH}$  (B)  $(\text{CH}_3)_3\text{N}$  (C)  $\text{CH}_3\text{NH}_2$  (D)  $\text{C}_6\text{H}_5\text{NH}_2$
- \*38. Which of the following amines can be prepared by Gabriel phthalimide reaction ?
- (A) Benzylamine (B) Aniline (C) Ethylamine (D) Methylamine
- \*39. In the Hoffmann's Bromamide rearrangement, the intermediate species involved is(are) :
- (A)  $\text{R} - \text{CO} - \text{NHBr}$  (B)  $[\text{R} - \text{CO} \overset{-}{\text{N}} - \text{Br}] \text{Na}^+$  (C)  $\text{R} - \text{N} = \text{C} = \text{O}$  (D)  $\text{R} - \text{CO} - \overset{\cdot\cdot}{\text{N}} :$

40. Aniline (1 mole) react with bromine to give symmetrical tri-bromoaniline. The amount of bromine required is :  
 (A) 3 moles (B) 1.5 moles (C) 4.5 moles (D) 6 moles
- \*41. Among the following correct resonance structures of Benzene diazonium ion is(are) :  
 (A)  (B)  (C)  (D) 
- \*42. A positive carbylamine test is given by :  
 (A) N, N-dimethyl aniline (B) isopropyl amine  
 (C) diethyl amine (D) benzyl amine
- \*43. Aniline can react with :  
 (A) dil HCl (B) dil NaOH (C) CH<sub>3</sub>COCl (D) Br<sub>2</sub> water
- \*44. Which of the following converts benzene diazonium chloride to Benzene ?  
 (A) H<sub>3</sub>PO<sub>4</sub> (B) C<sub>2</sub>H<sub>5</sub>OH (C) H<sub>3</sub>PO<sub>2</sub> (D) HBF<sub>4</sub>
- \*45. Which of the following can react with benzene sulphonyl chloride in aq. NaOH ?  
 (A) Aniline (B) Methylamine  
 (C) N, N-dimethyl aniline (D) N-methyl aniline

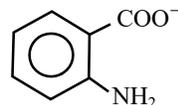
- \*46. In the given reaction :  $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{NH}_2 \xrightarrow[\text{conc. HCl}]{\text{NaNO}_2}$  product(s). The possible product(s) will be :

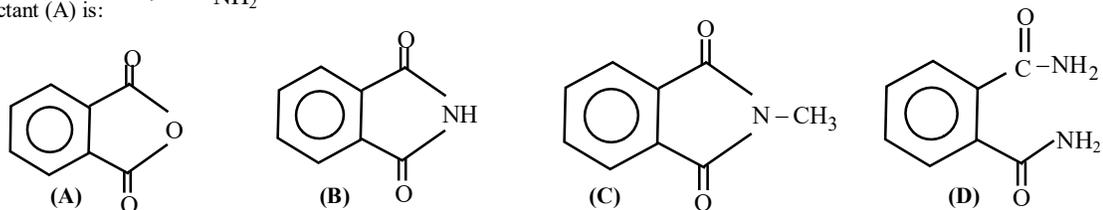
- (A)  $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\overset{\text{OH}}{\text{C}}} - \text{CH}_3$  (B)  $\text{CH}_3 - \text{CH} = \underset{\text{CH}_3}{\text{C}} - \text{CH}_3$   
 (C)  $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\overset{\text{OH}}{\text{C}}} - \text{NH}_2$  (D)  $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\overset{\text{Cl}}{\text{C}}} - \text{CH}_3$

47.  $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_2\text{CH}_3 \xrightarrow{\text{CH}_3\text{I}(\text{Excess})} \xrightarrow{\text{AgOH}} \xrightarrow{\Delta(150^\circ\text{C})}$

The major product formed in the above sequence of reactions is :

- (A) Propene (B) Methyl Alcohol (C) Ethene (D) Trimethyl amine
48. An organic compound with molecular formula C<sub>3</sub>H<sub>5</sub>N on hydrolysis gives ammonia and acid. The acid on heating with HN<sub>3</sub> and conc. H<sub>2</sub>SO<sub>4</sub> gives :  
 (A) Propanamide (B) Ethyl acetate (C) Methyl amine (D) Ethyl amine

49. (A)  $\xrightarrow[\text{KOH}]{\text{Br}_2}$    
 Reactant (A) is:



50.  $\text{Ph}-\text{C}\equiv\text{N} \xrightarrow[\text{(Partial hydrolysis)}]{\text{OH}^- / \text{H}_2\text{O}} (\text{A}) \xrightarrow{\text{Br}_2 + \text{KOH}} (\text{B})$

Product (B) is:

- (A) Ph-CH<sub>2</sub>-NH<sub>2</sub> (B) Ph-OH (C) Ph-NH<sub>2</sub> (D) Ph-CH<sub>3</sub>

**ANSWER KEY FOR CLASS TEST  
AMINES**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
BCD	BCD	ACD	C	B	A	B	D	D	B
<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
B	ACD	CD	D	AD	C	B	ACD	ABC	ABD
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
B	C	C	B	B	D	A	A	C	B
<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>
CD	B	ABCD	ABC	A	A	CD	ACD	ABCD	A
<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>
ABD	BD	ACD	BC	ABD	AB	C	D	B	C

T<sub>1</sub> H<sub>4</sub> A<sub>1</sub> N<sub>1</sub> K<sub>5</sub>  
Y<sub>4</sub> O<sub>1</sub> U<sub>1</sub>