

A-Level Chemistry

Name: _____ Score: _____

1. A primary amine has the group:
 - ☐ -COO-
 - ☐ -OH
 - ☐ -NH_2
 - ☐ -COOH
2. Phenylamine is made from benzene by:
 - ☐ oxidising with KMnO_4
 - ☐ free-radical substitution
 - ☐ nitrating to nitrobenzene, then reducing (Sn/conc. HCl , then NaOH)
 - ☐ adding water
3. An amide is made from an acyl chloride and:
 - ☐ an alkene
 - ☐ ammonia or a primary amine
 - ☐ water
 - ☐ an alcohol
4. An amino acid contains:
 - ☐ only a -COOH group
 - ☐ both a basic -NH_2 group and an acidic -COOH group
 - ☐ a C=C double bond
 - ☐ only an -NH_2 group
5. A primary amine is made by heating a halogenoalkane with:
 - ☐ ammonia in ethanol, under pressure
 - ☐ water
 - ☐ acidified dichromate
 - ☐ bromine
6. Phenylamine can be used to make azo dyes via a diazonium salt.
 - ☐ True ☐ False

7. The functional group -CONH_2 is found in an _____.

8. Amino acids contain both an amino group and a carboxylic acid group.

☐ True ☐ False

9. Amines act as bases because the nitrogen has a lone _____.

10. The order of basicity is:

☐ phenylamine < ammonia < ethylamine

☐ ammonia < ethylamine < phenylamine

☐ all equal

☐ ethylamine < ammonia < phenylamine

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1. **-NH_2**

A primary amine has -NH_2 ; a secondary amine has -NH- between two carbons.

2. **nitrating to nitrobenzene, then reducing (Sn/conc. HCl, then NaOH)**

Benzene $\rightarrow$ nitrobenzene (nitration) $\rightarrow$ phenylamine (reduction with tin and acid, then NaOH).

3. **ammonia or a primary amine**

Ammonia or a $1^\circ/2^\circ$ amine reacts with an acyl chloride to give an amide.

4. **both a basic -NH_2 group and an acidic -COOH group**

Having both groups is what makes amino acids behave as they do (zwitterions, peptide bonds).

5. **ammonia in ethanol, under pressure**

Ammonia substitutes the halogen to give the amine (excess NH_3 favours the primary amine).

6. **True**

Azo compounds are brightly coloured.

7. **amide**

Formed from an acyl chloride and ammonia or an amine.

8. **True**

They can act as both acid and base (zwitterions).

9. **pair**

It accepts a proton.

10. **phenylamine $<$ ammonia $<$ ethylamine**

Ethylamine's alkyl group makes its lone pair most available; phenylamine's lone pair is delocalised into the ring, so it is weakest.