



**CHEMISTRY ONLINE**  
— **TUITION** —

Phone: +442081445350

[www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)

Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)

# CHEMISTRY

## INORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	AMINES
PAPER TYPE:	QUESTION PAPER - 4
TOTAL QUESTIONS	10
TOTAL MARKS	40

**ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.**

## Amines - 4

1. 4-Methylphenylamine is dissolved in ice-cold hydrochloric acid and sodium nitrite is added.

This mixture is then slowly added to an alkaline solution of the phenol to form the dye.



- (a) Identify the inorganic nitrogen-containing compound formed by the mixture of hydrochloric acid and sodium nitrite.

(1)

- (b) Draw the structure of the organic compound formed in the ice-cold acidic mixture, showing a displayed formula of the nitrogen-containing group.

CHEMISTRY ONLINE

(1)

- (c) State the name of the type of organic compound drawn in (b).

(1)

- (d) Suggest why the mixture must be kept at a low temperature.

(1)

(e) Suggest the structure of the dye.

(2)

2. Methylamine reacts with bromoethane by nucleophilic substitution to produce a mixture of products.

Which is not a possible product of this reaction?

- A.  $C_2H_5NHCH_3$
- B.  $(C_2H_5)_2NCH_3$
- C.  $[(C_2H_5)_2N(CH_3)_2]^+Br^-$
- D.  $[(C_2H_5)_3NCH_3]^+Br^-$

(1)

3. Aqueous solutions of ammonia, ethylamine and phenylamine are prepared.

Each solution has the same concentration. Which is the correct order for the pH values of these solutions?

- A. ammonia > ethylamine > phenylamine
- B. ammonia > phenylamine > ethylamine
- C. ethylamine > ammonia > phenylamine
- D. ethylamine > phenylamine > ammonia

(1)

4. E110 is a yellow colouring agent that is commonly added to a variety of foods.

E110 contains an azo dye made from an amine and a phenol.

Describe how you would prepare a sample of an azo dye in the laboratory from an amine, a phenol and any other necessary reagents.

Include in your answer

- essential reagents and conditions for each stage
- names of any functional groups formed during the process.

(7)

5. 1,4-Diaminobenzene is used in the manufacture of a variety of materials including dyes and polymers.



1,4-diaminobenzene

Explain what is meant by the term 1,4-diamino in the name of this compound.

I am Sorry !!!!!

(2)

6. Propylamine,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$ , can be formed either by nucleophilic substitution or by reduction.

(a) Draw the structure of a compound which can undergo nucleophilic substitution to form propylamine.

(1)

(b) Draw the structure of the nitrile which can be reduced to form propylamine.

(1)

(c) State and explain which of the two routes to propylamine, by nucleophilic substitution or by reduction, gives the less pure product.

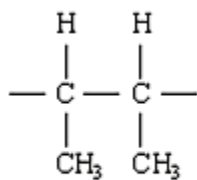
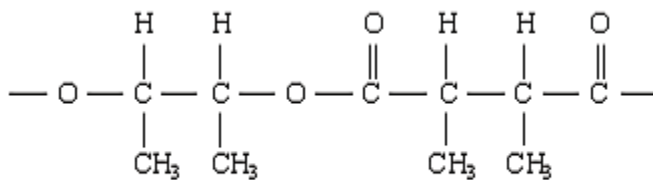
Draw the structure of a compound formed as an impurity.

CHEMISTRY ONLINE  
— TUITION —

(3)

I am Sorry !!!!!

7. The repeating units of two polymers, P and Q, are shown below.

**P****Q**

**(a)** Draw the structure of the monomer used to form polymer P.

Name the type of polymerisation involved.

**(2)**

**(b)** Draw the structures of two compounds which react together to form polymer Q.

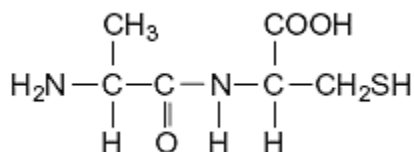
Name these two compounds and name the type of polymerisation involved.

**(3)**

**(c)** Identify a compound which, in aqueous solution, will break down polymer Q but not polymer P.

**(2)**

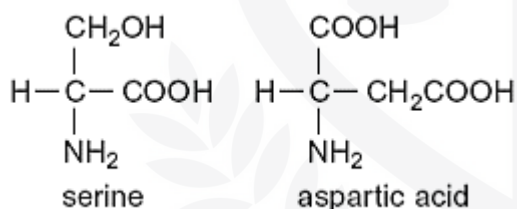
8. The dipeptide shown below is formed from two different amino acids.



Draw the structure of the alternative dipeptide that could be formed by these two amino acids.

(1)

9. The amino acids serine and aspartic acid are shown below.



(a) Give the IUPAC name of serine.

(1)

(b) Draw the structure of the species formed when aspartic acid reacts with aqueous sodium hydroxide.

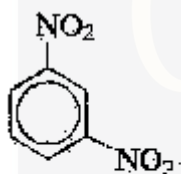
(1)


(c) Draw the structure of the species formed when serine reacts with dilute hydrochloric acid.

(1)

(d) Draw the structure of the species formed when serine reacts with an excess of bromomethane.

(1)



10. Compound X  is prepared from nitrobenzene by reaction with a mixture of concentrated nitric acid and concentrated sulfuric acid.

The two acids react to form an inorganic species that reacts with nitrobenzene to form X.

(a) Give the formula of this inorganic species formed from the two acids and write an equation to show its formation.

CHEMISTRY ONLINE  
— TUITION —

(2)

(b) Name and outline a mechanism for the reaction of this inorganic species with nitrobenzene to form X.

I am Sorry !!!!!





**DR. ASHAR RANA**



- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, and Math's Tutor

## CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: [www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)
- Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)
- Address: 210-Old Brompton Road, London SW5 OBS, UK