
Examiners' Report – Paper A (Chemistry)

I Independent claims (maximum: 75 points)

The main challenge in this paper was to claim all the different aspects of the invention. Most of the marks were awarded for the independent claims.

Points were awarded for independent claims directed to:

- 1: A catalyst comprising alkali metal on a basic support in which a basic support is defined to be one which desorbs carbon dioxide at a temperature higher than a standard alumina;
- 2: A process for making the catalyst of claim 1, said process comprising introducing 1 part by weight of the alkali metal and 0.5-500 parts by weight of the support into a closed vessel under an inert atmosphere and stirring;
- 3: A process for alkylating or alkenylating alkylbenzenes with an alkene or a conjugated diene using dry starting materials in the presence of said catalyst in an oxygen free atmosphere;
- 4: A process for making substituted naphthalenes comprising the process of claim 3 and the subsequent step of dehydrocyclisation;
- 5: A process for making 2,6-DMN comprising the use of p-xylene and butene or 1,3-butadiene in the process of claim 4;
- 6: A process for making PEN bottles including the process of claim 5.

Claims 1 and 3 were considered to be the most important.

Some candidates limited the scope of the claims by features, which were clearly indicated as being optional. Such features include the reaction temperatures and times in claim 2 (see page 4, 2nd paragraph: "...**typically** at a temperature between 30 and 60°C for 1 to 5 hours."). Many candidates included the temperature range of from 100 °C to 200 °C in claims 3 and 5. Some of these candidates argued that below this temperature range the reaction rate was too low and above 200 °C the selectivity decreased (see page 4, 5th paragraph of the English version). Nevertheless it was not necessary to include this range in the independent claims since said feature was clearly stated to be optional ("The reaction is usually performed at a temperature ...") and there was no need for such a limitation in view of the prior art. Claims with an unnecessarily restricted scope gained fewer marks.

It was not necessary to formulate the claim to the catalyst as a product by process claim. Candidates who did so gained fewer marks.

Unity of invention

The subject-matter defined in the claims did not lack unity of invention as the common technical feature - the alkali metal catalyst on a basic support - was not described in or obvious in view of the prior art. Candidates who decided to file divisional applications gained fewer marks for the claims covered by these additional applications.

Novelty

Some candidates presented claims the subject-matter of which was clearly not novel. Considerable numbers of marks were deducted for each of these claims. Such claims included, e.g. product-by-process claims as to 2,6-DMN. This product was not novel in view of **D1** (see 9/17) or **D2**.

II Dependent claims (maximum: 10 points)

Candidates were expected to file only a limited number of dependent claims directed to additional important aspects of the invention.

Examples of good dependent claims were those having the following features:

- sodium or potassium carbonate as the basic support in claims 1 or 2;
- T 30-60 °C; 1-5 h in claim 2;
- use of one of the reactants as a solvent in claim 2;
- T 100-200 °C; 1-10 h in claim 3.

III Description (maximum: 15 points)

The candidates were expected to discuss documents **D1** and **D2** and define the problem solved in view of these documents. This was generally done well though some of the candidates did not realise that **D2** discloses the dehydrocyclisation step used in independent claims 4 and 5. The candidates were also expected to incorporate the subject-matter included in the fax into the description.

EXAMINATION COMMITTEE I

Candidate No.

Paper A (Chemistry) 2003 - Schedule of marks

Category	Maximum possible	Marks awarded	
		Marker	Marker
Independent claims	75		
Dependent claims	10		
Description	15		
Total	100		

Sub-Committee for Chemistry agrees on marks and recommends the following grade to the Examination Board:

☐**PASS**

(50-100)

☐**FAIL**

(0-49)

COMPENSABLE FAIL

(45-49, in case the candidate sits the examination for the first time)

Vienna, 22 August 2003

Chairman of Examination Committee I