**Feedback on Questions**

Question 1 was inspired by the classic "Pharoah's Serpent" demonstration that used to be commonly seen in schools before the toxicity of the products became a worry. This allowed us to explore some classic inorganic chemistry as well as introduce the important technique of Thermogravimetric Analysis (TGA). Question 2 explores some interesting redox chemistry and allowed Dr Wothers to further explore the links between chemistry and animal-based humour!

**Question 1**

This question examined some chemistry of (iso)thiocyanates and began to explore an area of modern materials chemistry with graphitic carbon nitrides. With care and clear thinking, all of the marks were accessible to many candidates. Parts (a) to (d) were designed to get candidates thinking about alternative structures for isomeric compounds and these were well-answered by many. Part (e) was a straightforward Hess cycle which was eminently doable, with all of the important information contained in the introduction. We then introduced TGA, which is a technique that is used a great deal when examining the decomposition of materials, or indeed the uptake of gases into novel, solid substrates. Many candidates calculated percentages in part (f) that did not take into account the initial loss of carbon disulphide from the reaction. These answers received the partial credit as detailed in the mark scheme. It has long been an ambition of ours to introduce some polymer chemistry into the C3L6 paper. This is challenging as it is all too easy for this area of chemistry to be either far too difficult or rather unchallenging. We hope that we achieved some kind of balance in this paper. For part (g)(iii), we accepted any structure that was tautomeric with the normally seen, aromatic structure for melamine. This also applied to the structure of the melamine dimer in part (h)(iii). Overall, the marks for this first question were high and those candidates who were prepared to read through to the end were rewarded with some approachable chemistry and some marks that were easy to gain.

**Question 2**

Oxidation state and redox chemistry are important concepts at A-level. We wanted to reinforce the concept of "maximum oxidation state" based upon position in the Periodic Table and this led to some formulae that were likely unfamiliar to most candidates. In 2(c)(ii), we expected the best candidates to recognise that the minus five charge on the $TlO_4^{5-}$ ion would render the species unstable. Indeed, the published crystal structure of $Li_5TlO_4$ shows that each thallium is coordinated to three oxide ions in a non-planar $TlO_3^{3-}$ species, with the unit cell containing a separate $O^{2-}$ ion per thallium complex as well as the $Li^+$ ions. Many high-scoring candidates spotted this. The remainder of this question was designed to show how the change in oxidation states can be used to balance some complicated stoichiometric equations. Part (e) allowed us to test candidates' ability to manipulate units successfully and part (f) allowed the use of oxidation state changes to construct a balanced equation.

Some teachers remarked to us that they thought the paper was easier this year than in the past. We accept that this may have been the case, but certainly the statistics show that, following another difficult year in their education, many students found the paper quite challenging enough. We are gratified that all marks were achievable by significant numbers of candidates in the cohort.