4.2.3 Organic synthesis

(a) the techniques and procedures for: **(i)** use of Quickfit apparatus including for distillation and heating under reflux **(ii)** preparation and purification of an organic liquid including: • use of a separating funnel to remove an organic layer from an aqueous layer • drying with an anhydrous salt (e.g. $MgSO_4$, $CaCl_2$) • redistillation					
(b) for an organic molecule containing several functional groups: **(i)** identification of individual functional groups **(ii)** prediction of properties and reactions					
(c) two-stage synthetic routes for preparing organic compounds.					

4.2.4 Analytical Techniques

(a) infrared (IR) radiation causes covalent bonds to vibrate more and absorb energy					
(b) absorption of infrared radiation by atmospheric gases containing C=O, O–H and C–H bonds (e.g. H_2O, CO_2 and CH_4), the suspected link to global warming and resulting changes to energy usage					
(c) use of an infrared spectrum of an organic compound to identify: n alcohol from an absorption peak of the O–H bond an aldehyde or ketone from an absorption peak of the C=O bond **(iii)** a carboxylic acid from an absorption peak of the C=O bond and a broad absorption peak of the O–H bond					
(d) interpretations and predictions of an infrared spectrum of familiar or unfamiliar substances using supplied data					
(e) use of infrared spectroscopy to monitor gases causing air pollution (e.g. CO and NO from car emissions) and in modern breathalysers to measure ethanol in the breath					
(f) use of a mass spectrum of an organic compound to identify the molecular ion peak and hence to determine molecular mass					
(g) analysis of fragmentation peaks in a mass spectrum to identify parts of structures.					
(h) deduction of the structures of organic compounds from different analytical data including: **(i)** elemental analysis **(see also 2.1.3 c)** **(ii)** mass spectra **(iii)** IR spectra.					