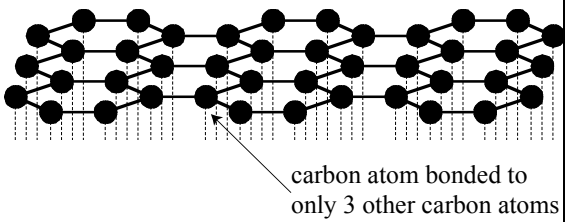
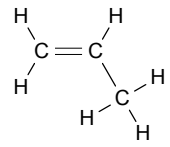
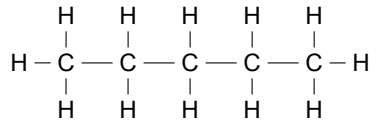
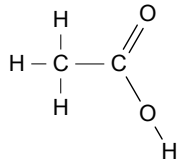
Assessment Schedule – 2006

Chemistry: Describe properties and reactions of carbon and its compounds (90648)

Evidence Statement

Q	Evidence	Achievement	Merit	Excellence
1(a)	An allotrope is a different form of an element, where the atoms are arranged differently.	Answer must include that atoms are arranged differently.		
1(b)(i)	Diamond C-60 (Buckminster fullerene, fullerenes or Bucky balls)	**TWO** correct.		
1(b)(ii)	Graphite is a good conductor of electricity. Within a sheet or layer, each carbon atom is covalently bonded to 3 other carbon atoms. These bonds are all single, so each carbon atom has 1 unbonded valence electron which is able to move and carry a current that is passed through it.  	States graphite is a good electrical conductor.	Each carbon atom is covalently bonded to three other carbon atoms within a layer. **OR** A valence electron from each carbon atom is available to move. Labelled diagrams are acceptable as explanations.	Each carbon atom is covalently bonded to three other carbon atoms within a layer. **AND** A valence electron from each carbon atom is available to move. **AND** Answer links the ability of graphite to conduct electricity. Labelled diagrams are acceptable as part of the explanation.
2(a)	Carbon dioxide or CO_2.	Correct name or formula.		
2(b)	The gas carbon dioxide is heavier than air, so can be collected by displacing air in a (gas) jar.		Correct explanation given.	
2(c)	$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(\ell) + CO_2(g)$	Reactants and products formulae correct **OR** Correct word equation.	Correctly balanced.	

3	When dissolved in water, only some of the carbon dioxide reacts with water to form carbonic acid which forms (H^+) H_3O^+ ions in water. This means the pH will be about 5 or 6, so it is only slightly acidic. $CO_2 + H_2O \rightarrow H_2CO_3$ or $CO_2 + 2H_2O \rightarrow H_3O^+ + HCO_3^-$ or $CO_2 + 3H_2O \rightarrow 2H_3O^+ + CO_3^{2-}$	States that only some of the carbon dioxide gas reacts with water.	Some carbon dioxide reacts with water **AND** Explains that this results in a slightly acidic solution with a pH of between 4 and 6.	Some carbon dioxide reacts with water **AND** Explains that this results in a slightly acidic solution with a pH of between 4 and 6 **AND** Includes an appropriate equation.
4(a)	Name (i) butane (ii) hexane (iii) ethanol	**FOUR** out of six correct		
	(iv) 			
	(v) 			
	(vi) 			
4 (b)(i)	Used to make vinegar (as a preservative). Used as a flavouring in food. Production of esters / other organic compounds.	Any TWO correct uses.		
4 (b)(ii)	Oxidation	Correct answer.		
5 (a)	Organic compounds are used as fuels because they burn (combust) easily and produce large amounts of energy.	Burn easily AND Produce relatively large amounts of energy.		

5 (b)	$C_4H_{10} + 6.5O_2 \rightarrow 4CO_2 + 5H_2O$ Or $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$	Formulae of reactants **OR** Products are correct or correct word equation.	Formulae of reactants **AND** Products are correct.	Equation is correctly balanced.
5 (c)	Complete combustion occurs when sufficient oxygen is present for the compound to form carbon dioxide and water. In incomplete combustion, less oxygen is available so some soot (carbon) or carbon monoxide is formed.	Identifies complete combustion requires sufficient oxygen to be present **OR** Incomplete combustion occurs when insufficient oxygen is present.	Identifies complete combustion requires sufficient oxygen to be present **AND** Incomplete combustion occurs when insufficient oxygen is present **AND** Correctly identifies products of both forms of combustion.	

Judgement Statement

Chemistry: Describe properties and reactions of carbon and its compounds (90648)

Achievement	Achievement with Merit	Achievement with Excellence
SEVEN questions answered correctly. Minimum of 7 × A	NINE questions answered correctly, including at least FOUR at Merit level. Minimum of 4 × M + 5 × A	ELEVEN questions answered correctly, including at least TWO at Excellence level and at least THREE at Merit level. Minimum of 2 × E + 3 × M + 6 × A