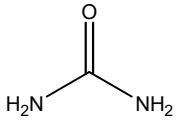
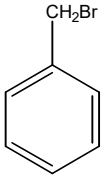
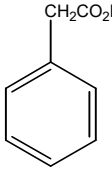
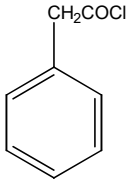
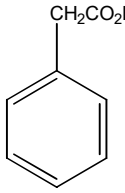
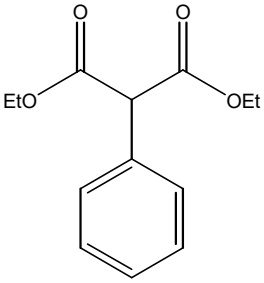
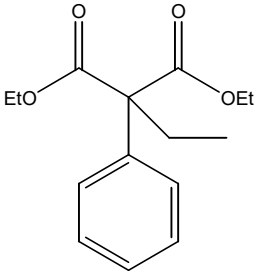
Question 5			
		Answer	**Marks**
a)		• Moles **A** = 0.250/60 = 4.2 x 10^{-3} • Moles C = moles CO_2 = 0.178/44.01 = 4.0(4) x 10^{-3} • Moles H = 2 x moles H_2O = 2 x (0.146/18.016) = 16.2(1) x 10^{-3} • Moles N = moles NH_3 = moles HCl = (40.8/1000) x 0.200 = 8.16 x 10^{-3} • Mass of C + H + N in sample of **A** = (4.04 x 10^{-3} x 12.01)+(16.21 x 10^{-3} x 1.008)+(8.16 x 10^{-3} x 14.01) = 0.179(2)g • Mass of O in **A** = 0.250 – 0.179(2) = 0.071g • Moles of O in **A** = 0.071/16 = 4.4 x 10^{-3} • This gives empirical formula of **A** = CH_4N_2O • M_r (**A**) = 60, so molecular formula of **A** is also **CH_4N_2O** • [Or .. CH_4N_2 = 44, M_r(**A**) = 60; molecular formula of **A** = **CH_4N_2O**] *1 mark for calculating moles **A**, C and H; 1 mark for calculating moles N; 1 mark for deducing oxygen as missing element; 1 mark for final formula*	4
b)	**A:** 	*Allow any clear representation of correct structures. Award 1 mark for each correct structure*	7
	B: 	**C:** 	
	D: 	**E:** 	
	F: 	**G:** 	
			11 marks

Note: Tests are to be taken under controlled conditions. Students must not have access to the information contained in this marking scheme prior to, or during, the test.