21. Organic synthesis Analysis

21.1 Organic synthesis

Paper 2

Marking Scheme

Q1.

(c)

Chemical test	observation with 2-bromooctane	observation with octan-2-ol	observation with $CH_3(CH_2)_5CHCH_2$
Br_2 in the dark	×		orange / brown to colourless
PCl_5		steamy fumes	×
$AgNO_3$(aq)	cream precipitate **OR** off white precipitate	×	

6 correct answers = 3 marks
4 or 5 correct answers = 2 marks
2 or 3 correct answers = 1 mark
0 or 1 correct answer = 0 marks

3

Q2.

(d)	(reaction 2) NaOH**(aq)**	**1**
	(reaction 3) hot **acidified <u>concentrated</u>** $KMnO_4$	**1**
	(reaction 4) <u>conc</u> H_2SO_4 catalyst	**1**

Q3.

(a)

$K_2Cr_2O_7$ **OR** $KMnO_4$ **OR** Na	**<u>A2</u>** make solution turn (orange to) green **OR** turn colourless **OR** effervescence	**2**
alkaline I_2(aq) / **OR** 2,4-DNPH	**<u>B1</u>** gives yellow/orange ppt **OR** **<u>B1</u>** gives red/yellow/orange ppt	**2**
Br_2(aq)	**<u>C2</u>** turns it (orange to) colourless	
Na_2CO_3 $NaHCO_3$	**<u>D2</u>** gives effervescence	

Q4.

(a)(i)	**M1** Tollens' **OR** Fehling's **OR** $K_2Cr_2O_7$ **OR** $KMnO_4$ **OR** alkaline I_2(aq) with	**M2** **A1** gives silver mirror **OR** brick-red ppt **OR** (orange solution) turns green **OR** (purple solution) turns colourless **A2** gives yellow ppt	**2**
	M3 alkaline I_2(aq)	**M4** **B1** gives yellow ppt	**2**
	M5 2,4-DNPH	**M6** **C1** gives red/orange/yellow ppt	**2**
	M7 Br_2(aq)	**M8** **D2** turns it (orange to) colourless	**2**

(d)	**M1** one portion of **A1**: $NaBH_4$ **AND** → propan-1-ol / $CH_3(CH_2)_2OH$	**1**
	M2 second portion of **A1**: acidified $K_2Cr_2O_7$ **AND** → propanoic acid / $C_2H_5CO_2H$	**1**
	M3 two products: conc(entrated mineral) acid / H^+ / H_2SO_4 (catalyst)	**1**