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Centre Number			Candidate Number
Candidate Signature			

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General Certificate of Education  
June 2006  
Advanced Level Examination



**CHEMISTRY**  
**Unit 6a Synoptic Assessment**

**CHM6/W**

Monday 26 June 2006 9.00 am to 10.00 am

**For this paper you must have:**

- an objective test answer sheet,
- a calculator.

Time allowed: 1 hour

**Instructions**

- Use a black ball-point pen. Do **not** use pencil.
- Fill in the boxes at the top of this page.
- Answer **all** 40 questions.
- For each item there are four responses. When you have selected the response which you think is the best answer to a question, mark this response on your answer sheet.
- Mark all responses as instructed on your answer sheet. If you wish to change your answer to a question, follow the instructions on your answer sheet.
- Do all rough work in this book, **not** on your answer sheet.
- Make sure that you hand in **both** your answer sheet **and** this answer book at the end of this examination.
- The Periodic Table/Data Sheet is provided on pages 3 and 4. Detach this perforated sheet at the start of the examination.

**Information**

- Each correct answer will score one mark. No deductions will be made for wrong answers.
- Graph paper is available from the Invigilator.

**Advice**

- Do not spend too long on any question. If you have time at the end, go back and answer any question you missed out.

**There are no questions printed on this page**

# The Periodic Table of the Elements

- The atomic numbers and approximate relative atomic masses shown in the table are for use in the examination unless stated otherwise in an individual question.

		I		II		III		IV		V		VI		VII		0																							
1.0	<b>H</b> Hydrogen 1	9.0	<b>Be</b> Beryllium 4	relative atomic mass ——— 6.9 atomic number ——— 3		<b>Li</b> Lithium 3	10.8	<b>B</b> Boron 5	12.0	<b>C</b> Carbon 6	14.0	<b>N</b> Nitrogen 7	16.0	<b>O</b> Oxygen 8	19.0	<b>F</b> Fluorine 9	20.2	<b>Ne</b> Neon 10																					
23.0	<b>Na</b> Sodium 11	24.3	<b>Mg</b> Magnesium 12	45.0	<b>Sc</b> Scandium 21	47.9	<b>Ti</b> Titanium 22	50.9	<b>V</b> Vanadium 23	52.0	<b>Cr</b> Chromium 24	54.9	<b>Mn</b> Manganese 25	55.8	<b>Fe</b> Iron 26	58.9	<b>Co</b> Cobalt 27	58.7	<b>Ni</b> Nickel 28	63.5	<b>Cu</b> Copper 29	65.4	<b>Zn</b> Zinc 30	69.7	<b>Ga</b> Gallium 31	72.6	<b>Ge</b> Germanium 32	74.9	<b>As</b> Arsenic 33	79.0	<b>Se</b> Selenium 34	79.9	<b>Br</b> Bromine 35	83.8	<b>Kr</b> Krypton 36				
39.1	<b>K</b> Potassium 19	40.1	<b>Ca</b> Calcium 20	88.9	<b>Y</b> Yttrium 39	91.2	<b>Zr</b> Zirconium 40	92.9	<b>Nb</b> Niobium 41	95.9	<b>Mo</b> Molybdenum 42	98.9	<b>Tc</b> Technetium 43	101.1	<b>Ru</b> Ruthenium 44	102.9	<b>Rh</b> Rhodium 45	106.4	<b>Pd</b> Palladium 46	107.9	<b>Ag</b> Silver 47	112.4	<b>Cd</b> Cadmium 48	114.8	<b>In</b> Indium 49	118.7	<b>Sn</b> Tin 50	121.8	<b>Sb</b> Antimony 51	127.6	<b>Te</b> Tellurium 52	126.9	<b>I</b> Iodine 53	131.3	<b>Xe</b> Xenon 54				
85.5	<b>Rb</b> Rubidium 37	87.6	<b>Sr</b> Strontium 38	138.9	<b>La</b> Lanthanum 57	178.5	<b>Hf</b> Hafnium 72	180.9	<b>Ta</b> Tantalum 73	183.9	<b>W</b> Tungsten 74	186.2	<b>Re</b> Rhenium 75	190.2	<b>Os</b> Osmium 76	192.2	<b>Ir</b> Iridium 77	195.1	<b>Pt</b> Platinum 78	197.0	<b>Au</b> Gold 79	200.6	<b>Hg</b> Mercury 80	204.4	<b>Tl</b> Thallium 81	207.2	<b>Pb</b> Lead 82	209.0	<b>Bi</b> Bismuth 83	210.0	<b>Po</b> Polonium 84	210.0	<b>At</b> Astatine 85	222.0	<b>Rn</b> Radon 86				
132.9	<b>Cs</b> Caesium 55	137.3	<b>Ba</b> Barium 56	227	<b>Ac</b> Actinium 89	†		223.0	<b>Fr</b> Francium 87	226.0	<b>Ra</b> Radium 88																												

140.1	<b>Ce</b> Cerium 58	140.9	<b>Pr</b> Praseodymium 59	144.2	<b>Nd</b> Neodymium 60	144.9	<b>Pm</b> Promethium 61	150.4	<b>Sm</b> Samarium 62	152.0	<b>Eu</b> Europium 63	157.3	<b>Gd</b> Gadolinium 64	158.9	<b>Tb</b> Terbium 65	162.5	<b>Dy</b> Dysprosium 66	164.9	<b>Ho</b> Holmium 67	167.3	<b>Er</b> Erbium 68	168.9	<b>Tm</b> Thulium 69	173.0	<b>Yb</b> Ytterbium 70	175.0	<b>Lu</b> Lutetium 71
232.0	<b>Th</b> Thorium 90	231.0	<b>Pa</b> Protactinium 91	238.0	<b>U</b> Uranium 92	237.0	<b>Np</b> Neptunium 93	239.1	<b>Pu</b> Plutonium 94	243.1	<b>Am</b> Americium 95	247.1	<b>Cm</b> Curium 96	247.1	<b>Bk</b> Berkelium 97	252.1	<b>Cf</b> Californium 98	(252)	<b>Es</b> Einsteinium 99	(257)	<b>Fm</b> Fermium 100	(258)	<b>Md</b> Mendelevium 101	(259)	<b>No</b> Nobelium 102	(260)	<b>Lr</b> Lawrencium 103

\* 58 – 71 Lanthanides

† 90 – 103 Actinides

Gas constant  $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$

**Table 1**  
Proton n.m.r chemical shift data

Type of proton	$\delta/\text{ppm}$
$\text{RCH}_3$	0.7–1.2
$\text{R}_2\text{CH}_2$	1.2–1.4
$\text{R}_3\text{CH}$	1.4–1.6
$\text{RCOCH}_3$	2.1–2.6
$\text{ROCH}_3$	3.1–3.9
$\text{RCOOCH}_3$	3.7–4.1
$\text{ROH}$	0.5–5.0

**Table 2**  
Infra-red absorption data

Bond	Wavenumber/ $\text{cm}^{-1}$
$\text{C—H}$	2850–3300
$\text{C—C}$	750–1100
$\text{C=C}$	1620–1680
$\text{C=O}$	1680–1750
$\text{C—O}$	1000–1300
$\text{O—H}$ (alcohols)	3230–3550
$\text{O—H}$ (acids)	2500–3000

### Multiple choice questions

Each of Questions 1 to 21 consists of a question or an incomplete statement followed by four suggested answers or completions. You are asked to select the most appropriate answer in each case.

1 Which one of the following is the electron arrangement of the strongest reducing agent?

- A  $1s^2 2s^2 2p^5$   
 B  $1s^2 2s^2 2p^6 3s^2$   
 C  $1s^2 2s^2 2p^6 3s^2 3p^5$   
 D  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

2 The table below shows data for the four hydrocarbons ethyne, propyne, propene and propane.  $\Delta H_c^\ominus$  is the standard enthalpy of combustion of these hydrocarbons.

Compound	Name	$M_r$	$-\Delta H_c^\ominus/\text{kJ mol}^{-1}$
HC≡CH	ethyne	26	1300
HC≡CCH <sub>3</sub>	propyne	40	1940
H <sub>2</sub> C=CHCH <sub>3</sub>	propene	42	2060
CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	propane	44	2220

The complete combustion of 2.0 g of one of the above hydrocarbons releases exactly 100 kJ of heat energy.

This hydrocarbon is

- A ethyne  
 B propyne  
 C propene  
 D propane

3 Which one of the equations below represents a reaction that is feasible at all temperatures?

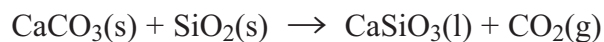
- A  $\text{P(s)} \rightarrow \text{Q(s)} + \text{R(g)}$                       endothermic  
 B  $2\text{L(g)} + \text{M(g)} \rightarrow 2\text{N(g)}$                       exothermic  
 C  $\text{S(g)} \rightarrow 2\text{T(g)}$                                       exothermic  
 D  $\text{A(g)} + \text{B(g)} \rightarrow \text{C(g)}$                               endothermic

Turn over ►

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**Questions 4 to 6**

The removal of silicon dioxide with limestone in the Blast Furnace can be represented by the following equation.



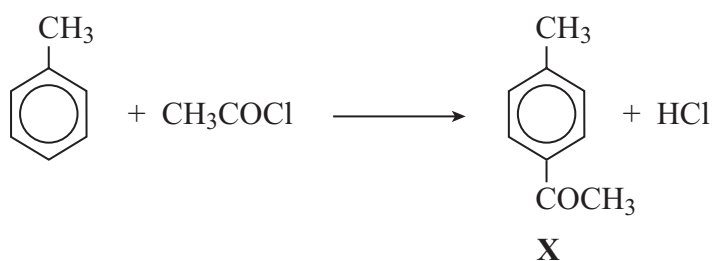
- 4 Which one of the following statements is **not** correct?
- A There is an increase in entropy during this reaction.
  - B The calcium silicate formed floats on the surface of the molten iron.
  - C The calcium silicate formed can be used in the construction industry.
  - D Silicon dioxide is a basic oxide.
- 5 The minimum mass of calcium carbonate needed to remove 1.00 tonne (1000 kg) of silicon dioxide is
- A 0.46 tonne
  - B 0.60 tonne
  - C 1.67 tonne
  - D 2.18 tonne
- 6 The volume of carbon dioxide, measured at 298 K and  $1.01 \times 10^5$  Pa, formed in this reaction during the removal of 1.00 tonne (1000 kg) of silicon dioxide is
- A 24.5 dm<sup>3</sup>
  - B 408 dm<sup>3</sup>
  - C 24.5 m<sup>3</sup>
  - D 408 m<sup>3</sup>

- 7 In which one of the following species is the shape influenced by the presence of one or more lone pairs of electrons?
- A  $\text{NH}_2^-$
- B  $\text{NH}_4^+$
- C  $[\text{CH}_3\text{NH}_3]^+$
- D  $[\text{Co}(\text{NH}_3)_6]^{2+}$
- 8 Which one of the following statements is **not** correct?
- A In the production of steel, sulphur impurities are removed by reaction with magnesium.
- B The equation  $\text{VO}_3^- + 2\text{H}^+ \rightarrow \text{VO}_2^+ + \text{H}_2\text{O}$  represents a redox reaction.
- C If an aqueous solution of chlorine is added to aqueous potassium iodide, iodine is formed.
- D The first ionisation energy of sulphur is lower than that of phosphorus because there is repulsion between paired electrons in the 3p sub-level.
- 9 Which one of the following statements is **not** correct?
- A The atomic radii of Period 3 elements decrease from sodium to chlorine.
- B The hydroxides of Group II metals increase in solubility as the group is descended.
- C In water, aluminium chloride is hydrolysed more than magnesium chloride.
- D  $\text{SiO}_2$  has a higher melting point than  $\text{P}_4\text{O}_{10}$  because of stronger van der Waals' forces.
- 10 Which one of the following is **not** a redox reaction?
- A  $\text{Br}_2 + \text{SO}_2 + 2\text{H}_2\text{O} \rightarrow \text{SO}_4^{2-} + 4\text{H}^+ + 2\text{Br}^-$
- B  $\text{SnCl}_2 + \text{HgCl}_2 \rightarrow \text{Hg} + \text{SnCl}_4$
- C  $\text{Cu}_2\text{O} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{Cu} + \text{H}_2\text{O}$
- D  $2\text{CrO}_4^{2-} + 2\text{H}^+ \rightarrow \text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{O}$

- 11 Which one of the following reactions in aqueous solution has the most positive change in entropy?
- A  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+} + 4\text{NH}_3 \rightarrow [\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+} + 4\text{H}_2\text{O}$
- B  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+} + 4\text{Cl}^- \rightarrow [\text{CuCl}_4]^{2-} + 6\text{H}_2\text{O}$
- C  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+} + \text{EDTA}^{4-} \rightarrow [\text{Cu}(\text{EDTA})]^{2-} + 6\text{H}_2\text{O}$
- D  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+} + 2\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2 \rightarrow [\text{Cu}(\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2)_2(\text{H}_2\text{O})_2]^{2+} + 4\text{H}_2\text{O}$
- 12 The standard enthalpy of formation,  $\Delta H_f^\ominus$  for  $\text{O}_3(\text{g})$  is  $+142 \text{ kJ mol}^{-1}$ . In which one of the following would both the changes shown increase the amount of  $\text{O}_2$  gas in an equilibrium mixture containing only  $\text{O}_2(\text{g})$  and  $\text{O}_3(\text{g})$ ?
- A increasing the temperature and increasing the pressure
- B increasing the temperature and decreasing the pressure
- C decreasing the temperature and increasing the pressure
- D decreasing the temperature and decreasing the pressure
- 13 Which one of the following processes is carried out for environmental reasons only?
- A the fermentation of glucose
- B the recycling of aluminium
- C the catalytic reduction of nitrogen monoxide
- D the combustion of methane
- 14 In which one of the following reactions is a heterogeneous catalyst **not** used?
- A  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
- B  $\text{CO} + \text{NO} \rightarrow \text{CO}_2 + \frac{1}{2}\text{N}_2$
- C  $\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$
- D  $\text{SO}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{SO}_3$



- 15 Which one of the following can exhibit both geometrical and optical isomerism?
- A  $(\text{CH}_3)_2\text{C}=\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- B  $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- C  $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_2\text{CH}_3)_2$
- D  $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{C}=\text{CH}_2$
- 16 How many different alkenes are formed when 2-bromo-3-methylbutane reacts with ethanolic potassium hydroxide?
- A 2
- B 3
- C 4
- D 5
- 17 Ethanoyl chloride reacts with methylbenzene forming compound X according to the equation below.



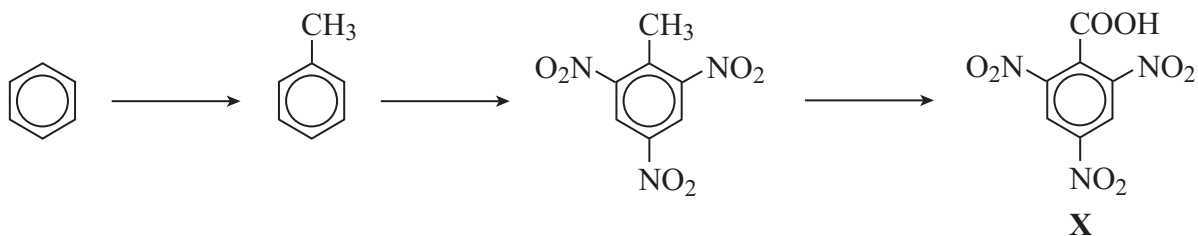
If the experimental yield is 40.0%, the mass in grams of X ( $M_r = 134.0$ ) formed from 18.4 g of methylbenzene ( $M_r = 92.0$ ) is

- A 26.8
- B 16.1
- C 10.7
- D 7.4

- 18** Which one of the following statements explains best why fluoroalkanes are the least reactive haloalkanes?
- A** Fluorine is much more electronegative than carbon.
  - B** The  $F^-$  ion is the most stable halide ion.
  - C** The C–F bond is the most polar carbon–halogen bond.
  - D** The C–F bond is the strongest carbon–halogen bond.
- 19** Which one of the following pairs of reagents reacts to form an organic product that shows only 2 peaks in its proton n.m.r. spectrum?
- A** butan-2-ol and acidified potassium dichromate(VI)
  - B** ethanoyl chloride and methanol
  - C** propanoic acid and ethanol in the presence of concentrated sulphuric acid
  - D** ethene and hydrogen in the presence of nickel

**Questions 20 and 21**

Questions 20 and 21 are based on the reactions and compounds shown in the scheme below.



- 20** Which one of the following types of reaction is **not** shown in the reaction scheme?
- A** reduction
  - B** oxidation
  - C** alkylation
  - D** nitration
- 21** A  $0.100 \text{ mol dm}^{-3}$  solution of **X** is found to have a pH of 2.50. The value of  $K_a$  in  $\text{mol dm}^{-3}$  is
- A**  $3.16 \times 10^{-2}$
  - B**  $3.16 \times 10^{-3}$
  - C**  $1.00 \times 10^{-4}$
  - D**  $1.00 \times 10^{-5}$

**Multiple completion questions**

For each of Questions 22 to 40, **one or more** of the options given may be correct. Select your answer by means of the following code.

**A** if 1, 2 and 3 only are correct.

**B** if 1 and 3 only are correct.

**C** if 2 and 4 only are correct.

**D** if 4 only is correct.

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

- 22 The value of the standard enthalpy of formation,  $\Delta H_f^\ominus$ , for nitrogen monoxide, NO(g), is +90 kJ mol<sup>-1</sup>.

Which of the following changes would favour the formation of nitrogen monoxide gas in an equilibrium mixture containing nitrogen monoxide, nitrogen and oxygen?

- 1 increasing the temperature
- 2 decreasing the pressure
- 3 adding nitrogen gas to the mixture
- 4 adding a catalyst to the mixture

- 23 Molecules with a permanent dipole include

- 1 NH<sub>3</sub>
- 2 PCl<sub>3</sub>
- 3 SCl<sub>2</sub>
- 4 SiCl<sub>4</sub>

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

- 24 The following information concerns the gas-phase reaction of nitrogen monoxide with hydrogen.



A series of experiments was carried out in a reaction vessel at constant temperature. The initial rate of reaction increased by a factor of 2 when the initial pressure of NO was doubled and that of H<sub>2</sub> was halved.

When both pressures were halved, the initial rate decreased by a factor of 8.

Correct statements include

- 1 the overall order of reaction is 2.
  - 2 the reaction is first order with respect to hydrogen.
  - 3 the reaction is first order with respect to nitrogen monoxide.
  - 4 the overall order of reaction is 3.
- 25 Molecules or ions that contain an element with an oxidation state of +5 include
- 1 H<sub>2</sub>SO<sub>3</sub>
  - 2 NO<sub>2</sub><sup>+</sup>
  - 3 [Cr(H<sub>2</sub>O)<sub>4</sub>Cl<sub>2</sub>]<sup>+</sup>
  - 4 ClO<sub>3</sub><sup>-</sup>

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

26 The e.m.f. of the cell  $\text{Zn(s)}|\text{Zn}^{2+}(\text{aq})||\text{Cu}^{2+}(\text{aq})|\text{Cu(s)}$ , is +1.10 V

When the cell is in operation, correct statements include

- 1 oxidation occurs at the copper electrode.
- 2 electrons pass from copper to zinc.
- 3 the concentration of  $\text{Zn}^{2+}$  ions decreases.
- 4 the e.m.f. of the cell decreases.

27 Correct statements include

- 1 in the production of titanium, titanium(IV) oxide is reduced by carbon at a high temperature.
- 2 in the reduction of iron(III) oxide using carbon, there is a greater positive entropy change than in the reduction using carbon monoxide.
- 3 the melting point of barium is higher than that of calcium.
- 4 silicon(IV) chloride reacts with water to form a strongly acidic solution.

28 Lewis bases include

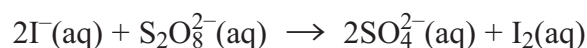
- 1  $\text{H}_2\text{O}$
- 2  $\text{NH}_4^+$
- 3  $\text{Cl}^-$
- 4  $\text{C}_2\text{H}_6$

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

29 Correct statements about sulphuric acid include

- 1 concentrated sulphuric acid can be reduced to hydrogen sulphide by iodide ions.
- 2 1.713 g of barium hydroxide is neutralised exactly by 100 cm<sup>3</sup> of 0.100 mol dm<sup>-3</sup> sulphuric acid.
- 3 in sulphuric acid, the oxidation state of sulphur is +6.
- 4 the pH of 0.0200 mol dm<sup>-3</sup> sulphuric acid is 1.70.

30 Consider the following reaction,



Ions which could catalyse this reaction include

- 1 Fe<sup>2+</sup>(aq)
- 2 Zn<sup>2+</sup>(aq)
- 3 Fe<sup>3+</sup>(aq)
- 4 Al<sup>3+</sup>(aq)

31 Correct statements about silver and its compounds include

- 1 silver bromide is insoluble in concentrated aqueous ammonia.
- 2 a silver-based catalyst is used in the oxidation of ethene to epoxyethane.
- 3 [Ag(NH<sub>3</sub>)<sub>2</sub>]<sup>+</sup>(aq) is reduced to silver by propanone.
- 4 silver bromide dissolves in aqueous sodium thiosulphate to form a linear complex ion.

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

32 The hydrolysis of a metal-aqua ion can be described by the general equation



In this reaction

- 1 the solvent  $\text{H}_2\text{O}$  is acting as a base by accepting a proton.
- 2 the pH of the solution will be lower if the value of  $n$  is 2 rather than 3.
- 3 the equilibrium position lies more to the right if the value of  $n$  is 3 rather than 2.
- 4 the oxidation state of the central metal cation has decreased from  $n$  to  $n-1$ .

33 Aqueous reagents that leave a precipitate after an excess has been added to separate samples of aqueous copper(II) sulphate include

- 1  $\text{NH}_3$
- 2  $\text{Na}_2\text{CO}_3$
- 3  $\text{HCl}$
- 4  $\text{NaOH}$

34 Reactions which involve a free-radical intermediate include

- 1 the nitration of benzene.
- 2 the acylation of methylamine with ethanoyl chloride.
- 3 the reduction of butanal with  $\text{NaBH}_4$
- 4 the thermal cracking of octane.



Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

- 35 Correct statements about ammonia, methylamine and phenylamine include
- 1 the order of base strength is phenylamine < methylamine < ammonia.
  - 2 they all form amides with ethanoyl chloride.
  - 3 they all form acidic buffers with a suitable amount of hydrochloric acid.
  - 4 they all can act as nucleophiles and ligands using the lone pair on the nitrogen atom.

- 36 Compound X,  $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_2\text{OH}$ , is found in freshly cut grass.

Correct statements about X include

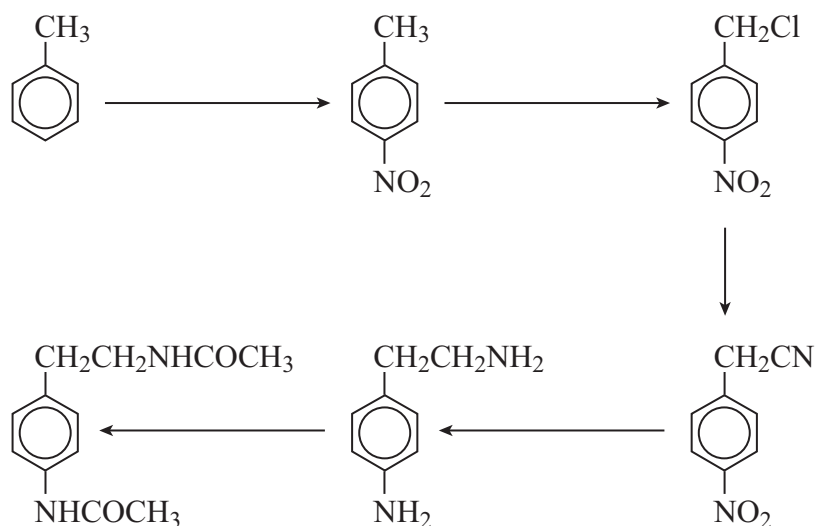
- 1 it has the systematic name hex-4-en-1-ol.
- 2 it has the empirical formula  $\text{C}_3\text{H}_6\text{O}$
- 3 it has optical isomers.
- 4 it has geometrical isomers.

**Turn over for the next question**

**Turn over** 

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

37 Refer to the following reaction scheme.



Types of reaction involved in this scheme include

- 1 chlorination.
- 2 oxidation.
- 3 acylation.
- 4 alkylation.

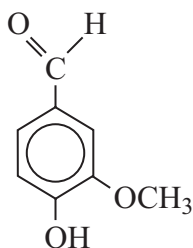
38 Amine **X**,  $\text{H}_2\text{N}(\text{CH}_2)_5\text{NH}_2$ , and acid **Y**,  $\text{HOOC}(\text{CH}_2)_3\text{COOH}$ , react to form polymer **Z**.

Correct statements include

- 1 polymer **Z** has a repeating unit with empirical formula  $\text{C}_5\text{H}_9\text{NO}$
- 2 acid **Y** has the systematic name dibutanoic acid.
- 3 amine **X** has the systematic name pentane-1,5-diamine.
- 4 polymer **Z** is an addition polymer.

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

39 Vanillin (artificial vanilla flavouring) has the following structure.



Correct statements about vanillin include

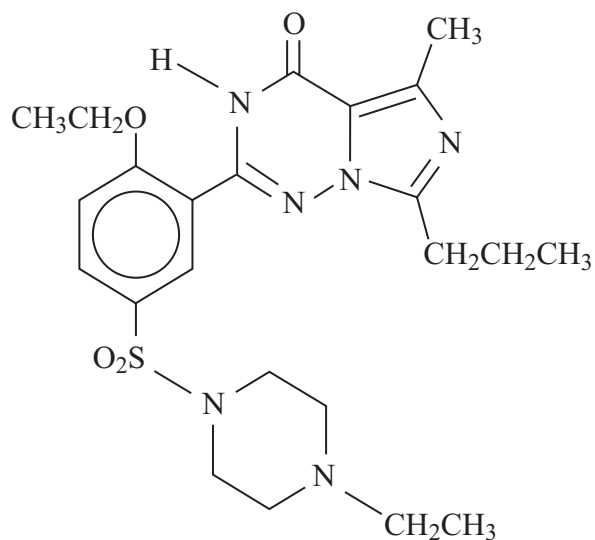
- 1 it contains an ester functional group.
- 2 it will produce a silver precipitate with Tollens' reagent.
- 3 it will undergo nucleophilic substitution.
- 4 it is able to undergo hydrogen bonding.

**Turn over for the next question**

**Turn over** ►

Directions summarised			
A	B	C	D
1, 2 and 3 only correct	1 and 3 only correct	2 and 4 only correct	4 only correct

40 Levitra, an alternative to Viagra, has the following structure.



Correct statements about Levitra include

- 1 it reacts with dilute hydrochloric acid.
- 2 it exhibits geometrical isomerism.
- 3 it can be nitrated.
- 4 it can undergo condensation polymerisation.

**END OF QUESTIONS**