**1** Compound **X** is an anhydrous, white solid which decomposes on heating to form a white solid residue, a colourless gas, and a colourless vapour which condenses to a colourless liquid.

Compound **X** is

☒ **A** sodium carbonate.

☒ **B** sodium hydrogencarbonate.

☒ **C** sodium nitrate.

☒ **D** sodium sulfate.

**(Total for Question 9 = mark)**

**2** When a flame test is carried out on calcium iodide, the colour of the flame is

☒ **A** yellow-red.

☒ **B** pale green.

☒ **C** purple.

☒ **D** crimson.

**(Total for Question 8 = mark)**

**3** What would be the experimental observations if chlorine gas was bubbled through potassium iodide solution, followed by the addition of cyclohexane?

☒ **A** The solution turns brown, then two layers are produced and the top layer is purple.

☒ **B** A white precipitate is formed, which then dissolves to leave a colourless solution.

☒ **C** Bubbles of gas are seen and then a brown precipitate is formed.

☒ **D** The solution remains colourless, and then two layers are seen with the bottom layer being brown.

**(Total for Question 20 = mark)**

**4** The colour observed in a flame test is due to

☒ **A** electrons jumping to a higher energy level, absorbing energy.

☒ **B** electrons jumping to a higher energy level, emitting energy.

☒ **C** electrons dropping from a higher energy level, absorbing energy.

☒ **D** electrons dropping from a higher energy level, emitting energy.

**(Total for Question 3 mark)**

**5** The best way to confirm the presence of **iodine** in an aqueous solution is

☒ **A** adding hexane to form a purple layer.

☒ **B** adding hexane to form an orange layer.

☒ **C** adding acidified silver nitrate solution to form a yellow precipitate which is soluble in concentrated ammonia.

☒ **D** adding acidified silver nitrate solution to form a yellow precipitate which is insoluble in concentrated ammonia.

**(Total for Question 4 mark)**

**6** Which silver halide is a cream coloured solid which darkens in sunlight and dissolves in concentrated ammonia solution?

☒ **A** AgF

☒ **B** AgCl

☒ **C** AgBr

☒ **D** AgI

**(Total for Question 3 mark)**

**7** Compound **X** is a white solid. On heating this compound, a colourless, acidic gas is the only gaseous product. A flame test is carried out on the solid residue and a reddish flame is observed.

Compound **X** is

☒ **A** calcium nitrate.

☒ **B** calcium carbonate.

☒ **C** magnesium carbonate.

☒ **D** strontium nitrate.

**(Total for Question 5 = mark)**

**8** What colour precipitate would you expect to see if 1-bromopropane was heated with a solution of silver nitrate?

☒ **A** Orange

☒ **B** White

☒ **C** Yellow

☒ **D** Cream

**(Total for Question 4 = mark)**

**9** What would be the colour of the solution when iodine is dissolved in a hydrocarbon solvent?

☒ **A** Grey

☒ **B** Brown

☒ **C** Yellow

☒ **D** Purple

**(Total for Question 14 = mark)**

**10** Starch is often used as an indicator in titrations between sodium thiosulfate and iodine solutions. What colour change would you see at the end-point as sodium thiosulfate is added to iodine solution in the presence of starch?

☒ **A** Yellow to colourless

☒ **B** Colourless to yellow

☒ **C** Blue-black to colourless

☒ **D** Colourless to blue-black

**(Total for Question 15 = mark)**

**11** A solid gives a red colour in a flame test and reacts with concentrated sulfuric acid to produce steamy fumes, but no other gases. The solid could be

☒ **A** lithium bromide.

☒ **B** strontium chloride.

☒ **C** calcium bromide.

☒ **D** sodium chloride.

**(Total for Question 8 = mark)**

**12** What colour is the vapour which forms when concentrated sulfuric acid is added to solid potassium iodide?

☒ **A** Green

☒ **B** Orange

☒ **C** Brown

☒ **D** Purple

**(Total for Question 11 = mark)**

**13** Most compounds of lead are insoluble, an exception being lead(II) nitrate. Therefore a good method of preparing lead(II) sulfate is

☒ **A** adding dilute sulfuric acid to lead metal.

☒ **B** adding concentrated sulfuric acid to lead metal.

☒ **C** adding dilute sulfuric acid to lead(II) nitrate solution.

☒ **D** adding dilute sulfuric acid to solid lead(II) oxide.

**(Total for Question 11 mark)**

**14** Which concentrated acid would be best for mixing with a salt to carry out a flame test?

☒ **A** Hydrochloric acid

☒ **B** Nitric acid

☒ **C** Phosphoric(V) acid

☒ **D** Sulfuric acid

**(Total for Question 3 mark)**

**15** The flame produced by a compound containing barium in a flame test is

☒ **A** colourless.

☒ **B** green.

☒ **C** red.

☒ **D** yellow.

**(Total for Question 4 mark)**

**16** A drop of concentrated nickel(II) sulfate solution, which is green, is placed on moist filter paper on a microscope slide and the ends of the slide are connected to a 24 V DC power supply. After ten minutes,

☒ **A** a blue colour has moved towards the negative terminal and a yellow colour towards the positive terminal.

☒ **B** a blue colour has moved towards the positive terminal and a yellow colour towards the negative terminal.

☒ **C** a green colour has moved towards the negative terminal but there is no other visible change.

☒ **D** a green colour has moved towards the positive terminal but there is no other visible change.

**(Total for Question 11 = mark)**

**17** Chlorides of Group 1 elements produce coloured flames when

☒ **A** electrons become excited to a higher energy level.

☒ **B** excited electrons move from a higher to a lower energy level.

☒ **C** an outer electron leaves the atom.

☒ **D** electrons move between the negative and positive ions.

**(Total for Question 8 = mark)**

**18** This question is about the following compounds.

**A** Barium carbonate

**B** Lithium nitrate

**C** Potassium bromide

**D** Potassium nitrate

(a) Which compound gives a green colour in a flame test?

**(1)**

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(b) Which compound gives a lilac colour in a flame test and does **not** decompose on heating?

**(1)**

☒ **A**

☒ **B**

☒ **C**

☒ **D**

**(Total for Question 9 = marks)**