Student Name ....Student Number .....Section .....

Time allowed: 2 hours

Section A: Multiple Choice. Answer <u>all</u> questions. [1 mark each]

For each question, select the best answer and shade the letter corresponding to this answer on the answer sheet provided.

1). The thermal decomposition of copper (II) nitrate to form copper(II) oxide is best described as

A a physical change.

B a chemical change.

C a physical property.

D a chemical property.

E a compound.

2). Aqueous solutions

A are always colorless.

B are heterogeneous mixtures.

C are cloudy in appearance.

D are always compounds.

E always contain water.

3). The melting point of a solid can be used

A only to identify the solid

B only to check purity of the solid.

C only to turn the solid into a liquid.

D both to check the purity of the solid and to identify the solid.

E to convert the solid into another substance.

4). Three solid samples X, Y and Z all melted at 132^0C. A mixture of X and Z melted at between 120^0C and 126^0C. A mixture of X and Y melted at 132^0C. Which statement is true?

A X, Y and Z are samples of the same substance.

B Y and Z are sample of the same substance.

C X and Z are samples of the same substance.

D X, Y and Z are samples of three different substances.

E X and Y are samples of the same substance.

Student Name ....Student Number .....Section .....

5). Which is the best description of a compound?

A The chemical combination of two or more elements.

B A substance formed by the chemical combination of two or more elements.

C A substance formed by mixing two or more elements.

D The physical combination of two or more elements.

E A substance formed by the physical combination of two or more elements.

6). Which statement about a pure compound is **false**?

A It has a fixed set of physical properties.

B It has a fixed set of chemicals properties.

C Its component elements are present in a fixed proportion by mass.

D It can be separated into component elements by distillation.

E It can be separated into its components by chemical means.

7). Which statement about the element potassium is **false**?

A Its chemical symbol is K.

B Its atomic number is 19.

C Its compounds are ionic.

D Its electronic configuration is 2,8,8,1.

E It has 19 neutrons in the nucleus of each atom.

8). According to the kinetic theory of matter, the temperature of a gas is a measure of

A the average distance between the gas molecules.

B the average forces of attraction between the molecules.

C the average kinetic energy of the gas molecules.

D the average mass of the gas molecules.

E the average size of the gas molecules.

9). When the temperature of a liquid is increased

A the particles move more rapidly.

B the forces between particles increase.

C the liquid evaporates more slowly.

D the average kinetic energy of the particles decreases.

E the particles get bigger.

Student Name ....Student Number .....Section .....

10). A thermometer is placed in a beaker in which an endothermic reaction is occurring .The reading on the thermometer is expected to

A fall.

B rise.

C remain the same.

D rise or fall depending on the particular reaction considered.

E fall first and then rise later.

11). The elements are arranged in the Periodic Table in order of increasing

A isotope number

B mass number.

C atomic number.

D valency.

E number of neutrons.

12). The number of electrons in the outer shell of the atoms of the noble gases is generally

A 1

B 4

C 6

D 8

E 18

13). An atom becomes an ion by

A losing or gaining electrons.

B losing or gaining protons.

C losing or gaining neutrons.

D sharing electrons.

E joining with another atom.

14). The element Y combines with oxygen to form a compound is Y_2O_3 . To which group of the Periodic Table does Y belong?

A 1

B 2

C 3

D 4

E 6

Student Name ....Student Number .....Section .....

15). An element, X, has a relative atomic mass of 25 and an atomic number of 12. Which of the following statements is true?

A X is in group 2 of the periodic table.

B X is in period 2 of the periodic table.

C An atom of X has 13 protons.

D An atom of X has 12 neutrons.

E An atom of X has 25 protons.

16). What type of bonding occurs between magnesium and chlorine in magnesium chloride?

A Ionic

B Covalent

C Metallic

D Weak

E Non-metallic

17). The pH of a solution of ethanoic acid is most likely to be in the range of:

A 1-2

B 3-4

C 7-8

D 9-11

E 11-14

18). Which salt can be prepared by precipitation from a mixture of soluble substances?

A Sodium chloride.

B Calcium nitrate.

C Potassium sulphate

D Zinc carbonate

E Sodium nitrate

19). Which of the following is an acid salt?

A Potassium sulphate

B Copper (11) nitrate

C Sodium hydrogen sulphate

D Lead(11) chloride

E Carbonic acid

Student Name ....Student Number .....Section .....

20). Sulphuric acid is described as a **strong** acid because

A each molecule can give up two protons.

B sulphuric acid always exists in highly concentrated solutions.

C sulphuric acid is an amphoteric substance.

D sulphuric acid reacts completely with hydrogen ions.

E sulphuric acid is completely dissociated when dissolved in water.

21) Water boils at 100 ^{0}C whereas ethanol boils at 78.4 ^{0}C. It follows that

A water is more volatile than ethanol.

B water has a higher saturated vapour pressure than ethanol at 25 ^{0}C.

C water has stronger intermolecular forces of attraction than ethanol.

D water is a liquid at room temperature whereas ethanol is a gas.

E water boils off first when a mixture of the two is heated.

22) The conditions of standard temperature and pressure as applied to gases are

A 760 atm and 273^{0}C.

B 1 atm and 0 K.

C 1 atm and 273^{0}C.

D 760 mm Hg and 273 ^{0}C.

E 1 atm and 273 K.

23) The atomic number of an element is determined by

A The number of neutrons in one atom of the element.

B The number of protons in one atom of the element.

C The valency of the element.

D The number of nucleons in one atom of the element.

E The size of an atom of the element.

24) An atom becomes a cation by

A gaining electrons.

B losing electrons.

C sharing electrons.

D losing protons.

E gaining protons.

Student Name ....Student Number .....Section .....

25) The molecular formula for the compound benzene is C_6H_6. Which statement is **not** true?

A Benzene is an ionic compound.

B The empirical formula for benzene is CH.

C Each molecule of benzene contains 6 carbon atoms and 6 hydrogen atoms.

D The relative molecular mass of benzene is 78.

E Benzene is insoluble in water.

26) The correct name for the compound CuO is

A copper (I) oxide.

B copper oxide.

C copper(II) oxide.

D copper oxygen.

E copper(III) oxide.

27) Two isotopes of an element have

A the same physical properties.

B the same chemical properties.

C different physical and chemical properties.

D the same physical and chemical properties.

E different electronic configurations.

28) How does a mixture of iron and sulphur differ from a compound of iron and sulphur?

A In the mixture the iron and sulphur are in physical contact whereas in the compound they are chemically combined.

B In the mixture, the iron and sulphur can be present in any proportion by mass, whereas in the compound they are present in a fixed proportion by mass.

C Iron and sulphur retain their individual properties in the mixture, whereas the compound has different properties from iron and sulphur.

D All of the above are correct.

E None of the above is correct.

29) Nitrogen has two naturally occurring isotopes with mass numbers 14 and 15. The relative atomic mass of nitrogen must therefore be

A Exactly 14.

B Exactly 15.

C Greater than 15.

D Lower than 14.

E Between 14 and 15.

Student Name ....Student Number .....Section .....

30) The formula P_4 represents

A an element.

B a compound.

C a mixture.

D a solution.

E a metal

<u>Section B:</u> Answer <u>all</u> questions in the spaces provided on the question paper.

1). Complete the passage below with suitable words or phrases. [11 marks]

An acid may be described as a substance which releases_____ ions when dissolved in water. A base may be described as a substance which _____hydrogen ions when dissolved in water. When an acid reacts with a basic oxide or hydroxide a process called _____ occurs. This results in the formation of an ionic compound called a _____, together with water. Some salts such as_____ are soluble in water. Other salts such as _____ are insoluble in water. When a soluble salt dissolves in water a _____ is formed . In this case the salt is called the _____ and water is the _____.

Typical reactions of acids include their reaction with reactive metals. For example, when hydrochloric acid reacts with _____, the salt zinc chloride and the gas _____ are formed.

2) Complete the passage below with suitable words or phrases. [10marks]

The kinetic molecular theory attempts to explain the states of _____ and the _____ of state. It does so by postulating that the particles of which a substance is composed are in a state of continual motion. Evidence for this includes Brownian motion and the phenomenon of _____. As a solid substance is _____ the motion of the molecules gets more vigorous. As a direct result their kinetic _____ increases and they undergo collisions with each other more frequently and more violently. This makes the molecules push each other apart and the substance is seen to

Student Name ....Student Number .....Section .....

_____. The increasing distance between molecules weakens the forces of attraction between them. At a certain _____, known as the melting point, the forces of attraction become so weak that they can no longer hold the regular arrangement of molecules, known as the _____, together. Molecules break free and are able to _____ past one another, though still being held in contact with one another. Now the substance has become a(n) _____ and can flow.

3). Fill in the blanks in the table below. [8 marks]

Name of compound	**Formula of compound**
Aluminium oxide	
Sulphuric acid	
Copper(11) nitrate	
	HNO_3
	CCl_4
	Na_2S
	$Fe(OH)_2$

4. Balance the equations given below. [3 marks]

a) $Mg + HCl \rightarrow MgCl_2 + H_2$

b) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

c) $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$

5). a) State Boyle's Law. [2 marks]

b) State Charles' Law [2 marks]

Student Name ....Student Number .....Section .....

c) A sample of nitrogen gas, in a container of volume of 30 cm^3 exerted a pressure of 1 atmosphere when kept in a refrigerator at 3° C. The nitrogen gas was transferred to a larger container and its temperature was allowed to reach room temperature of 25°C. The pressure of the nitrogen is now 0.8 atmosphere. Calculate the volume of the larger container. [4 marks]

6). Draw a fully labeled diagram to represent the particle $^{5}Li^{+}$. Your diagram should show all the sub-atomic particles present, as well as the electronic configuration.

[2.5 marks]

7). Sodium chloride and carbon tetrachloride are two compounds containing the element chlorine.

a) State the nature of the bonding in each. [2 marks]

Sodium chloride _____

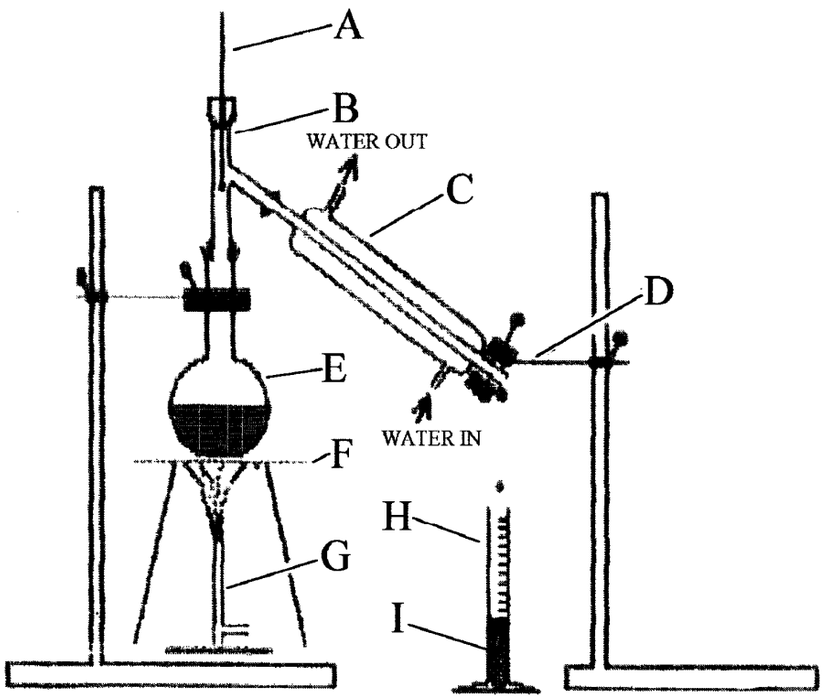
Carbon tetrachloride _____

b) Explain why sodium chloride is a solid with a high melting point whereas carbon tetrachloride is a liquid at room temperature and pressure.

[3 marks]

Student Name ....Student Number .....Section .....

8). The diagram shows the apparatus used for the separation of a mixture of methanol and water.



a) Name the features labeled A to I. [4.5 marks]

A ..... F .....

B ..... G .....

C ..... H .....

D ..... I .....

E .....

b) What is the name of the technique used for this separation? [1 mark].

c) The separation is based on a difference in which physical property? [1 mark]

d)
Name the change of state which occurs in

i) E

ii) C [2 marks]

END OF EXAMINATION.