EXAM PRACTICE

READING TASKS

1. Terms: Put the following words in the gaps. There are three of them that will not be needed.

core	*vary*	*molecular*	*contribute*	*subatomic*	*nucleus*	*moving*
	remaining	*element*	*charge*	*particle*		

Atoms

An atom is defined as the smallest _____[1] of an element.
The number of protons in the _____[2] of an atom is equal to the atomic number of that element. This number determines the kind of atom, that is, the identity of the _____[3].
For example, an atom with 26 protons (one whose atomic number is 26) is an atom of iron.
There are three fundamental _____[4] particles: a proton, a neutron, and an electron.
Protons and neutrons are in the nucleus at the very centre of atom. The electrons are scattered through the _____[5] space of the atom.
The proton and neutron have almost the same mass, 1 amu each. The proton has an opposite _____[6] to that of an electron. This charge on proton is written as 1+. The electron has a charge of 1-. The electrons _____[7] little to the total mass of the atom, the mass of the electrons is usually disregarded.
The number of neutrons in the nuclei of atoms of a given element may _____[8]. Atoms that have the same number of protons but different numbers of neutrons are called isotopes.

2. Logical connections: Put the missing phrases back in the text.

Hydrogen bonding

A special intermolecular force called hydrogen bonding acts between molecules in which a hydrogen atom 1_____ with nonbonding electron pairs. The electronegative atom may be fluorine, oxygen, or nitrogen. The hydrogen bond 2_____ with a partial positive charge on one molecule and an electronegative atom (F, O, or N) of another molecule that has a partial negative charge and one or more unshared electron pairs. The greater the electron attraction of the atom connected to H, 3_____ on the H, hence, the stronger the hydrogen bond is between it and a partially negative atom on another molecule. Hydrogen bonds are typically shown as dotted lines between atoms.

$$\overset{\delta+\ \ \delta-}{H-F}\ \underset{\text{hydrogen bond}}{\ldots.}\ \overset{\delta+\ \ \delta-}{H-F}\ \underset{\text{covalent bond}}{\ldots.}\ \overset{\delta+\ \ \delta-}{H-F}$$

Water provides the most common example of hydrogen bonding. Hydrogen compounds of oxygen's neighbors and family members in the periodic table 4_____. However, water is a liquid at room temperature, and this indicates a strong 5_____. Apparently, the boiling point of water is about 200ºC 6_____ if hydrogen bonding were not present.

A *the greater the partial positive charge*

B *degree of intermolecular attraction*

C *is the attraction between such a hydrogen atom*

D *is covalently bonded to a strongly electronegative atom*

E *higher than would be predicted*

F *are all gases at room temperature*

3. Synonyms: Identify words which have the following meaning. The order is the same as they appear in the text.

THE METHOD OF TITRATION

A technique called titration is often used to determine the amount of acid or base present in a sample. Assume the unknown is an acid. The unknown (usually in aqueous solution) is placed in a container. Then a solution of base of known concentration (called a *standard base*) is added dropwise from a buret. (A buret is a piece of laboratory glassware designed to deliver known amounts of liquid into another container. See fig. 8.2).

As it is added, the base neutralizes the acid. Finally, one additional drop of base neutralizes the last bit of acid with a little bit of base left over. The addition of this last drop of base, therefore, causes the solution suddenly to swing from acidic to basic. How can one tell when this change occurs? One way is to use a dye, called an indicator, whose color depends on the acidity of a solution. Litmus is such a dye, and a compound called phenolphthalein is another commonly used indicator (fig. 8.3).

The indicator is added to the solution at the beginning of the titration, and, if everything is done correctly, the color change (endpoint) occurs when the number of equivalents of base present just equals the number of equivalents of acid (the equivalence point). The number of equivalents of base (and the number of equivalence of acid) can be calculated from the amount of base added and the concentration of the base.

1. to think that something is probably true without knowing it
2. the amount of dissolved substance in a given volume of solvent
3. in the form of drops
4. objects, especially containers, made of glass
5. to bring or transport to the proper place
6. a substance used to colour materials (also to colour hair or cloth)
7. something equal in value, force, effect, or significance

4. Logical connections: Complete the text with the phrases below.

Solutions

Solutions may be defined as homogeneous mixtures of two or more components. The component, usually present in greatest amount, that dissolves the other components is termed the solvent. The components that are dissolved by the solvent are called solutes. Solutes may 1 _____ . Vinegar is a solution of acetic acid (a liquid) in water. Champagne and soda pop have a gas (carbon dioxide) dissolved in water. Sugar and salt 2_____ that dissolve in water. Blood plasma is a water solution of solids (e.g., salt), liquids (e.g., alcohol, if you have been drinking), and gases (e.g., oxygen and carbon dioxide). The solvent need not 3 _____ . Air is a solution of oxygen, argon, water vapor, and other gases in nitrogen gas. Steel is a solution of carbon (the solute) in iron (the solvent) – a solid in a solid.

In this chapter we shall deal primarily with aqueous solutions, those in which the solvent is water. Such solutions [4]_____.

Solutions have a number of characteristic properties. The particles of a solution are molecules, atoms, or ions. Once the solute and solvent are thoroughly mixed, the solute does not settle out. Molecular motion [5]_____ . Solute cannot be removed from a true solution by passing the solution through a filter paper. The solute particles go through the pores of the paper as readily as the solvent particles. Liquid solutions may be colored, but they are transparent. A beam of light will [6] _____but will not be visible in the solution. When the path of light through a mixture is visible, then particles larger than those in solution are present.

Table salt is soluble in water. Just what does that mean? Can we dissolve 10 teaspoonfuls or 100 teaspoonfuls of salt in a cup of water? We know from everyday experience that there is a limit to the amount of slat we can [7] _____ . A few substances can be mixed in any proportions to form solutions. Water and alcohol are familiar examples; we say that such substances are completely miscible. At the other extreme of solubility are materials that are essentially insoluble in one another – sand and water, for example. Most substances are like salt and [8] _____ of complete miscibility and insolubility.

The amount of solute that dissolves in a given solvent depends on the nature of the solute and solvent. Temperature and, in the case of gases, pressure also are factors. Solubility usually increases with increasing temperature. Gaseous solutes are major exceptions to this rule since the solubility of a gas [9]_____ . You have probably observed this phenomenon when heating water. Long before the water boils, dissolved gases come out of solution and form bubbles that rise to the surface of the liquid and escape to the atmosphere.

A dissolve in a given volume of water
B are the most important for living systems
C be water or even a liquid
D decreases with increasing temperature
E keeps the particles randomly distributed
F fall somewhere between the two extremes
G be liquid, gas, or solid
H shine right through a true solution
J are examples of solids

5. Terms: Put the following words in the gaps. There are three of them that will not be needed.

disposal	occurring	compounds	variety	elements	monomers
properties	packages	significant	items	dissolving	degradable

Plastics are everywhere. While you're reading this article, there are probably numerous plastic 1_____ within your reach (your computer, your pen, your phone). A plastic is any material that can be shaped or molded into any form - some are naturally 2_____, but most are man-made.

Plastics are made from oil. Oil is a carbon-rich raw material, and plastics are large carbon-containing 3_____. They're large molecules called polymers, which are composed of repeating units of shorter carbon-containing compounds called monomers. Chemists combine various types of 4_____ in many different arrangements to make an almost infinite variety of plastics with different chemical 5_____. Most plastic is chemically inert and will not react chemically with other substances - you can store alcohol, soap, water, acid or gasoline in a plastic container without 6_____ the container itself. Plastic can be molded into an almost endless 7_____ of shapes, so you can find it in toys, cups, bottles, utensils, wiring, cars, even in bubble gum. Plastics have revolutionized the world.

Because plastic doesn't react chemically with most other substances, it doesn't decay. Therefore, plastic disposal poses a difficult and 8_____ environmental problem. Plastic hangs around in the environment for centuries, so recycling is the best method of 9_____ . However, new technologies are being developed to make plastic from biological substances like corn oil. These types of plastics would be biodegradable and better for the environment.

6. Synonyms: Identify words which have the following meaning.

Freshers' Flu is the name commonly given to a battery of illnesses contracted by as many as 90% of new students during the first few weeks at a university, in some form; common symptoms include fever, sore throat, severe headache, coughing and general discomfort.

The most likely cause is the convergence of large numbers of people arriving from all over the world, many of whom carry pathogens to which they are immune, but others have not had a chance to acquire the necessary immunity. The poor diet and heavy consumption of alcohol during Freshers' Week is also reported as a cause for many of the illnesses contracted during this time. Stress, which may be induced by tiredness, combined with a poor diet, late nights and too much alcohol, can weaken the immune system and be a recipe for ill health. All this can make students more susceptible to infections within their first weeks of term. The increased susceptibility to illness from late nights, heavy alcohol consumption and stress peaks 2–4 weeks after arrival at university and happens to coincide with the seasonal surge in the outbreaks of colds and influenza in the Northern Hemisphere.

1 acquired
2 meeting, coming together
3 drinking
4 easily affected
5 happen at the same time

7. Logical connections: Complete the text with the phrases below.

http://www.medicinenet.com/script/main/art.asp?articlekey=13184

A blood bank is a place where blood is collected from donors, typed, separated into components, stored, and prepared for transfusion to recipients. It may be a separate 1_____ or part of a larger laboratory in a hospital.

Typically, each donated unit of blood (whole blood) is 2 _____, such as red blood cells, plasma and platelets. Each component is generally transfused to a different individual, 3_____ .

An increasingly common blood bank procedure is apheresis, or the process of removing a 4_____, such as platelets, and returning the remaining components, such as red blood cells and plasma, to the donor. This process allows more of one particular part of the blood to be collected than could be separated from a 5 _____. Apheresis is also 6_____ (the liquid part of the blood) and granulocytes (white blood cells).

A specific component of the blood
B performed to collect plasma
C free-standing facility
D separated into multiple components
E each with different needs
F unit of whole blood

8. Complete the text with the removed words. Three of them will not be needed.

affect	*increase*	*filtration*	*ethanol*	*esters*	*fructose*	*focus*
yeast	*starch*	*fermentation*	*extracted*	*lowered*		

Wine-making is essentially a chemical process. It involves a chemical reaction in which sugars are turned to alcohol and carbon dioxide in the presence of **1**…….. There are also many other chemical processes going on which **2**…….. the strength, appearance, colour and taste of the wine.

Wine is made from grapes. In addition to water, grapes contain two different sugars: glucose and **3**……., tartaric acid, malic acid, amino acids and a few other chemicals. The chemical processes of wine-making involve several of these components and the amount of each is important in determining the character of the wine produced.

The most important chemical reaction in the wine making process is the breaking down of glucose by yeast, forming **4**…….. and carbon dioxide as gas. There are various important factors at this stage which affect the wine. First, sulphur dioxide gas is passed through the crushed grapes to kill off wild yeasts. If this was not done the yeasts would compete with one another and **5**…….. would stop prematurely.

Next the pH (acidity) of the grape pulp needs to be controlled. If grapes are too sweet, then their pH is too high (acidity too low) then less flavours are produced in the wine. The pH can be **6**…….. by adding tartaric acid at the start of the fermentation process.

Finally the temperature must be controlled throughout the process. Fermentation is an exothermic process, but there are various reasons for keeping the temperature as low as possible. Yeast stops growing as temperatures **7**…….. and will die at higher temperatures. Also at lower temperatures colours and flavours are **8**…….. from the skins and by-products such as **9**…….. and aromatic compounds are produced which add to the flavour and also the clarity of the wine.

9. Synonyms: Identify words which have the following meaning.

In 1913, English metallurgist Harry Brearly accidentally discovered that adding chromium to low carbon steel gives it stain resistance. It is the addition of a minimum of 12% chromium to the steel that makes it resist rust, or stain 'less' than other types of steel. The chromium in the steel combines with oxygen in the atmosphere to form a thin, invisible layer of chrome-containing oxide, called the passive film. The sizes of chromium atoms and their oxides are similar, so they pack neatly together on the surface of the metal, forming a stable layer only a few atoms thick. If the metal is cut or scratched and the passive film is disrupted, more oxide will quickly form and recover the exposed surface, protecting it from oxidative corrosion. The passive film requires oxygen to self-repair, so stainless steels have poor corrosion resistance in low-oxygen and poor circulation environments.
http://worldsteel.org

1¨by chance
2 oxides formed by corrosion
3 impossible to see
4 topmost boundary of an object
5 having no protecting cover

Key
1 1particle 2 nucleus 3 element 4 subatomic 5 remaining 6 charge 7 contribute 8 vary
2 1D 2 C 3 A 4 F 5B 6E
3 1 assume 2 concentration 3 dropwise 4 glassware 5 deliver 6 dye 7 equivalent
4 1G 2 J 3 C 4B 5E 6 H 7 A 8 F 9 D
5 1 items 2 occurring 3 compounds 4 monomers 5 properties 6 dissolving 7 variety 8 significant 9 disposal
6 1 contracted 2 convergence 3 consumption 4 susceptible 5 coincide
7 1C 2D 3E 4A 5F 6 B
8 1 yeast 2 affect 3fructose 4 ethanol 5 fermentation 6 lowered 7 increase 8 extracted 9 esters
9 1accidentally 2 rust 3 invisible 4 surface 5 exposed

GRAMMAR

A. Transformations into the passive form: Change the sentences into passive voice using the number of words given in brackets.

1. We can classify matter as solid, liquid & gas.
Matter …….. as solid, liquid & gas. (3 words)

2. You would need a considerable force to change the shape of an iron bar.
A considerable force …….. to change the shape of an iron bar. (3 words)

3. When you heat solids, they melt.
When ……., they melt. (3 words)

4. If we pour water on the table, it will flow all over the surface.
If …… on the table, it will flow all over the surface. (3 words)

B) Transformations: Paraphrase the sentences. Keep the original meaning of the sentence.

1. Corrosive substances destroy materials or living tissues on contact.
Materials or living tissues …… ……. corrosive substances on contact. (3 words)

2. Flammable materials are easily ignited.
It is …… flammable materials (3 words)

3. Oxidising substances can worsen existing fires.
Existing fires……by oxidising substances. (3 words)

4. It is vital not to touch, inhale, or swallow toxic substances.
You …… touch, inhale, or swallow toxic substances. (2 words)

C) Word formation: Change the form of the word in bold into the right form to fit in the sentence. Do not use –ing forms.

1. The periodic table is a tabular …… of the chemical elements. ARRANGE

2. This ordering shows periodic trends, such as similar ……..…. in the same column. BEHAVE

3. It also shows four ……..…… blocks with some approximately similar chemical properties. RECTANGLE

4. About 32 of the chemical elements …… on Earth in native uncombined forms. OCCURRENCE

5. The atomic number of an element is ……..…. to the number of protons in each atom. EQUALITY

6. Allotropes are different ……..… modifications of an element. STRUCTURE

7. Most ……..... occurring elements have more than one stable isotope. NATURE

8. All carbon isotopes have nearly ……. chemical properties. IDENTITY

Key

A 1can be classified 2 would be needed 3solids are heated 4 water is poured

B 1 are destroyed by 2 easy to ignite 3 can be worsened 4 must not

C 1 arrangement 2 behaviour, behaviour 3 rectangular 4 occur 5 equal 6 structural 7 naturally 8 identical