

## CHEMISTRY AROUND YOU REVISION

1) Which term best describes an atom?

- a) The smallest particle of matter.
- b) The smallest possible sugar crystal.
- c) The smallest particle of water.
- d) The energy given off during a chemical reaction.

2) An atom is composed of which subatomic particles?

- a) Neutrons and protons only.
- b) Electrons and protons only.
- c) Protons and electrons only.
- d) Neutrons, protons and electrons.

3) Which of the following statements is true?

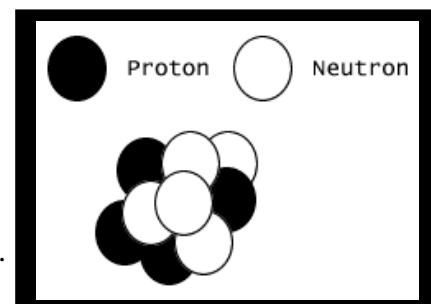
- a) The nucleus of an atom has no energy.
- b) The nucleus of an atom contains electrons and protons.
- c) The mass of an atom is concentrated in the nucleus.
- d) Electrons can be found in the nucleus as they orbit around neutrons.

4) An atom has the atomic number 8. It will therefore have:

- a) 8 neutrons in its nucleus;
- b) 8 electrons in its nucleus;
- c) 8 electrons orbiting around the nucleus;
- d) 8 protons in its nucleus.

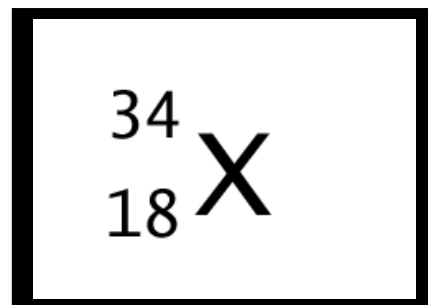
5) Atom "X" is shown on the right. Which comment is true?

- a) The atomic mass of the atom is 9 atomic mass units.
- b) The atomic number of the atom is 5.
- c) The atomic mass of the atom is 5 atomic mass units.
- d) The atomic number is the number of electrons and can not be determined from the information provided.



6) Consider the element "X" pictured on the right. Which one of the statements below is true?

- a) An atom of element "X" has 18 neutrons.
- b) An atom of element "X" has 34 protons.
- c) An atom of element "X" has 34 neutrons.
- d) An atom of element "X" has 18 protons.

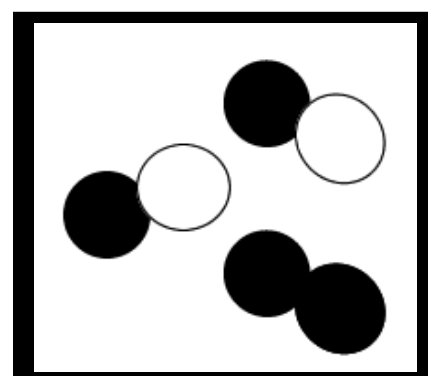


7) An atom has 10 electrons, 10 neutrons and 12 protons. Which comment is true?

- a) The atom has a charge of +2.
- b) The atom is neutral.
- c) The atom has a charge of -2.
- d) The atom has an atomic number 10.

8) Consider the diagram on the right. Each different coloured circle represents an atom of a different element. Which comment below is true?

- a) The diagram represents a mixture of a compound and an element.
- b) The diagram represents a compound.
- c) The diagram represents an element.
- d) The diagram represents a mixture of a compounds.



9) Atom "Y" has the following electronic configuration 2,8,1. Which comment is true?

- a) Atom "Y" will give one electron away.
- b) Atom "Y" will take one electron away.
- c) Atom "Y" will share one electron with another atom.
- d) Atom "Y" will share two electrons with another atom.

10) The electronic configuration of atoms from element "X" is 2,8. Which comment is true?

- a) Atoms from element "X" will take electrons.
- b) Atoms from element "X" will give up some of their electrons.
- c) Element "X" will react with other element to form a gas.
- d) Element "X" is a very stable substance and will not react with other elements.

- 11) The Law of Conservation of Mass states that:
- matter is destroyed during chemical reactions.
  - matter can be created during chemical reactions.
  - mass can not be created or destroyed.
  - elements can be converted into other elements during chemical reactions.
- 12) Ammonium phosphate has the formula  $(\text{NH}_4)_3\text{PO}_4$ . Every unit of ammonium phosphate has:
- 4 phosphorus (P) atoms;
  - 12 hydrogen (H) atoms;
  - 1 oxygen (O) atom;
  - 4 nitrogen (N) atoms.
- 13) The sulfate ion has the formula  $\text{SO}_4^{-2}$  while the sodium ion has the formula  $\text{Na}^+$ . Which option below represents the formula for sodium sulfate?
- $\text{NaSO}_4$
  - $\text{Na}_2\text{SO}_4$
  - $\text{Na}_2(\text{SO}_4)_3$
  - $\text{Na}(\text{SO}_4)_2$
- 14) Atom "X" has the atomic number 12 while atom "Y" has the atomic number 9. When these two atoms react together the compound formed will have the chemical formula:
- $\text{X}_2\text{Y}$ ;
  - $\text{XY}$ ;
  - $\text{XY}_2$ ;
  - $\text{X}_3\text{Y}_2$ .
- 15) A solution of sodium chloride is mixed with a solution of silver nitrate. A precipitate is formed called:
- silver chloride;
  - sodium nitrate;
  - silver sodium;
  - Silver nitrate sodium.
- 16) Which one of the following options does not obey the "Law of Conservation of Mass"?
- $2\text{H}_2 + \text{O}_2 \Rightarrow 2\text{H}_2\text{O}$ .
  - $\text{CaCO}_3 \Rightarrow \text{CaO} + \text{CO}_2$ .
  - $\text{CH}_4 + \text{O}_2 \Rightarrow \text{CO}_2 + \text{H}_2\text{O}$ .
  - $3\text{H}_2 + \text{N}_2 \Rightarrow 2\text{NH}_3$ .

17) Some chemical reactions need a flame or spark to get going. This flame is known as:

- a) kinetic energy;
- b) potential energy;
- c) activation energy;
- d) chemical energy.

18) Modern society is reliant on plastics. After considering all the benefits of plastics, which one reason has caused such wide use of plastics?

- a) Plastics will not shatter.
- b) Plastics are durable and do not degrade in sunlight.
- c) Plastics are cheap to produce.
- d) Plastics do not melt.

19) Ethene is a small molecule derived from crude oil. Under certain conditions the ethene molecules join together to form polyethene. Which statement is true?

- a) The ethene molecule is a monomer.
- b) Polyethene is a monomer.
- c) The reaction to form polyethene is known as distillation.
- d) Polyethene will undergo polymerisation to form ethene.

20) Which word equation represents the fermentation reaction performed by yeast?

- a) Alcohol + oxygen  $\Rightarrow$  carbon dioxide + water
- b) Carbon dioxide + water  $\Rightarrow$  sugar + oxygen
- c) Sugar + oxygen  $\Rightarrow$  alcohol.
- d) Sugar  $\Rightarrow$  alcohol + carbon dioxide.

21) Pure ethanol can be produced from wine by a process best known as:

- a) evaporation;
- b) condensation;
- c) distillation;
- d) filtration.

22) A metal reacts with an acid to produce:

- a) oxygen gas;
- b) hydrogen gas;
- c) carbon dioxide;
- d) water.

23) A reactive metal will:

- a) give electrons to a less reactive metal;
- b) will take electrons from a less reactive metal;
- c) will share electrons with a more reactive metal;
- d) not corrode.

*The information below applies to questions 24-26. The following metals are listed in order of increasing reactivity.*

*"A", "B", "C", "D". Metal "A" is the least reactive while metal "D" is the most reactive.*

24) A bridge is constructed of metal "B". The bolts to secure the huge, metal beams should be made of metal:

- a) "A";
- b) "B";
- c) "C" and "D";
- d) "D".

25) A boat is made of metal "B". What metal/s can be used as a sacrificial anode?

- a) "A" only.
- b) "B" only.
- c) "C" and "D".
- d) "D" only.

26) A window frame was made of metal "C" while the screws used to secure the window frame were made of metal "B". What is likely to happen.

- a) The screws are too soft and will not support the window.
- b) Both the window frame and the screw will rust away.
- c) The screws will rust.
- d) The metal around the screw will corrode and the screw will fall out.

27) Aluminium is a very reactive metal. When it reacts with water it produces:

- a) hydrogen gas;
- b) oxygen gas;
- c) carbon dioxide;
- d) water.

28) A chemist has two solid substances which he will react together. Which of the following will not increase the rate of the reaction?

- a) Grinding the solids into a fine powder before mixing them together.
- b) Heating the solids before mixing them together.
- c) Cooling the solids before mixing them together.
- d) Heating one solid only before mixing it with the other solid.

29) Esters are molecules which give food special flavour and smell. All esters:

- a) have the same smell and flavour;
- b) have low melting temperatures;
- c) are natural;
- d) are man made.

30) Chemists react organic acids with alcohols to form:

- a) proteins;
- b) esters;
- c) hydrogen gas;
- d) carbon dioxide.

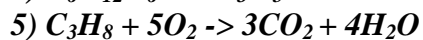
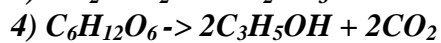
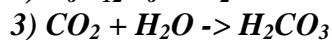
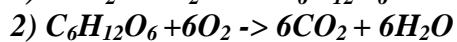
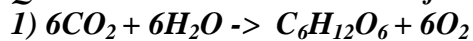
31) Which one of the following is a renewable energy source?

- a) Natural gas
- b) Ethanol
- c) Uranium
- d) all of the above

32) Which of the following are carbon neutral fuels?

- a) Ethanol
- b) Coal and bio-diesel
- c) Bio-diesel and natural gas
- d) Ethanol and coal

*Questions 33 to 35 relate to the following information.*



33) Which of the following reactions is not responsible for forming a carbon sink?

- a) 1 only
- b) 2 and 4 only
- c) 3 and 4 only
- d) 4 and 5 only

34) Which of the following reactions is responsible for climate change?

- a) 1 only
- b) 2 only
- c) 3 and 4 only
- d) 5 only

35) Which of the following reactions is responsible for removing carbon from the atmosphere?

- a) 1 and 3 only
- b) 2 only
- c) 3 and 4 only
- d) 4 and 5 only

Name \_\_\_\_\_ Teacher \_\_\_\_\_

Section A answer sheet. Circle the correct response. Each question is worth 1 mark

- 1) A, B, C, D
- 2) A, B, C, D
- 3) A, B, C, D
- 4) A, B, C, D
- 5) A, B, C, D
- 6) A, B, C, D
- 7) A, B, C, D
- 8) A, B, C, D
- 9) A, B, C, D
- 10) A, B, C, D
- 11) A, B, C, D
- 12) A, B, C, D
- 13) A, B, C, D
- 14) A, B, C, D
- 15) A, B, C, D
- 16) A, B, C, D
- 17) A, B, C, D
- 18) A, B, C, D
- 19) A, B, C, D
- 20) A, B, C, D
- 21) A, B, C, D
- 22) A, B, C, D
- 23) A, B, C, D
- 24) A, B, C, D
- 25) A, B, C, D
- 26) A, B, C, D
- 27) A, B, C, D
- 28) A, B, C, D
- 29) A, B, C, D
- 30) A, B, C, D
- 31) A, B, C, D
- 32) A, B, C, D
- 33) A, B, C, D
- 34) A, B, C, D
- 35) A, B, C, D



Section B consists of 7 short answer questions worth a total of 60 marks. Write all answers in the space provided.

1) Draw a picture of an atom in the space provided below. Label the following.

- a) neutron
- b) proton
- c) electron
- d) nucleus
- e) first and second energy levels.

5 marks

2) Below are the formulae and charge of several ions. Use this information to answer question 2.

Ion	Formula	Charge
Nitrate	NO <sub>3</sub>	-1
Carbonate	CO <sub>3</sub>	-2
Sulfate	SO <sub>4</sub>	-2
Sodium	Na	+1
Ammonium	NH <sub>4</sub>	+1
Chloride	Cl	-1
Copper	Cu	+2
Phosphate	PO <sub>4</sub>	-3

a) Complete the table below

Compound	Formula
Sodium chloride	
Ammonium chloride	
Ammonium carbonate	
Copper sulfate	
	CuCO <sub>3</sub>
	(NH <sub>4</sub> ) <sub>3</sub> PO <sub>4</sub>
	NH <sub>4</sub> NO <sub>3</sub>
Copper chloride	
Sodium phosphate	
Ammonium sulfate	

10 marks

b) The following solutions were mixed to form a precipitate. Give the name of the precipitate.

Solutions	Precipitate
Lead nitrate is mixed with potassium iodide	
Lead nitrate is mixed with sodium carbonate	
Silver nitrate is mixed with sodium chloride	

3 marks

c) Write balanced chemical equations for the following

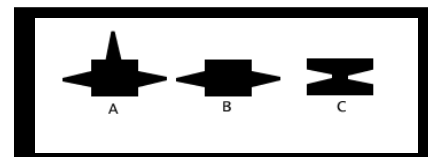
i) Hydrogen gas ( $H_2$ ) reacts with oxygen gas ( $O_2$ ) to form water ( $H_2O$ )

2 marks

ii) Methane ( $CH_4$ ) gas reacts with oxygen ( $O_2$ ) to form carbon dioxide ( $CO_2$ ) and water ( $H_2O$ ).

2 marks

3) Consider the molecules "A", "B" and "C" pictured on the right.



a) Which molecules can be used to form a thermoplastic?

2 marks

b) Draw a small portion of the resultant thermoplastic.

2 marks

d) Which molecules can be used to form a thermosetting plastic?

2 marks

e) Draw a small portion of the resultant thermosetting plastic.

2 marks

The following information relates to question 4.

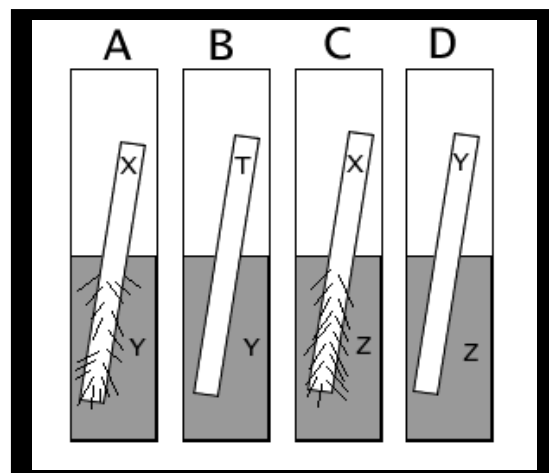
Metals “X”, “T”, “Y” and “Z” were tested with various metal solutions, as shown on the right.

A strip of metal “X” was placed in a solution containing metal “Y”. Solid metal “Y” was deposited.

A strip of metal “T” was placed in a solution containing metal “Y”. No metal was deposited.

A strip of metal “X” was placed in a solution containing metal “Z”. Solid metal “Z” was deposited.

A strip of metal “Y” was placed in a solution containing metal “Z”. No metal was deposited.



4)a) Place the metals in order of increasing reactivity.

\_\_\_\_\_ 2 marks

b) Metal beams used to construct a bridge are made of metal “T” while the bolts used to secure the beams are made of metal “Y”. Describe what will happen to the bridge and explain why.

\_\_\_\_\_  
\_\_\_\_\_

2 marks

c) Explain the term *sacrificial anode*.

\_\_\_\_\_  
\_\_\_\_\_

2 marks

d) A boat is made of metal “Y”. Which metal can be used as a sacrificial anode? Explain.

\_\_\_\_\_  
\_\_\_\_\_

2 marks

e) A plumber welded a copper pipe to an existing pipe made of iron. In two weeks the iron pipe was completely rusted and burst . Give an explanation.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 marks

f) Aluminium warships were used extensively by the British Navy. During the Falklands War the Sheffield was hit by a missile and began to burn. Sailors used water to put out the fire only to discover it was like pouring petrol onto the fire. Explain why?

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3 marks

g) Why is aluminium used extensively for kitchen utensils such as pots and frying pans but not for warships?

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3 marks

5) Explosions are chemical reactions that occur rapidly, produce gaseous products and a large amount of heat energy.

a) The Space Shuttle burns liquid oxygen and hydrogen to produce steam and heat energy. Write a word equation for this reaction.

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1 mark

b) For a reaction to be considered explosive it must produce gases and heat. Why?

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2 marks

c) Rusting occurs quickly if the metal is in powder form, heated and placed in a container with a great deal of oxygen. Explain why?

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3 marks

6) Yeast converts sugar into alcohol (ethanol) and carbon dioxide through a process called *fermentation*.

a) Write the word equation for the process of fermentation.

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*1 mark*

b) Describe a way of purifying alcohol, which boils at 80°C, from wine. Draw the apparatus below. Use the space on the back of this page if you need to.

In your explanation use the following words.

i) Evaporation.

ii) Condensation.

iii) Boiling temperature.

iv) Heating.

v) Cooling.

*7 marks*

7) Global warming is a major challenge of our times.

a) Define a carbon sink and give one example.

*2 marks*

b) Draw a simplified carbon cycle. In your diagram

i. label 4 carbon sinks

ii. Indicate the chemical reaction that is responsible for placing carbon in a particular carbon sink

iii. Indicate how carbon flows from carbon sink to carbon sink using arrows.

*8 marks*