Section A: Multiple Choice

Instructions: There are twenty-five (25) multiple choice questions. For each question, choose the best possible answer. Circle the correct choice on the examination paper.

1) Which of the following could be described as a physical change?
   (a) The melting of iron.
   (b) Sulphur dioxide.
   (c) The way magnesium catches fire when heated in air or oxygen.
   (d) The ability of sodium to float on water.
   (e) The slow change of iron to rust when exposed to moist air.

2) Where is most of the mass of an atom concentrated?
   (a) In the nucleus.
   (b) In the protons.
   (c) In the neutrons.
   (d) In the electrons.
   (e) In the electrons and protons.

3) In chemistry, a salt is a substance that:
   (a) tastes sour.
   (b) forms blue crystals.
   (c) is necessary in the diet for good health.
   (d) is formed by the reaction of an acid and a base.
   (e) decomposes when heated.

4) The pH of a solution of sodium hydroxide would most likely be about:
   (a) 7
   (b) 14
   (c) 3
   (d) 1
   (e) 8

5) The relative atomic mass of lead is 207. This means that an atom of lead:
   (a) is 207 times heavier than an atom of hydrogen.
   (b) is 207 heavier than an atom of carbon.
   (c) is 207 larger than an atom of hydrogen
   (d) contains 207 particles.
   (e) is 207 times larger than an atom of carbon.

6) Ionic compounds are usually:
   (a) gases at room temperature.
   (b) solids with low melting point.
   (c) liquids with a fairly high boiling point.
   (d) solids with high melting point.
   (e) liquids with low boiling point.

7) 300°C is the same as:
   (a) 27 K
   (b) 573 K
   (c) –300 K
   (d) 273 K
   (e) 0 K

8) Which one of the following terms applies most closely to the statement: "Fluorine is a corrosive gas":
   (a) Compound
   (b) Chemical change
   (c) Physical property
   (d) Chemical property
   (e) Physical change

9) In neutralization:
   (a) the base is neutralized.
   (b) the acid is neutralized.
   (c) a salt is formed.
   (d) all of the above are correct.
   (e) none of the above are correct.

10) For a fixed mass of gas, if the pressure is held constant and the temperature of the gas is increased, then the volume of the gas:
   (a) increases.
   (b) decreases.
   (c) remains the same.
   (d) is inversely proportional to its new temperature.
   (e) is directly proportional to its pressure.

11) Which is most likely to lead to a chemical change?
   (a) Distilling a sample of sea water.
   (b) Adding sodium metal to water.
   (c) Heating a mixture of salt and iodine.
   (d) Heating nickel wire.
   (e) Adding water to alcohol.

12) A student prepared three samples of sulphur dioxide in three different ways. After analysis, it was found that each sample contained the same elements in the same relative amounts. This provides evidence for:
   (a) The law of conservation of mass
   (b) The law of finite proportions
   (c) Boyle's law.
   (d) The law of multiple proportions.
   (e) The law of definite proportions.

13) The element Y combines with oxygen to form a compound Y_2O_3. To which group of the Periodic table does Y belong?
   (a) 6
   (b) 4
   (c) 3
   (d) 2
   (e) 1

14) An element W has a relative atomic mass of 25 and an atomic number of 13. Which of the following statements **is true**?
   (a) W is in group 2 of the periodic table.
   (b) W is in period 2 of the periodic table
   (c) An atom of W has 13 protons
   (d) An atom of W has 12 electrons.
   (e) All of the above.

15) Which of the following is an element?
   (a) Steam.
   (b) Liquid oxygen.
   (c) Carbon dioxide.
   (d) Steel.
   (e) Paper.

16) Which one of the following statements regarding a liquid being cooled is **NOT** true?
   (a) Molecular motion gets slower.
   (b) The forces between molecules gets stronger.
   (c) The liquid gets denser.
   (d) The temperature decreases.
   (e) The molecules get further apart.

17) Which of for the following is in general the largest in size?
(a) Molecule.
(b) Atom.
(c) Proton.
(d) Electron.
(e) Neutron.

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For questions 18-20, choose the best answer from the following alternatives A-E.

A. Calcium Carbonate
B. Sodium Hydroxide
C. Potassium Hydrogen Sulphate
D. H_2SO_4
E. Methyl Orange

18) ____is an indicator
19) ____is an alkali
20) ____ is an acid salt.

.....

21) Which is **NOT** a true statement of trends from left to right across the periodic table?
(a) The number of protons in each atom increases.
(b) Atomic radius increases.
(c) Nuclear charge increases.
(d) Number of electrons in each atom increases.
(e) Ionization energy increases.

22) Which statement about trends down the groups of the periodic table **is correct**?
(a) The number of shells increases down the group.
(b) Reactivity increases down all groups.
(c) It is easier to gain electrons down each group.
(d) Atomic radius decreases down each group.
(e) Ionization energy increases down each group.

23) The term pH describes:
(a) the concentration or strength of an acid.
(b) the measure of hydrogen ion concentration in a solution.
(c) the strength of a base.
(d) the OH^- concentration in a solution.
(e) all of the above.

24) A weak acid:
(a) Is only partially ionized in solution.
(b) is totally ionized.
(c) is not ionized.
(d) has a pH of 8.
(e) has no ions at all.

25) Oxidation is:
(a) when an atom goes into a higher valency state.
(b) the gain of electrons.
(c) the removal of oxygen.
(d) reaction with hydrogen.
(e) the loss of protons.

(Total pts. – 25)

Section B

Instructions: There are four (4) questions in this section, each with multiple parts. Answer **ALL** questions and parts of questions.

Question #1

Match the description in the left column with the correct answer in the right column by placing the corresponding letter on the line provided.

1.	Acid ____	a)	$CaCl_2$
2.	Base ____	b)	Solid
3.	Two electrons shared ____	c)	Neutrons
4.	Greater for group VII than group I ____	d)	Single covalent bond
5.	At the bottom of a group ____	e)	Largest atoms
6.	Uncharged atomic elementary particles ____	f)	Nucleus
7.	Contains most of the mass in an atom ____	g)	Gas
8.	Has definite shape and volume ____	h)	Hydrogen ion donor
9.	Has indefinite shape and volume ____	i)	Ionization energy
10.	An alkali ____	j)	Hydrogen ion acceptor
11.	Salt of hydrochloric acid ____	k)	NaOH

(Total pts.-11)

Question #2

Write the balanced chemical equations in each of the following cases:

a) $Zn + HCl \rightarrow ZnCl_2 + H_2$ (1)

b) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$ (2)

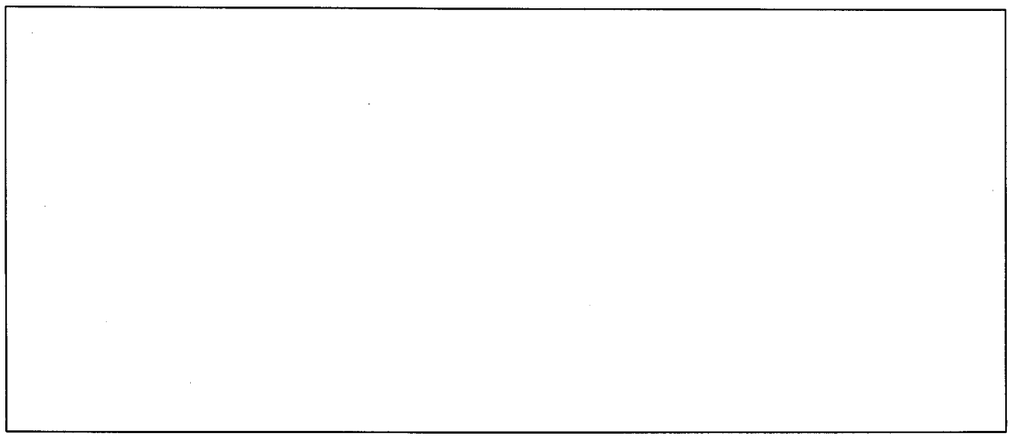
c) The reaction of iron (II) sulphate ($FeSO_4$) with potassium hydroxide to form iron (II) hydroxide and potassium sulphate. (2)

d) The combustion of magnesium in air to form magnesium oxide. (2)

(Total pts.-7)

Question #3

a) Draw a labelled diagram of the apparatus used to determine the melting point of solid. (3)



b) The melting point of thymol is 49.6°C. Why would a water bath be suitable for the meting point determination of thymol? (2)

_____

_____

c) State two uses for the determination of the melting point of a solid. (2)

i. _____

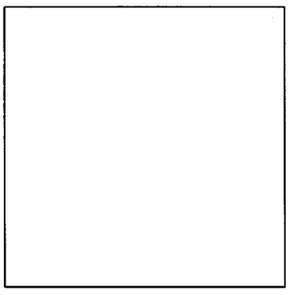
ii. _____

d) What two effects does an impurity have on the melting point of a solid? (2)

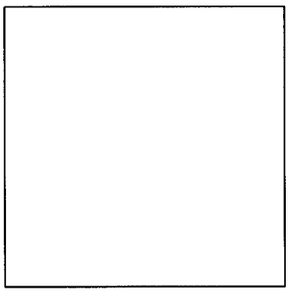
i. _____

ii. _____

e) Explain with the help of diagrams, and in terms of the kinetic theory, what happens when a solid is heated and melts. (4)



(Before heating)



(After heating)

Explanation: _____

_____

_____

_____

(Total pts.-13)

Question #4

a) State Boyles Law **in words**. (2)

_____

_____

b) A sample of hydrogen gas at 2 atm. pressure occupies a volume of $6dm^3$. What volume would the gas occupy at a pressure of 4 atm. if the temperature remains constant? (2)

Ans. _____

c) $200cm^3$ of oxygen were collected at 25°C and a fixed pressure. What is the new volume if temperature is raised to 40°C? (2)

Ans. _____

d) Which gas law must be applied in parts (b) and (c)?

Part (b): _____(1)

Part (c): _____(1)

e) What is meant by the abbreviation S.T.P.? State these values as applied to a gas. (2)

_____

_____

_____

(Total pts.-10)

End of Examination!!!

*****Please check over ALL of your work.*****