Section A: Multiple Choice. Answer all 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) 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) 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.

5) 300°C is the same as:
   (a) 27 K
   (b) 573 K
   (c) –300 K
   (d) 273 K
   (e) 0 K

6) 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 is correct.

7) 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) (Temperature and volume) is inversely proportional to its new temperature are inversely proportional.
   (e) Is directly proportional to its pressure. None of the above is true.

8) 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.

9) 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

10) 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.

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

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

13) Name the indicator of the group?
(a) Calcium Carbonate
(b) Sodium Hydroxide
(c) Potassium Hydrogen Sulphate
(d) H_2SO_4
(e) Methyl Orange

14) 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.

15) Air can be separated into its components by
a) Distillation
b) Condensation
c) Filtration
d) Evaporation
e) Chromatography

16) A solution
a) Contains particles that can be removed by filtration.
b) May be described as a homogenous mixture.
c) Is generally cloudy in appearance.
d) Always contains water.
e) Consists of two phases.

17) Which statement about a pure compound is false?
a) It has a fixed set of physical properties.
b) It has a fixed set of chemical properties.
c) It can be separated into its constituent elements by physical means.
d) It can be separated into constituent elements by chemical means.

18) The diatomic gases H_2, O_2 and $N_2$are considered to be
   a) Elements
   b) Compounds
   c) Atoms
   d) Mixtures
   e) Alloys

19) When a bottle of perfume is opened in the corner of a room .the fragrance gradually spreads throughout the room .this process is known a:
   a) Deliquescence
   b) Brownian motion
   c) Spreading
   d) Diffusion
   e) Infiltration

20) Copper (II) sulphate is so-called because
   a) It contains two copper atoms.
   b) The valency of copper is 2.
   c) It contains twice as much cooper as sulphate.
   d) The relative atomic mass of cooper is 2.
   e) The sulphate ion has a charge of 2.

21) The term iodide is used in preference to iodine when:
   a) Iodine is in the free form.
   b) Iodine is mixed with salt.
   c) Iodine has been sublimed.
   d) Iodine is used as an antiseptic
   e) Iodine is combined with another element.

SECTION B: Short Answer Questions

Answer each of the following questions in the space provided on your question paper. Answer numerical questions MUST include working, must include the correct units, and must be double underlined.

1) Use the elements A-E to answer all of the questions below:

$^{23}A_{11,}$ $^{19}B_{9,}$ $^{17}C_{8,}$ $^{20}A_{10,}$ $^{24}E_{11}$

   a) List one metal _____

   b) List one noble gas _____

   c) Which two of the above are isotopes? _____ and _____

   d) Which element has a valency of 0? _____

   e) How many neutrons are in C? _____

   f) Give two elements that for an electrovalent bond? _____ and _____

   g) Write the formula of the compound in question f? _____

   h) Which element is a non-metal with a charge of -2? _____

(8 Marks)

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

_____

_____

_____

a) 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 2 atm. if the temperature remains constant?

(2 Marks)

Ans. _____

b) $100cm^3$ of oxygen were collected at 25°C and a fixed pressure. What is the new volume if temperature is raised to 40°C? (2 Marks)

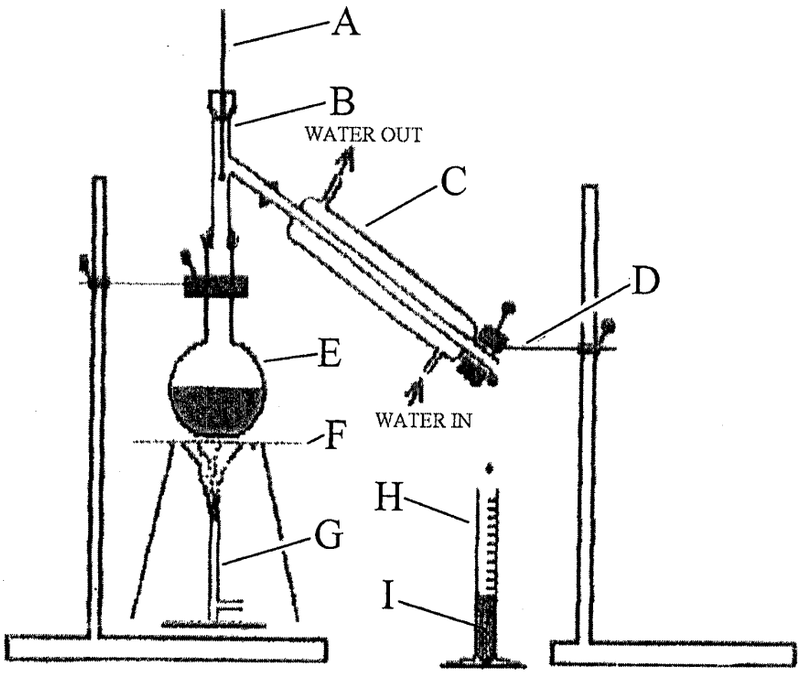
Ans. _____

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

Part (b): _____ (1 Mark)

Part (c): _____ (1 Mark)

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



a) Name the features labelled A to I. (4 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)

4) Answer and calculate the following parts:

(a) Draw and label the diagram showing the interconvertibility of matter. (2 Marks)

(b) Compare the differences between the solid state and the vapour state. (2 Marks)

_____

_____

(c) Write the formulate for the following substances (5 marks)

Lead (II) Nitrate _____

Nitrogen dioxide gas _____

Potassium carbonate _____

Ammonium sulphate _____

Copper (I) oxide _____

(d) Write the formulae for the following substances (5 Marks)

Al_2O_3 _____

$NaNO_3$ _____

$FeSO_4$ _____

$Mg(OH)_2$ _____

H_2SO_4 _____

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

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

_____ (1 Mark)

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

_____ (2 Marks)

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

_____ (2 Marks)

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

_____ (2 Marks)