

**END OF TERM 2 EXAM - 2019**  
**CHEMISTRY**  
**FORM 2**

NAME..... ADM.

NO.....

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Time: 2hrs

***Instructions; answer all questions in section A and B in the spaces provided.***

Q1. An element Y has isotopes Y and Y. The relative atomic mass of Y is 19.8.

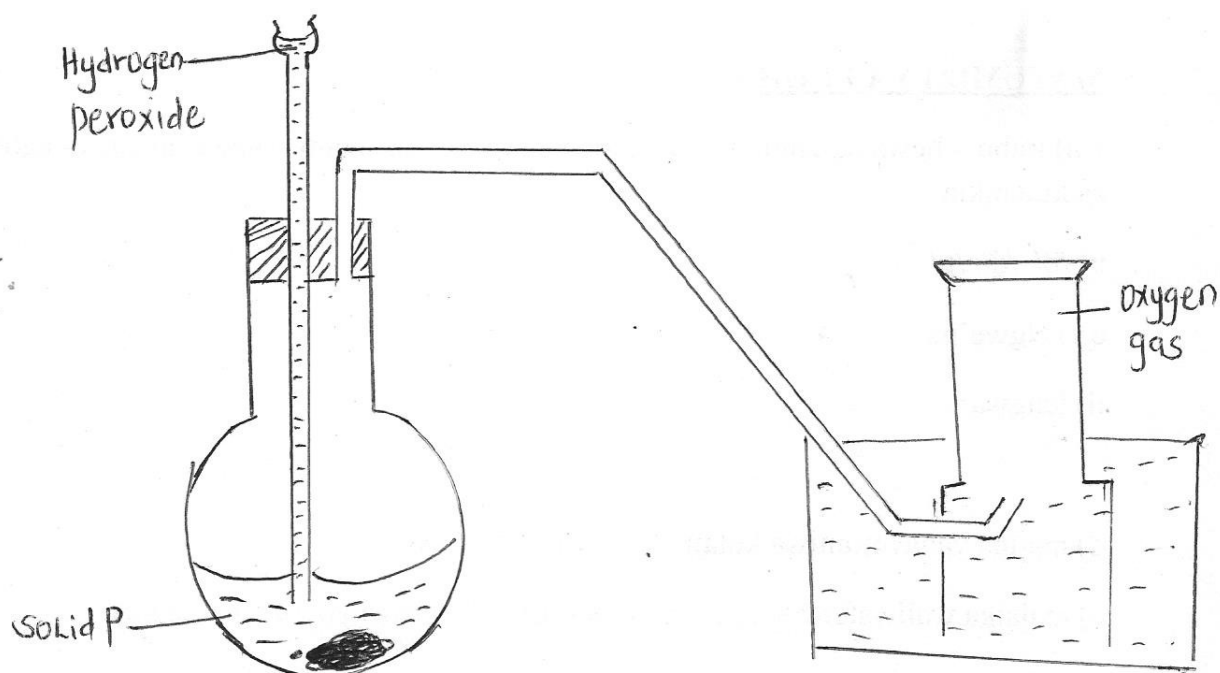
Determine the relative abundance of each isotope as percentage.  
(3mks)

2. Why is solid carbon (iv) oxide (dry ice) preferred in cool boxes than the normal

ice(solid water)?  
(2mks)

3. starting with copper (II) oxide, describe how you can prepare copper (II) sulphate crystals  
(3mks)

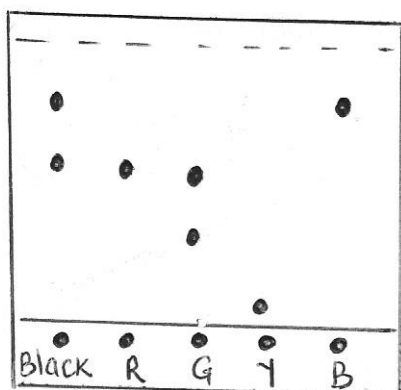
4. The diagram below is a laboratory set up for preparation of oxygen gas



a) Identify solid P  
(1mk)

b) Write an equation for the reaction that takes place in the flask  
(1mk)

5. Black ink was subjected to a chromatographic analysis to determine its contents. It was analyzed alongside known dyes; red, green, yellow and blue. Study the diagram and answer questions that follow



KEY

Black - black ink

red dye

- Yellow dye

- Green dye

Blue dye

R -

Y

G

B -

a) Which of the dye is least absorbed to the absorbent material?  
Explain (2mks)

b) Which dye is not found in the black ink?  
(1mk)

6. An element M has atomic number 5.  
i) Write the electronic configuration of M  
(1mk)

ii) State the group and period to which element M belongs in the periodic table (1mk)

Group..... period.....

7. Briefly explain why water is not used to put off kerosene fires  
(2mks)

8. A student tested the PH of five solutions using universal indicator and obtained the following results.

| <b>solution</b> | <b>colour</b> | <b>PH</b> |
|-----------------|---------------|-----------|
| I               | Blue          | 10        |
| J               | Violet        | 14        |
| K               | Red           | 1         |
| L               | Green         | 7         |
| M               | yellow        | 5         |

Which of the solutions is likely to be ;-

- i) Potassium hydroxide.....
- ii) lactic acid.....
- iii) sulphuric acid.....
- iv) Sodium chloride .....

9. Fill in the table below (2mks)

| element | Number of electron | Number of neutrons |
|---------|--------------------|--------------------|
| $Q^+$   |                    |                    |

10.a) Using dot(.) and cross(x) to represent the outer most electrons, draw diagrams to

show the bonding in sodium chloride  
(2mks)

b) State the structure of the above compound  
(1mk)

c) Give two properties of substances with the above structure  
(2mks)

11. Study the table below and answer the questions that follow.

| Element  | Atomic radii (mm) | Ionic radii (nm) |
|----------|-------------------|------------------|
| Fluorine | 0.071             | 0.136            |
| Chlorine | 0.099             | 0.181            |
| Bromine  | 0.114             | 0.195            |

a.i) Explain why atomic radius increases from fluorine to bromine  
(2mks)

ii) Explain why the ionic radius is larger than the atomic radius.  
(1mk)

12. Name a suitable method used to separate the following mixtures  
(3mks)

i) Sodium chloride and sand -.....

ii) iron (iii) chloride and lead (ii) sulphate .....

iii) Water and ethanol.....

13.a) Give two differences between a luminous and a non-luminous  
flames (2mks)

c) What is the function of the following parts of a Bunsen burner.  
(2mks)

i)

Collar .....  
.....

ii)

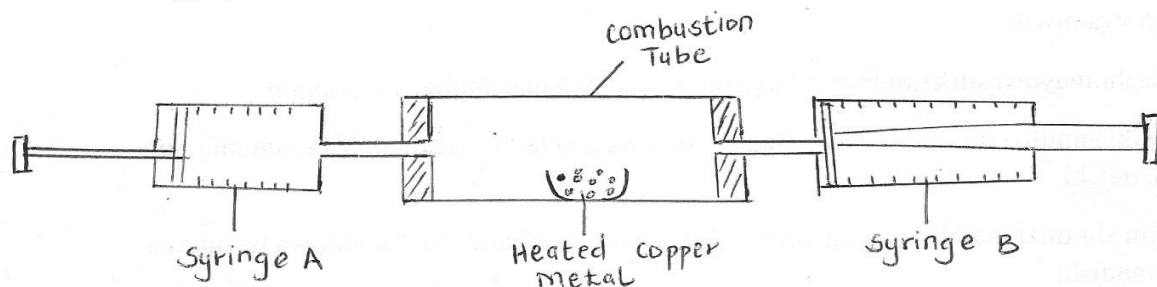
chimney .....  
.....

14. Using dot(.) and cross (x) to represent the electrons in the energy level, Draw a

structure to show bonding in ammonium ion from ammonia and hydrogen ion.  
(2mks)

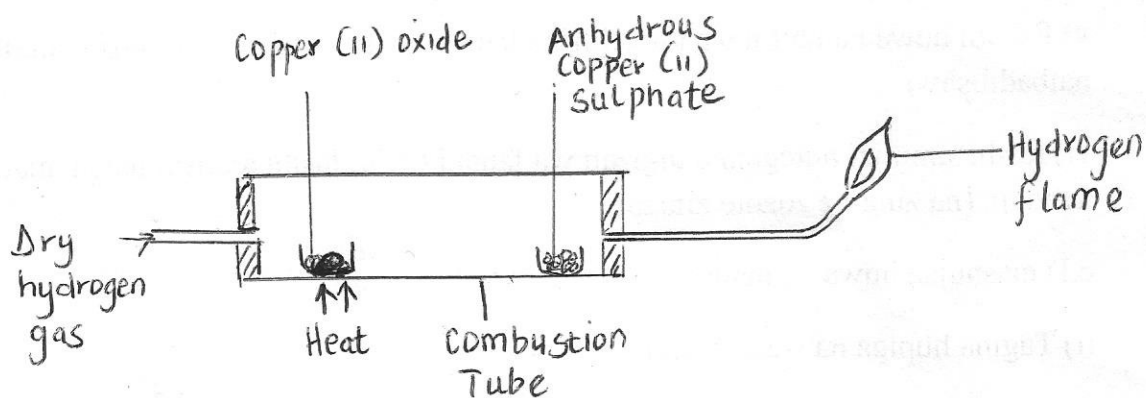
## **SECTION B**

15.  $120\text{cm}^3$  of air is continuously passed through a combustion tube connected to the syringes as show below. The combustion tube contains some clean granules of copper metal which are heated. The process is repeated until there is no further change in the volume of air. The volume of air remaining is  $96\text{cm}^3$ .



- a) State one observation made in the combustion tube. Explain (2mks)
- b) Work out the percentage of air used after the reaction (2mks)
- c) List two gases remaining after the reaction (2mks)

16. The set up below was used to investigate certain property of hydrogen gas. Study it and answer questions that follow.



i) State the property of hydrogen which was being investigated (1mk)

ii) Give two observations made in the combustion tube (2mks)

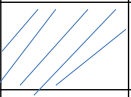
iii) Write a balanced chemical equation for the reaction taking place in the combustion

tube (1mk)

iv) Why is excess hydrogen burned and not allowed to escape into air?  
(1mk)

v) State one use of hydrogen gas  
(1mk)

17. The grid below represents part of the periodic table. Study it and answer questions that follow. The letters do not represent the actual symbols of the elements.

|   |   |                                                                                     |   |   |  |   |   |   |
|---|---|-------------------------------------------------------------------------------------|---|---|--|---|---|---|
| C |   |                                                                                     |   |   |  |   |   |   |
| H |   | W                                                                                   |   | T |  | R | Y | F |
|   | E |  | S |   |  |   | Z |   |
| M | I |                                                                                     |   |   |  |   |   |   |

i) Which element would form a trivalent cation? Give a reason  
(2mks)

ii) Write the equation for the reaction that would occur between E and Y (1mk)

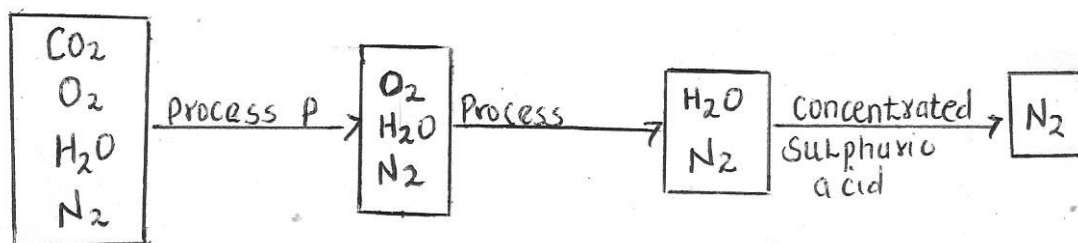
iii) Which elements belong to the region labeled W  
(1mk)

- iv) Which is the most reactive non-metallic element in the table above? Explain

(2mks)

- v) How does the atomic radius of T compare with that of Y?  
(2mks)

18. The flow chart below shows the process of obtaining nitrogen by fractional distillation of disqualifed air. Use it to answer questions that follow.



- a) What is the purpose of the processes P and Q  
(2mks)

- b) Identify the reagents used in processes P and Q  
(2mks)

c) Write the equations for the chemical processes P and Q  
(2mks)

d) Give one commercial use of oxygen  
(1mk)

e) Give an impurity that could be found in the nitrogen gas  
obtained above (1mk)

19. In the table below, elements are represented by letters P, Q, R, S and T which are

not the actual symbols of the elements.

| element | Electronic configuration | Atomic radius(nm) | Ionic radius |
|---------|--------------------------|-------------------|--------------|
| P       | 2.1                      | 0.123             | 0.060        |
| Q       | 2.3                      | 0.082             | 0.020        |
| R       | 2.4                      | 0.077             |              |
| S       | 2.5                      | 0.070             | 0.171        |
| T       | 2.6                      | 0.066             | 0.141        |

i) To which period of the periodic table do these elements belong?  
Give a reason

(2mks)

ii) Explain why the atomic radius decrease from P to T  
(2mks)

iii) Why is there no ionic radius given to element R?  
(2mks)

iv) Explain why the ionic radius is larger than the atomic radius for both S and T (2mks)

v) Explain whether S is a metal or a non-metal  
(2mks)

vi) Write the formula of the compound formed between P and T.  
(1mk)

vii) Name the type of bond found in the compound formed in (vi) above. Give a reason

(2mks)