**NAME: …………………………………………………… INDEX: ……………………………**

**SCHOOL.……………………………………………………………….………………………**

233/1

CHEMISTRY

JULY 2018

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CHEMISTRY

PAPER 1

**EXCEL JOINT EVALUATION TEST**

**END OF TERM TWO 2018**

**INSTRUCTIONS TO CANDIDATES**

* *Answer* ***all*** *the questions in the spaces provided*
* *Mathematical tables and electronic calculators* ***may*** *be used*
* *All workings* ***must*** *be clearly shown where necessary*
* *Answer all questions in* ***English***

**For Examiner’s Use Only**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Maximum Score** | **Candidates Score** |
| 1-29 | 80 |  |

1.An element M has atomic number 5

(a) **Write** the electronic configuration of M (1mk)

………………………………………………………………………………………………………………………………………………………………………………………………(b) **State** the group and period to which element M belongs in the periodic table.

(2mks)

Group:………………………………………………

Period:………………………………………………

2. Consider the following equilibrium reaction:

2SO2(g)  + O2(g) 2SO3(g) ΔH = -196KJ

What will be the effect of increasing the temperature on the yield of Sulphur (VI) Oxide? **Explain**. (2mks)

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3.Use the following standard electrode potentials to answer the questions that follow.

Zn2+(aq) + 2e- Zn(s) Eθ volts - 0.76

Cl2(g) + 2e- 2Cl-(aq) + 1.36

**Calculate** the e.m.f of the following cell:

Zn(s) / Zn2t(aq) // 2Cl-(aq), Cl2(g) /Pt (2mk)

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(b) **Write** down the equation for the overall cell reaction (1mk)

………………………………………………………………………………………………

4 .Below is a table of the first five alkanes and their boiling points.

|  |  |
| --- | --- |
| Name | Boiling Point (0C) |
| Methane | -161.5 |
| Ethane | -88.6 |
| Propane | -42.1 |
| Butane | -0.5 |
| Pentane | 36.1 |

(a) **What** is the state of pentane at room temperature (250C)? (1mk)

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(b) **Why** do the boiling increase from Methane to Pentane? (2mks)

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5.In 30 seconds 180cm3 of oxygen diffused through a porous plate. How long will it take 400cm3 of carbon (IV) oxide to diffuse through the same plate? ( C= 12, 0= 16) (3 mks) ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

6. A student collected the samples of water from two different sources. She measured equal volume of water in two different test-tubes. She added soap solution from a burette until permanent lather was formed. She then boiled another two samples of the same waters and repeated the experiment. She recorded the results in the table below.

|  |  |  |
| --- | --- | --- |
| Sample of Water | Volume of soap used before boiling (cm3) | Volume of soap used after boiling (cm3) |
| A | 30 | 10 |
| B | 30 | 30 |

(a) Name the type of water hardness in sample A. Explain (2mks)

…………………………………………………………………………………………………………………………………………

(b) Name the cations that causes water hardness (2mk)

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1. Give the systematic names of the following compounds: (2mks)

(a) CH3 CH (CH3) CH2 CH3

…………………………………………………………………………………………………

(b) CH3 CH2 CH2 CH BrCH2 OH

…………………………………………………………………………………………………

8. The diagram below show a set-up for the laboratory preparation of dry chlorine gas.



(a) Complete the diagram to show how dry chlorine gas is collected (1mk)

(b) Name:

(i) Substance G (1mk)

………………………………………………………………………………………………………………

(ii) A suitable drying agent (1mk)

………………………………………………………………………………………………………………

(iii) One industrial use of chlorine gas (1mk)

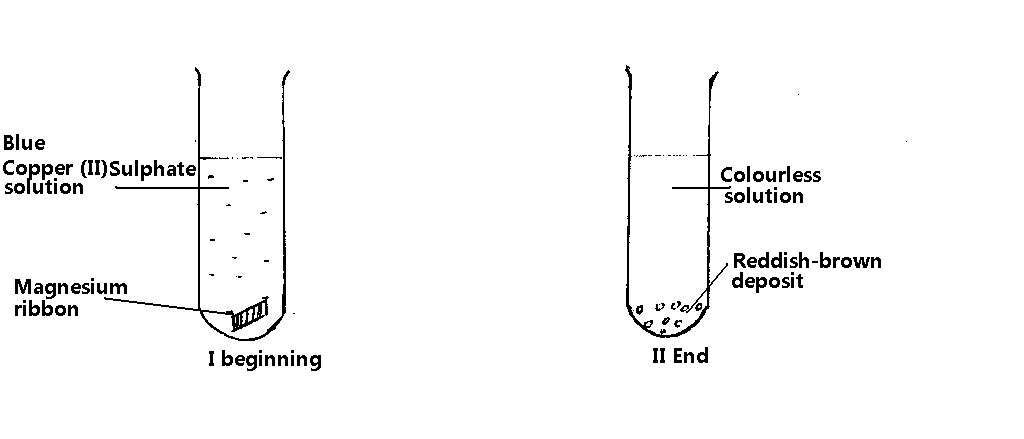
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9. An atom P contains 90% of isotope and 10% of isotope  **Calculate** the relative atomic mass of P (3mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………....................................................................................................

10. Explain why the enthalpy of neutralization of ethanoic acid with sodium hydroxide is different from that of hydrochloric acid with sodium hydroxide. (2mks) ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….................................

11. The following results were obtained in an experiment



(a) **Identify**

1. the reddish brown deposit (1mk)

…………………………………………………………………………………………………

1. the colourless solution (1mk)

…………………………………………………………………………………………………

(b) **Write** an equation for the reaction taking place (1mk)

……………………………………………………………………………………………………

12 When 2.23g of Lead (II) Oxide were heated in a stream of dry hydrogen gas; 2.07g of Lead were formed and 0.18g of water was collected. **Calculate** the mass of hydrogen which combines with one mole of Oxygen atoms ( Pb = 27, O =16, H =1) (3mks)

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13 (a) **Write** an ionic equation for the reaction between copper (II) Sulphate and sodium (1mk) hydroxide solution.

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(b) **Name** the type of reaction in (a) above (1mk)

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14 How would you distinguish the following compounds; (CH3COOH and CH3CH2OH?

(2mks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

15 At room temperature Silicon (IV) Oxide is a solid where as Carbon(IV) Oxide is a gas although Silicon is next to carbon in group (IV) of the periodic table. **Explain**. (2mks)

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16 .Below are the bond dissociation energies of some elements

|  |  |
| --- | --- |
| Bond | Bond dissociation energy (KJmol-1) |
| C – C | 343 |
| C – H | 414 |
| H – H | 435 |
| C(s) C(g) | 711 |

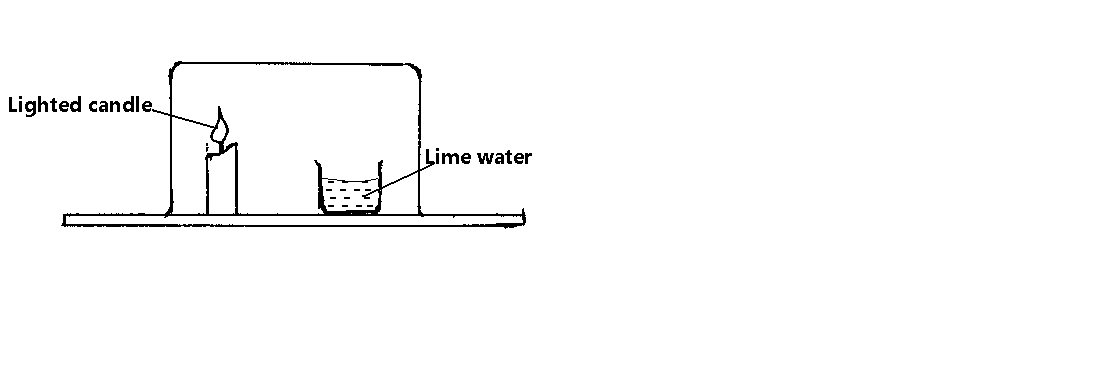
Use this information to **calculate** the heat of reaction for:

2C(s) + 3H2(g) C2H6 (g) (3mks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

17 25.0cm3 of a solution of hydrochloric acid dissolved 3g of magnesium ribbon. **Calculate** the concentration of hydrochloric acid in moldm-3 (Mg=24) (3mks)

18 **Study** the arrangement below and answer the question that follows



**Explain** what will be observed after sometime. (3mks)

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19. Study the table below showing the solubility of a salt at various temperatures

|  |  |
| --- | --- |
| **Temperature (0C)** | **Solubility (g/100g water)** |
| 0  30  70  100 | 30  24  19  14 |

What would happen if a sample of a saturated solution of the salt at 300C is heated to 700C? Explain. (2mks)

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20. Both diamond and graphite have giant atomic structures. Explain why graphite is soft while diamond is hard. (3mks)

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21. Excess chlorine was bubbled through a solution of potassium bromide. State and explain the observation made. (2mks)

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22. (a) What property of concentrated Sulphuric (VI) acid is illustrated by its action on:

(i) Sugar……………………………………………………………………………….. (1mk)

(ii) Copper metal ……………………………………………………………………. (1mk)

(b) Write the equation for the reaction of concentrated sulphuric acid with copper metal. (1mk)

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23. A current was passed through molten aluminium oxide for 10minutes. The volume of oxygen collected at the anode was 112cm3 at s.t.p .Calculate the mass of aluminium obtained at the cathode.

(O = 16, Al = 27, molar gas volume at s.t.p = 22.4dm3, F = 96500C) (3mks)

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24. The formulae below represent the active ingredients in a soap and in a detergent respectively.

* + 1. CH3 (CH)16 COO- Na+
    2. CH3 (CH2)6 CH(CH3)CH2SO3-Na+

**(a)Explain** why I is not suitable for washing using water from a river (1mk)

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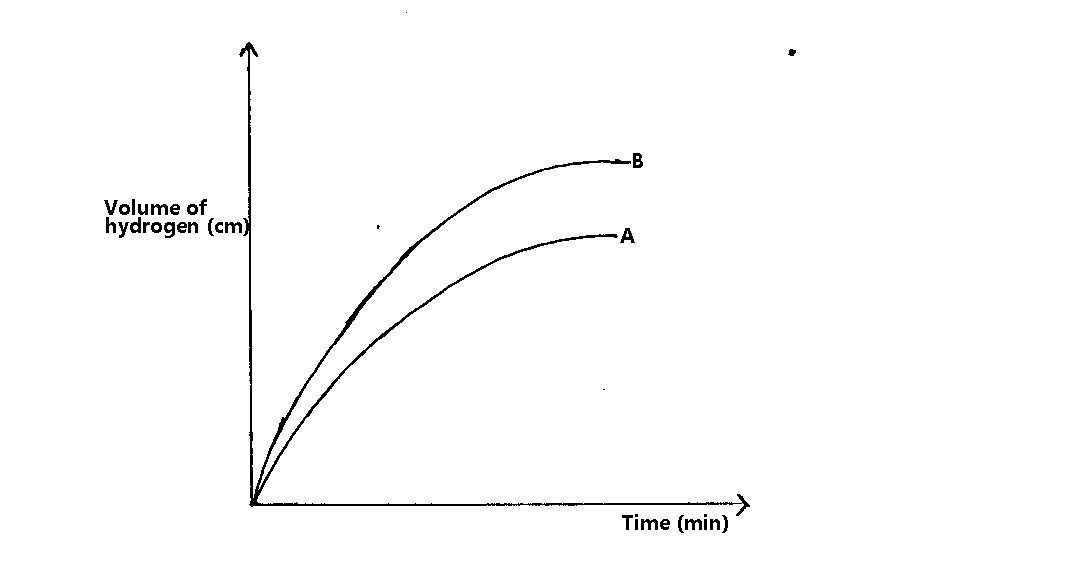
**(b)Give one** advantage and one disadvantage of II (2mks)

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25.Two experiments were carried out as follows and the volume of hydrogen gas evolved measured at intervals of 10 seconds for 100 seconds

* + - 1. 8cm of magnesium ribbon was added to 1M hydrochloric acid.
      2. 8cm of magnesium ribbon was added to 0.5M hydrochloric acid

Graphs of volume of hydrogen evolved against time were plotted thus



(a) Which of the graphs was obtained for reaction (i) **Explain** (2mks)

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(b) **Explain** the general shape of graphs (1mk)

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4NH3 (g) + 5O2 (g) 4NO (g) + 6H2O (l)

a) State two conditions under which this reaction is carried out (2mks) ...........................................................................................................................................................................................................................................................................................................................................

b) State two conditions under which nitric acid would react with magnesium metal to produce hydrogen gas. (1 mk)

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(a) the quantity of heat produced during the experiment (1mk)

( density of water = 1gcm-3, sp.ht, cap of water = 4.2Jg-1K-1, O =16, C =12, H =1)

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(b) the molar enthalpy of combustion of ethanol (2mks)

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28. **Draw** a dot-cross diagram to show bonding in Cl2O ( Cl= 17, O = 8) (2mks)

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29.Complete the diagram below to show how particles from a radioactive source can

be distinguished from each other. Label your diagram clearly. (3mks)

