**MOKASA 2 EXAMINATIONS – JULY 2018**

**CHEMISTRY PAPER 3**

**MARK SCHEME**

1. a).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time (min) | 0 | ½ | 1 | 1 ½ | 2 | 2 ½ | 3 | 3 ½ | 4 | 4 ½ | 5 | 5 ½ | 6 |
| Temperature (0C) | 22.0 | 22.0 | 22.0 | X | 29.0 | 30.0 | 32.0 | 34.0 | 35.0 | 35.0 | 34.0 | 33.5 | 33.0 |

*CT = 1*

*D = 1*

*A = 1 initial temperature2*

*T = 1*

b). ∆T= 34 – 20 = 140C (*1 mark)*

c). Energy change = 50 x 4.2 x 14 *(1)*

= 2940 Joules *(1)* (*2 marks)*

d). Moles = 2940  *(1)*

323 x 1000

= 0.009 moles *(1)*  (*2 marks)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **III** |
| Final burette reading (cm3) | 15.9 | 15.9 | 31.9 |
| Initial burette reading (cm3) | 0.00 | 0.0 | 16.0 |
| Volume of solution G used (cm3) | 15.9 | 15.9 | 15.9 |

*(6 marks)*

*CT = 1*

*D = 1*

*A = 1*

*P.A = 1*

*F.A = 1*

e). 15.9 +15.9 + 15.9 *( ½ )*

3

= 15.9cm3 *( ½ )* *1 mark*

f). 15.9 x 0.5

1000 *(1)*

= 0.008 moles *(1) 2 marks*

g). i). Moles of sulphuric acid = 0.008

2

= 0.004 moles *( ½ )* *1 mark*

ii). 25 cm3 = 0.004 ( ½ )

100cm3 = 0.016 moles *( ½ )*  *1 mark*

iii). Total moles of F = 0.009 + 0.016 *(½)*

= 0.025 moles *( ½ )* *1 mark*

iv). 50cm3 = 0.025 moles

1000cm3 = 0.025 x *1000 ( ½ )*

50

= 0.5M *(½)* *1 mark*

2. Dissolve all of the solid **G** in about 10cm3 of distilled water in a boiling tube. Use the solution for tests that follows

(i) Add lead II nitrate the solution

|  |  |
| --- | --- |
| Observations | Inferences |
| White ppt  ( ½ mark) | SO2- 4 , SO2- 3 , Cl - , CO2- 3  (1 mark) |

(ii) Add Barium Nitrate

|  |  |
| --- | --- |
| Observations | Inferences |
| White ppt  ( ½ mark) | SO2- 4 , SO2- 3 , CO2- 3  (1 mark) |

(iii) Place 2 cm3 of the solution in a test-tube and add 2 drops of acidified potassium Manganate (VII); solution **C**.

|  |  |
| --- | --- |
| Observations | Inferences |
| Purple is decolorized  ( ½ mark) | SO2- 3  ( ½ mark) |

(iv) To 2cm3 of the solution, add half of solid sodium hydrogen carbonate provided.

|  |  |
| --- | --- |
| Observations | Inferences |
| No Effervescence  ( ½ mark) | H+ absent  ( ½ mark) |

2**B**

**You** are provided with a liquid **L** suspected to be unsaturated alkanols

Using the reagents below write down a correct procedure that can be used to determine the functional group in L

* Acidified potassium permanganate
* Bromine liquid
* Acidified potassium dichromate
* Bunsen burner.

|  |  |
| --- | --- |
| Test1 | Expected observation |
| Take a small amount and heat | Burns with a yellow soot flame  (1 mark) |

|  |  |
| --- | --- |
| Test2 | Expected observation |
| Add 2 drops of acidified potassium permanganate  ( ½ mark) | Purple acidified potassium Manganate is decolorized  (1 mark) |

|  |  |
| --- | --- |
| Test3 | Expected observation |
| Add bromine water  ( ½ mark) | Yellow bromine water is decolorized  (1 mark) |

|  |  |
| --- | --- |
| Test4 | Expected observation |
| Add acidified potassium dichromate  ( ½ mark) | Orange colour changes to green  (1 mark) |

**Carry out the test described above and write the correct observation and inferences**

|  |  |
| --- | --- |
| Observation 1 | Inferences |
| Burns with a blue flame  ( ½ mark) | C = C - / - C = C - absent  (1 mark) |

|  |  |
| --- | --- |
| Observation 2 | Inferences |
| Purple is decolorized  ( ½ mark) | R-OH  (1 mark) |

|  |  |
| --- | --- |
| Observation 3 | Inferences |
| Yellow bromine water remains yellow  ( ½ mark) | C = C - / - C = C - absent  (1 mark) |

|  |  |
| --- | --- |
| Observation 4 | Inferences |
| Orange changes to green  ( ½ mark) | R-OH  (1 mark) |