**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 temperature*$ \pm $*2*

 *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) |