**Task 5: Validation Test Part B (13 marks)**

1. An experimentalist does some experiments with substances W, X, Y and Z.

Melting point NaCl : 800°C Melting point NaOH :318°C

Typical melting points of metals 800°C or more

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **W** | **X** | **Y** | **Z** |
| State: Solid, liquid or gas at room temperature | Solid | Solid | Solid | Solid |
| Appearance | Hard | Hard | Soft |  |
| Scratches it with a diamond knife | No effect | Flakes off or shatters if he/she presses too hard | No effect | No effect |
| Heats it to 250°C  And tries to stretch it out | Some stretching out | No effect | Turns into a liquid | No effect |
| Heats it to 900°C | Melts | Melts | Turns into a gas | solid |
| Measures its conductivity or the current at room temperature | 2000mA | No current | No current | No current |
| Measures its conductivity at 400°C | 4000mA | 270mA | No current | No current |
| Places the substance in water | Nothing happens | Dissolves | Nothing happens | Nothing happens |
| Measures the conductivity (current) of the dissolved substance in water | Won’t dissolve | 330mA | 0mA | Won’t dissolve |

From the results determine the type of bonding that each substance has : [6 marks]

W: \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1)

X :\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1)

Y: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1)

Z :\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1)

State the charge carriers in W: \_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( 1 )

State the charge carriers in X : \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 )

1. **In answering the following questions do not choose electrical conduction experiments**

a) You are given blue CuSO4 crystals and a piece of blue metal. [ 7 marks]

State an experiment that allows you to distinguish between the two: (1)

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Explain what will happen, and how this allows you to distinguish between the two materials. Make sure you make reference to the materials structure when answering this question. To help you a guide to answering the question is given below.

**CuSO4 :**

State what will happen? (1)

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Explain why this occurs, referring to the material’s structure (2)

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**Blue metal :**

State what will happen? (1)

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Explain why this occurs, referring to the material’s structure (2)

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