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Mark schemes must be read in conjunction with the question papers and the report on the examination.

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1 Table of results

total volume of water boxes correctly completed (1)
temperature boxes completed (1)
values decreasing (1)
comparable to supervisor’s results (2) \(±10\) at 10 cm\(^3\) \(±10\) at 16 cm\(^3\)  

(a) appropriate scale for y axis (1)
points plotted correctly(4), –1 for each incorrect
best fit straight line graph (1)  

(b) clear liquid formed/no solid visible owtte (1) e.g. no salt left  

(c) value from graph for 9 cm\(^3\) of water (1) \(±\frac{1}{2}\) small square
extrapolation of straight line shown (1)  

(d) sketch graph below line (1)
label (1)  

(e) temperatures at which crystals appear lower (1)
solution more dilute in same volume of water/less saturated owtte (1)
temperature halved as half as much solid = 2  

(f) one improvement from e.g.
don’t use a beaker of cold water to cool solution/
do not remove thermometer from the solution/
use second person/or IT method to note formation of crystals
repeat

linked explanation
different rate of heat losses/
loss of solid on thermometer/
observing formation of first crystals may vary
average
2 (a) Tests on solid W

- yellow (1)
- precipitate (1) not solid [2]

(b) Tests on solution X

(i) blue (1)
- pH of solution X approx 1–4 (1) [1]

(ii) blue (1)
- precipitate (1) [2]

(iii) blue precipitate (1)
- darker/deep/royal blue (1)
- solution (1) or precipitate dissolves/goes clear [3]

(iv) brown (liquid/solution) (1)
- cream/white (1)
- solid/precipitate (1) [3]

(c) Tests on solution Y

(i) pH 1–3 (1) [1]

(ii) white (1)
- precipitate (1) [2]

(d) iodide or I (1) not iodine [1]

(e) copper (1)
- acidic (1) [2]

(f) sulfate only (1)
- acid only (1)
- sulfuric acid (2) max [2]

[Total: 40]