Logo, company name

Description automatically generated**Year 11 ATAR Chemistry**

Task 8: Designing a cold pack Investigation (Validation Test)

Reference: Exploring Chemistry Year 11 ATAR pg 87

Weighting 7.5% of Year Total (24 marks total)

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

WORKED WITH: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The following questions are based on your investigation. Please answer them in the space provided.**

1. What qualities make for an effective cold pack? (3 marks)

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1. Which of the substances was the most effective for use in a cold pack? (1 mark)

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1. What ratio of solute to solvent was the most effective? (1 mark)

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1. Draw a labelled energy profile diagram that would depict the reaction occurring in a cold pack.

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(5 marks)

1. For part 1, calculate the change in energy (Q) for each of the four substances.

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| Substance tested: | Mass of substance (m): | Change in temperature (ΔT): | Change in energy (Q): |
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(6 marks)

1. Describe the energy that goes into bond breaking and bond forming in an:
   1. Exothermic reaction: (2 marks)

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* 1. Endothermic reaction: (2 marks)

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1. The reaction of urea with water is shown below:

CO(NH2)2(s) + H2O(l) 🡪 CO2(g) + 2NH3(g) ΔH = 15.4kJmol-1

How many joules of energy is absorbed by 25g of urea? (4 marks)

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**END OF VALIDATION TEST**