

**2013 AP<sup>®</sup> CHEMISTRY FREE-RESPONSE QUESTIONS**

(b) Carbon dioxide gas is bubbled into freshly distilled water.

(i) Balanced equation:

(ii) The pH of the solution decreases as the reaction proceeds. Explain.

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(c) A piece of zinc metal is placed in a 1.0 *M* solution of hydrochloric acid at 25°C.

(i) Balanced equation:

(ii) When a piece of zinc metal is placed in a 1.0 *M* solution of ethanoic (acetic) acid at 25°C, the rate of reaction is slower than when 1.0 *M* hydrochloric acid at 25°C is used. Explain.

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**YOU MAY USE THE SPACE BELOW FOR SCRATCH WORK, BUT ONLY EQUATIONS THAT ARE WRITTEN IN THE ANSWER BOXES PROVIDED WILL BE SCORED.**