

**Mark Scheme**

Q1.

Question Number	Answer	Mark
	<p>The only correct answer is C</p> <p><i>A is not correct because only Mn<sup>2+</sup> is an autocatalyst for this reaction</i></p> <p><i>B is not correct because only Mn<sup>2+</sup> is an autocatalyst for this reaction</i></p> <p><i>D is not correct because only Mn<sup>2+</sup> is an autocatalyst for this reaction</i></p>	(1)

Q2.

Question Number	Answer	Mark
	<p>The only correct answer is B</p> <p><i>A is not correct because it is not an explanation</i></p> <p><i>C is not correct because the d-orbitals can be split in energy</i></p> <p><i>D is not correct because there are ten electrons in the d-subshell</i></p>	(1)

Q3.

Question Number	Answer	Mark
	<p>The only correct answer is B</p> <p><i>A is not correct because 4 of the 3d electrons should be unpaired</i></p> <p><i>C is not correct because there should not be any electrons in the 4s orbital</i></p> <p><i>D is not correct because there should not be any electrons in the 4s orbital</i></p>	(1)

Q4.

Question Number	Answer	Mark
	<p>The only correct answer is C</p> <p><i>A is not correct because it is <math>3d^3</math> not <math>3d^5</math></i></p> <p><i>B is not correct because it is <math>3d^6</math> not <math>3d^5</math></i></p> <p><i>D is not correct because it is <math>3d^4</math> not <math>3d^5</math></i></p>	(1)

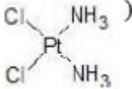
Q5.

Question Number	Answer	Mark
	<p>The only correct answer is B</p> <p><i>A is not correct because covalent is missing</i></p> <p><i>C is not correct because it has ionic is incorrect</i></p> <p><i>D is not correct because it has ionic is incorrect</i></p>	(1)

Q6.

Question Number	Acceptable Answer	Mark
	<p>The only correct answer is C</p> <p><i>A is incorrect because gaseous reactants attach only to the surface</i></p> <p><i>B is incorrect because this happens after adsorption</i></p> <p><i>D is incorrect because this is detachment of the products from the surface</i></p>	(1)

Q7.

Question Number	Answer	Mark
	<p>The only correct answer is C (  )</p> <p><i>A is not correct because water is not one of the ligands and the configuration of chloride ions should be cis not trans</i></p> <p><i>B is not correct because water is not one of the ligands</i></p> <p><i>D is not correct because the configuration should be cis not trans for the chloride ligands and one of the other ligands is a water molecule rather than ammonia</i></p>	(1)