

Q1.

Question number	Answer	Additional guidance	Mark
(v)	<p>C increase the efficiency of the cyclist and bicycle</p> <p>A is incorrect because lubrication has no effect on work done against gravity</p> <p>B is incorrect because lubrication will increase efficiency</p> <p>D is incorrect because the overall energy transfer will not increase</p>		(1) AO1

Q2.

Question Number	Answer	Additional guidance	Mark
(ii)	<p>An explanation linking</p> <p>reduces friction/amount of thermal energy transferred (1)</p> <p>extra useful energy is available/less input energy is required (1)</p> <p>efficiency = useful energy transferred (by the bicycle) ÷ total energy supplied (to the bicycle) (1)</p>	<p>(oil provides) lubrication</p> <p>less energy wasted</p> <p>allow for the last two mark points; either less input energy is required to produce the same output for 2 marks or more output energy is available for the same input energy for 2 marks</p>	(3)

Q3.

Question number	Answer	Mark
	An answer that combines points of interpretation/evaluation to provide a logical description: Use of lubrication / oil (1) To reduce friction (between parts) (1)	(2)

Q4.

Question Number:	Answer	Additional guidance	Mark
(i)	an explanation linking: wheel rubs on axle (as it rotates) OR friction (between the wheel and the axle) (1) causes heating/transfer of (thermal) energy/ work being done (1)	allow generates heat	(2) AO 1 1

Question Number:	Answer	Additional guidance	Mark
(ii)	any one from: lubrication/oil (1) (ball) bearings / ball-race (1) go slower (1)	anything that lubricates – grease etc.	(1) AO 1 1