

## Mark schemes

**Q1.**

- (a) 1. and 2. Accept for 2 marks correct names of three components adenine, ribose/pentose, three phosphates;;

*Accept for 1 mark, correct name of two components*

*Accept for 1 mark, ADP **and** phosphate/Pi*

*Ignore adenosine*

*Accept suitably labelled diagram*

3. Condensation (reaction);

*Ignore phosphodiester*

4. ATP synthase;

*Reject ATPase*

4

**Q2.**

- (b) Adenosine diphosphate and (inorganic) phosphate;

*Accept ADP for adenosine diphosphate*

*Accept Pi / PO<sub>4</sub><sup>3-</sup> / P in a circle for inorganic phosphate*

*Reject adenine diphosphate*

*Reject phosphorus / P for phosphate*

1

- (c) 1. Species / organism the muscle tissue came from;

**OR**

Thickness / type / source of the muscle tissue;

*Ignore surface area of muscle tissue*

2. Temperature of the muscle tissue / ATP solution / slides;

*Need to be qualified*

3. pH of the ATP solution;

*Need to be qualified*

*Reject concentration / volume of ATP hydrolase*

2 max

- (d) Description

1. As concentration of ATP increases, length of muscle decreases;

*Accept negative correlation*

Explanation

2. More ATP (hydrolysed by ATP hydrolase), **so** more energy released, **so** more muscle contraction / shortening of muscle;

*Accept more ATP available for correct/named aspect of muscle contraction*

*Idea of more is required once.  
Reject energy produced*

2

(e)  $4.88 \times 10^{-6}$  ;;;

If answer incorrect

**EITHER**

Allow 1 mark for 0.244

Allow 1 mark for  $1.22 \times 10^{-5}$

**OR**

Allow 1 mark for 12200 / 1.525

Allow 1 mark for 0.61

*Accept  $5 \times 10^{-6}$*

*Accept correct answer however expressed*

*Max 2 for incorrect final answer*

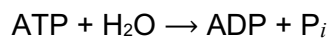
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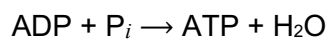
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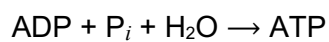
**Q3.**

(a)










1

- (b) 1. Human ATP synthase has a different tertiary structure to bacterial ATP synthase

**OR**

Human ATP synthase has a different shape active site to bacterial ATP synthase

**OR**

Antibiotic cannot enter human cells/mitochondria

**OR**

Antibiotic not complementary (to human ATP synthase);

1

**Q4.**

- (b) 1. Releases relatively small amount of energy / little energy lost as heat;  
*Key concept is that little danger of thermal death of cells*
2. Releases energy instantaneously;  
*Key concept is that energy is readily available*
3. Phosphorylates other compounds, making them more reactive;
4. Can be rapidly re-synthesised;
5. Is not lost from / does not leave cells.

**2 max****Q5.**

- (a) 1. From ADP and phosphate;  
*Accept  $\text{P}_i/\text{PO}_4^{3-}$  /  $\text{P}$*   
*Reject P/Phosphorus*  
*Reject use of water in the reaction*

2. By ATP synthase;
3. During respiration/photosynthesis;

**2 max**

- (b) 1. To provide energy for other reactions/named process;  
*Reject 'produce' energy*
2. To add phosphate to other substances **and** make them more reactive/change their shape;

**2**