

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 / PO₄³⁻ / 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) 4.88×10^{-6} ;;;

If answer incorrect

EITHER

Allow 1 mark for 0.244

Allow 1 mark for 1.22×10^{-5}

OR

Allow 1 mark for 12200 / 1.525

Allow 1 mark for 0.61

Accept 5×10^{-6}

Accept correct answer however expressed

Max 2 for incorrect final answer

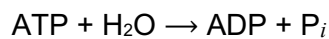
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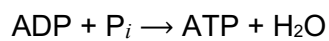
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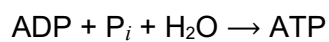
Q3.

(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 $\text{P}_i/\text{PO}_4^{3-}$ / 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