



CHEMISTRY ONLINE
— **TUITION** —

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BIOLOGY

BIOLOGICAL MOLECULES

LEVEL & BOARD:	AQA (A - LEVEL)
TOPIC:	ATP
PAPER TYPE:	Solution 1
TOTAL QUESTIONS:	05
TOTAL MARKS:	18

ATP

1.

(a) A single molecule of adenosine triphosphate (ATP) is a nucleotide derivative and is formed from a molecule of ribose, a molecule of adenine and three phosphate groups. Hydrolysis of ATP to adenosine diphosphate (ADP) and an inorganic phosphate group (P_i) is catalysed by the enzyme ATP hydrolase.

2.

(b) Adenosine diphosphate and inorganic phosphate

(c)

- Species the muscle tissue came from
- Temperature of the muscle tissue (ATP solution)
- pH of the ATP solution

(d) **Description**

As concentration of ATP increases, length of muscle decreases.

Explanation

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

(e)

$$= 30,500 - 18,300 = 12200$$

$$= 12200 / 20 = 610$$

$$= 610 / 1000 = 0.61$$

$$= 0.61 \times 8 \times 10^{-6} = 4.88 \times 10^{-6} \text{ J}$$

3.

(a) $ADP + P_i \rightarrow ATP + H_2O$

(b) Human ATP synthase has a different shape active site (tertiary structure) to bacterial ATP synthase.

4.

(a)

- Releases relatively small amount of energy
- Releases energy instantaneously
- Phosphorylates other compounds, making them more reactive;
- Can be rapidly re-synthesised, does not leave cells

5.

(a) ATP is resynthesized by the condensation of ADP and P_i . This reaction is catalyzed by the enzyme ATP synthase during photosynthesis, or during respiration.

(b)

- To provide energy for active transport across a cell surface membrane.
- To phosphorylate other molecules and make them more reactive.



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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