C1.1 Enzymes and metabolism

What the Cell · DP Biology · worksheet · SL statements C1.1.1–10

Name _____ **Date** _____ **Total** _____ / 44

About 45 minutes, or one section at a time. A calculator is allowed. The number of marks shows how many separate points to make.

Section A: Recall

7 marks

1 **Define** metabolism. C1.1.2 **[1]**

2 **State** one example each of an anabolic reaction and a catabolic reaction. C1.1.3 **[2]**

3 **State** what is meant by the active site. C1.1.4 **[1]**

4 **State** two factors that can denature an enzyme. C1.1.7 **[2]**

5 **Define** activation energy. C1.1.10 **[1]**

Section B: Understanding

15 marks

6 **Explain** why cells need many different enzymes. C1.1.2 **[2]**

7 **Describe** induced-fit binding. C1.1.5 **[2]**

8 **Explain** the role of molecular motion in enzyme catalysis. C1.1.6 **[3]**

9 **Explain** the effect of increasing substrate concentration on reaction rate. C1.1.8 **[3]**

10 **Explain** how changing the shape of an active site affects specificity. C1.1.7 **[2]**

11 **Sketch** an energy graph for a reaction with and without an enzyme, labelling both activation energies. C1.1.10 **[3]**

Section C: Working with data

14 marks

All data in this section are invented for practice. The patterns are realistic.

12 C1.1.8, C1.1.9

Students used catalase from liver to break down hydrogen peroxide at different temperatures. They measured the oxygen collected.

Temperature / °C	10	20	30	40	50	60
Oxygen in 60 s / cm^3	6	12	24	33	18	3

a **Calculate** the rate of reaction at 40°C. **[2]**

b **Identify** the optimum temperature within this range. **[1]**

c **Explain** the results between 10°C and 30°C. **[2]**

d **Explain** the results between 40°C and 60°C. **[3]**

e **State** two variables that must be controlled. **[2]**

13 C1.1.9

In another trial, oxygen volume rose like this:

Time / s	0	10	20	30	40
Oxygen / cm^3	0	8	14	17	18

a **Calculate** the initial rate, using the first 10 seconds. **[2]**

b **Explain** why the rate falls over time. **[2]**

Section D: Longer answer

8 marks

14 **Explain** how an enzyme catalyses a reaction, and how temperature and pH affect this. C1.1.4–10 **[8]**