Total marks	14
Time allowed	Approximately 25 minutes
Instructions	Answer ALL questions. Write answers in the spaces provided.

Question 1

A student uses starch solution, amylase and buffer solutions to investigate enzyme activity.

pH	Time to digest starch (s) — Trial 1	Trial 2	Trial 3	Mean time (s)
4	310	295	318	308
6	175	180	172	176
7	98	102	95	98
8	168	174	165	169
10	No reaction	No reaction	No reaction	-

A student investigates the effect of pH on the rate of amylase activity. The table below shows her results.

[0 marks]

Question 2

Using the data in the table, identify the optimum pH for amylase activity. Explain your answer.

[2 marks]

Question 3

At pH 10, the iodine solution always remained blue-black. Explain why no starch was digested at pH 10.

[3 marks]

Question 4

Explain why the student used a buffer solution in this experiment rather than adjusting pH with acid or alkali.

[2 marks]

Question 5

Calculate the mean rate of reaction at pH 7. Give your answer in s■¹. Show your working.

[2 marks]

Question 6

State TWO variables the student must control in this investigation to make it a fair test.

[2 marks]

★ **Higher Tier**

Question 7

Explain, using the induced fit model, how amylase catalyses the hydrolysis of starch.

[3 marks]

END OF QUESTIONS — Total: 14 marks