Level 2 Biology: practice paper 2026

AS 91156 Demonstrate understanding of life processes at the cellular level · Vertex Academy practice paper, not an NZQA paper

Attempt ALL the questions. Show ALL working. Write your answers on lined paper, or in the space under each question.

QUESTION ONE

(a) Kiwifruit contains an enzyme called actinidin, which digests proteins.
Describe how an enzyme such as actinidin speeds up a reaction. Use the terms active site, substrate and activation energy.

(b) Jelly sets because gelatin, a protein, forms a network that traps water. A jelly made with fresh kiwifruit does not set, but a jelly made with cooked or tinned kiwifruit sets normally.
Explain these results.

(c) A class measured how much gelatin actinidin digested in 30 minutes at different temperatures. Their results are in the table.

Discuss the effect of temperature on the activity of actinidin, using the data.

Temperature (°C)	**10**	**20**	**30**	**40**	**50**	**60**	**70**
Gelatin digested in 30 min (%)	12	25	41	55	60	38	5

QUESTION TWO

(a) Ryegrass in a Waikato dairy paddock photosynthesises in its chloroplasts.
Describe where the light-dependent and light-independent stages of photosynthesis take place, and what happens in each stage.

(b) On a cold, cloudy winter morning, the ryegrass photosynthesises slowly.
Explain how light intensity and carbon dioxide concentration each affect the rate of photosynthesis, referring to the stage each one affects.

(c) A runner sprints 400 m at the Christchurch athletics track. In the first seconds her leg muscles use mostly aerobic respiration, but by the last 100 m much of their ATP comes from anaerobic respiration. Discuss aerobic and anaerobic respiration in her muscle cells, and why her muscles rely more on anaerobic respiration towards the end of the race.

QUESTION THREE

(a) Before a cell divides by mitosis, its DNA is copied by semi-conservative replication.
Describe how DNA is replicated. Include complementary base pairing and the antiparallel strands.

(b) Students placed potato chips of equal size in sucrose solutions for 2 hours and measured the change in mass. Their results are in the table.
Explain the results, and estimate the sucrose concentration that has the same water potential as the potato cells.

Sucrose (mol L^{-1})	**0.0**	**0.2**	**0.4**	**0.6**
Change in mass (%)	+12	+4	−3	−9

(c) Root hair cells take up water and mineral ions such as nitrate from the soil. When a paddock is waterlogged for several days after heavy rain, the grass takes up far less nitrate.
Discuss how water and nitrate ions enter root hair cells, and why waterlogging reduces nitrate uptake.

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