YEAR 11 | BIOLOGY

Student practice paper

Name: _____ Date: _____

Suggested time: 60-75 minutes. Show reasoning and use evidence where appropriate. Questions are original and intended for MYP 5 / pre-DP preparation.

Section A - Cells and transport (20 marks)

1. Explain two differences between prokaryotic and eukaryotic cells. [4]

2. Describe osmosis and predict what happens to a plant cell placed in concentrated salt solution. [6]

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3. A cell image measures 45 mm; its real width is 0.015 mm. Calculate magnification. [4]

4. Explain why the small intestine has villi and a rich blood supply. [6]

Section B - Systems and genetics (20 marks)

5. Explain how enzymes are affected by temperature above their optimum. [5]

6. Compare aerobic and anaerobic respiration in human muscle. [5]

7. Two heterozygous parents (Bb x Bb) have offspring. Draw or describe a Punnett square and find probability of bb. [5]

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8. Explain how natural selection may increase antibiotic resistance in a bacterial population. [5]

Section C - Experimental design (20 marks)

9. A student tests how light intensity affects pondweed oxygen bubble production. State an independent, dependent and two control variables. [6]

10. Explain why counting bubbles may be an imperfect measure of photosynthesis rate and suggest an improvement. [5]

11. Describe how repeats, a mean and identifying anomalies improve confidence in results. [5]

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12. Predict the general trend as light intensity rises and explain why it may level off. [4]

ANSWER KEY & TUTOR GUIDANCE

Biology

The following pages contain suggested answers, marking points and tutor guidance. For open-ended tasks, answers are indicative rather than the only acceptable responses.

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Tutor answer and marking guide

Indicative answers

1: Prokaryotes lack membrane-bound nucleus and organelles; eukaryotes contain them. [4]

2: Net movement of water through a partially permeable membrane from higher water potential to lower; water exits cell, membrane may pull from wall (plasmolysis). [6]

3: Magnification = 45 / 0.015 = x3000. [4]

4: Large surface area for absorption; capillaries maintain concentration gradients and transport absorbed nutrients. [6]

5: Above optimum, increased molecular movement destabilises enzyme shape; active site changes and activity falls (denaturation). [5]

6: Aerobic requires oxygen and yields much more ATP, products CO2 and water; anaerobic in human muscle yields less ATP and lactate. [5]

7: BB, Bb, Bb, bb; probability 1/4 or 25%. [5]

8: Resistant variants survive antibiotic exposure and reproduce, passing on resistance; frequency rises. [5]

9: IV light intensity or lamp distance; DV oxygen bubbles per minute; controls temperature, species/length of plant, CO2 availability, time. [6]

10: Bubble sizes vary and some oxygen dissolves; measure oxygen volume using gas syringe/sensor. [5]

11: Repeats reduce random error; mean summarises; anomalies checked rather than discarded without reason. [5]

12: Rises initially then plateaus when another factor such as CO2 or temperature becomes limiting. [4]

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Tutor notes

Award scientific accuracy, justified reasoning and experimental validity. Total 60 marks.