

**Assessment Schedule – 2008****Biology: Describe cell structure and function (90464)****Evidence Statement**

Q	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	<p><b>Describes</b> that rough endoplasmic reticulum has a number of <b>ribosomes</b> attached to it, whilst smooth endoplasmic reticulum does not.</p> <p>Comparison made or implicit. Eg, one is smooth and the other is rough because RER has ribosomes.</p>		
(b)	<p><b>Describes</b> the basic function of BOTH types:</p> <p><b>RER:</b> Protein synthesis is the primary function.</p> <p>OR</p> <p><b>SER:</b> Synthesizes lipids / steroids / storage of calcium in muscles / (transport)</p>	<p><b>Reasons</b> of why ONE is needed:</p> <p>Describes the function of one type of ER and gives reasons for why it is needed : reason must relate to muscle cells.</p> <p>Eg:</p> <p>RER : synthesis of protein : growth and repair of muscle cells / enzymes to catalyze reaction related to respiration as lots of energy needed in muscle cells</p> <p>OR</p> <p>SER : synthesis of lipids / the metabolism of carbohydrates : needed for ATP / energy production to be used in muscle cell</p> <p>OR</p> <p>releasing calcium to trigger muscle contraction</p> <p>OR</p> <p>synthesis of steroids for muscle development.</p>	
TWO (a)	<p>Effective <b>description</b> of the general purpose of an enzyme:</p> <p>Eg:</p> <ul style="list-style-type: none"> <li>• Catalysts: speed up reaction</li> <li>• Speed up reaction / catalysts : lower activation energy / may be used more than once</li> <li>• Catalyse: biochemical reactions.</li> </ul>		

(b)	<p><b>Description of lock and key</b> shape / <b>active site</b> / <i>cleft</i> : the enzyme and substrate shape match</p> <p>OR</p> <p><b>Description of induced fit</b> If the active site is accessible then the reaction can occur : recognises that the active site is <b>not rigid</b></p>	<p><b>Explanation links structure (shape of the active site, ie its specificity) to function</b></p> <p>Lock and Key</p> <ul style="list-style-type: none"> <li>• <b>active site</b> of enzyme matches substrate shape model (diagram or description) : (implication of) change in substrate</li> </ul> <p>AND</p> <p>Induced fit</p> <ul style="list-style-type: none"> <li>• The <b>active site</b> is flexible : (enzyme/active site) changes slightly when combined with substrate.</li> </ul>	
(c)	<p><b>Description</b> of what each factor does is in relation to enzymes or how it changes the rate. (TWO factors clearly described)</p> <p>Eg:</p> <ul style="list-style-type: none"> <li>• Higher substrate amount : more <b>enzyme activity</b> / increased number of reactions (higher reaction rate).</li> <li>• Higher enzyme concentration : <b>more enzymes to react</b> with substrate / higher rate of reaction.</li> <li>• Coenzymes : hold molecules to the active site better / needed for reaction to occur / increase the rate of reaction.</li> <li>• Inhibitor / poisons : prevent many enzymes from working properly (eg. cyanide / stop reaction).</li> </ul> <p>(Substrate and concentration could be up or down change).</p> <p>Code: F = factor described.</p>	<p><b>Reasons for</b> how / why the factors alter the rate up or down: (TWO factors explained)</p> <p>Eg:</p> <ul style="list-style-type: none"> <li>• Higher Substrate: more enzyme activity : increase number of reactions (NOT reaction rate).</li> <li>• Higher concentration of enzyme: more enzymes to react : greater number of reactions / reaction rates increase (NOT enzyme activity increases; ie no change in product per unit time per unit mass of enzyme).</li> <li>• Coenzyme: organic molecules alter the shape of the active site : more effectively combine with the substrate(s) : without them the enzymes will not work / at a very low rate of activity.</li> <li>• Inhibitor: alter or block the active site to prevent the enzyme-substrate complex forming : stops the reaction / a few reactions may still occur / low rate.</li> </ul> <p>Code: F<sub>e</sub> = factor explained</p>	<p><b>Discussion considers of how factor increases and decreases the reaction rate and relates to the optimum</b> (One discussion and one explanation)</p> <p>Eg:</p> <ul style="list-style-type: none"> <li>• Higher Substrate: more enzyme activity: increase number of reactions: until available enzyme molecules become '<b>saturated</b>' and <b>the number of reactions levels off</b> (can be shown by a diagram).</li> <li>• Higher concentration of enzyme : greater number of reactions : reaction rates increase : <b>the actual enzyme activity does not increase</b> (ie no change in product per unit time per unit mass of enzyme).</li> </ul> <p>Code: F<sub>d</sub> = factor discussed</p>

THREE (a)	<p><b>Describes</b> the semi-permeable membrane (spm) as one that only allows <b>certain</b> substances to <b>pass through</b> it.</p> <p>Eg: spm : controls entry : exit of substances (controls movement of substances in / out of the cell).</p>	<p><b>Explains</b> why a membrane needs to be semi-permeable. Reason relates to internal balance / idea of homeostasis / control of internal environment.</p> <p>Eg: spm allows the organism to effectively control the passage of wanted and unwanted materials : to maintain the internal environment of the cell / osmotic potential.</p>	
(b)	<p><b>Infers</b> a surface area to volume (SA to Vol.) effect.</p> <p>Eg: small size : large SA to Vol</p> <p>OR</p> <p>Movement of required particles takes too long to sustain life when cell is too big.</p>	<p><b>Explains</b> why large SA to Vol. is needed.</p> <p>Eg: Idea of movement of particles / diffusion being too slow / inefficient when cell too big, therefore SA to vol. ratio is a limitation.</p>	
(c)	<p><b>Describes</b> the role of the contractile vacuole</p> <p>Eg: Contractile vacuole : removes the water that enters the organism through osmosis / down concentration gradient</p> <p>OR</p> <p>Describes the functioning as: the contractile vacuole fills with water, which is then released to the outside / acts as a pump to remove excess water from the cell.</p>	<p>As Achievement and <b>Explains</b> that:</p> <p>Water is more concentrated on the outside of the organism in the fresh water of its habitat (the pond / lake) so water enters the organism by osmosis moving from high to low concentration.</p> <p>AND</p> <p>Explains why: Contractile vacuole is a pump to remove excess water OR Why cell will burst / be damaged if no contractile vacuole present.</p>	<p>As Merit and <b>Discussion</b> relates to the <b>fresh water environment:</b> <b>(Three ideas needed)</b></p> <p><b>Water in the organism compared with water in the pond</b> (e.g. pond is hypotonic compared with hypertonic organism) AND Contractile Vacuole is a <b>pump</b> (actively moves water out of the cell) AND <b>Effect</b> on cell if no contractile vacuole, eg cell will burst / be damaged because of the water moving into the cell due to the concentration gradient / pressure on the cell membrane.</p>
FOUR (a)	<p><b>Describes</b> photosynthesis as:</p> <p>Light <b>energy</b> / (sunlight) : chemical energy / glucose / starch.</p> <p>OR</p> <p>Converts energy (from the sun) for use in cellular processes e.g. respiration.</p> <p>NOT food / nutrients.</p>		

(b)	<p><b>Description</b> of structure <b>OR</b> location of chloroplasts: (ONE needed)</p> <p>Structure</p> <ul style="list-style-type: none"> <li>• flat stacks of thylakoids / grana</li> <li>• surrounded by stroma</li> <li>• Chloroplasts in cells have thin membranes / large surface area</li> </ul> <p>OR</p> <p>Location</p> <ul style="list-style-type: none"> <li>• chloroplasts are mostly in the leaves</li> <li>• large number of chloroplasts near the top of the leaf (in the upper palisade layer)</li> <li>• chloroplasts are found near the cell membrane of palisade cells.</li> </ul> <p>Codes: S = structure described, L = location described.</p>	<p><b>Gives reasons</b> for how photosynthesis is affected by ONE of structure and ONE of location: eg: More photosynthesis can occur because :</p> <p>ONE of Structure (S)</p> <ul style="list-style-type: none"> <li>• flat stacks of thylakoids have an increased surface area for the absorption of light</li> <li>• stroma is a clear fluid which doesn't block the light</li> <li>• chloroplasts have thin membranes / large surface area for absorption of light.</li> </ul> <p><b>AND</b></p> <p>ONE of Location (L)</p> <ul style="list-style-type: none"> <li>• location of the leaf on the plant means that they are directly exposed to the light.</li> <li>• chloroplasts, near the top of the leaf, and near the (palisade) cell membrane lead to more light being received.</li> </ul> <p>Codes: S<sub>e</sub> = structure explained; L<sub>e</sub> = location explained.</p>	
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### Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
<p>Total of FIVE opportunities answered at Achievement level or higher.</p> <p>5 × A</p>	<p>Total of at least SEVEN opportunities answered with THREE at Merit level or higher.</p> <p>3 × M + 4 × A</p>	<p>Total of at least EIGHT opportunities answered with ONE at Excellence level and THREE at Merit level or higher.</p> <p>1 × E + 3 × M + 4 × A</p>