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BL01

Unit 1 The Diversity of Living Organisms

Mark scheme

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2 3 6 X B L 0 1 / M S

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Question	Marking guidance	Mark	Comments
01.1	A Phospholipid/lipid; B Peptidoglycan/murein/glycoprotein;	2	

Question	Marking guidance	Mark	Comments
01.2	Capsule 1. protects from drying out / protects from phagocytosis / attachment to surfaces or other cells; Pilus 2.movement / attachment to surfaces or other cells / exchange of plasmids / conjugation;	2	INGORE sexual reproduction

Question	Marking guidance	Mark	Comments
01.3	37(nm);;	2	Allow one mark for (25 mm÷670 000) or (25 000µm÷670 000) or (2.5cm÷670 000) or 37.3

Question	Marking guidance	Mark	Comments
01.4	3.6×10^6 ;;	2	Allow one mark for 3 600 000

Question	Marking guidance	Mark	Comments
01.5	Any one from • Not a representative sample; • Not mixed evenly / cells overlapping; • Not all cells stained so not all visible; • A difference of one (a few) cells is multiplied each time the sample is diluted; • The stain dilutes the sample more;	1	

Question	Marking guidance		Mark	Comments
01.6			2 max	Allow two marks for 3 differences Allow one mark for 1 or 2 differences The <u>difference</u> must be clear ALLOW description of no nucleus e.g. DNA in cytoplasm IGNORE proteins unqualified ALLOW one named example of an organelle
	Eukaryote	Prokaryote		
	nucleus/nucleolus	no nucleus/no nucleolus;		
	larger ribosomes (80s)	smaller ribosomes (70s);		
	Linear DNA/chromosomes/has histones	circular DNA/single chromosome /does not have histones;		
	no plasmids	plasmids;		
	no mesosomes	mesosomes;		
	eukaryotic cells are <u>larger</u>	prokaryotic cells are smaller;		
	(named) membrane bound cytoplasmic organelles	no (named) membrane bound cytoplasmic organelles;		
	no flagellum/pili	(some have) flagellum/pili;		

Question	Marking guidance	Mark	Comments
02.1	1. (concentration of salt) Does not decrease yield by the same amount; 2. Different species have different tolerance points / allow data ranges for any 2 of the 3 species; 3. Species with lower tolerance points decrease yield faster;	2 max	ALLOW e.g. potato has the largest decrease in yield ALLOW e.g. onions have the highest tolerance point

Question	Marking guidance	Mark	Comments
02.2	Similar salt tolerance / genetically similar;	1	

Question	Marking guidance	Mark	Comments
02.3	1. Volume of (salt/distilled) water; 2. Light intensity / distance of light source / duration of light; 3. Ion/mineral <u>concentration</u>/pH of the <u>soil</u>; 4. Seeds from the same plant/berry; 5. Distance between the seeds; 6. Humidity;	2 max	2. ACCEPT light / amount of light 3. ACCEPT correctly named ion/mineral concentration/amount 3. IGNORE nutrients unqualified 4. IGNORE variety/type/species

Question	Marking guidance	Mark	Comments
02.4	1. (idea that) Not all the seeds will germinate; 2. Want them to be the same height/size / they have the same starting point; 3. It allows a comparison to be made; 4. To reduce competition;	2 max	ACCEPT not all seeds will grow / some seeds may die / some may be diseased / not all seeds will be healthy

Question	Marking guidance	Mark	Comments
02.5	1. (salt solution) Decreases the (mean) mass; 2. (salt solution) Has very little/no effect on the (mean) dry mass of strawberries;	2	ACCEPT idea that it is <u>only</u> 1g different

Question	Marking guidance	Mark	Comments
02.6	1. T-test / standard error and 95% confidence limits and 2. Allows a significant difference between two means to be seen;	1	

Question	Marking guidance	Mark	Comments
02.7	(these cells shrink because); 1. Water leaves the cell; 2. by osmosis/diffusion; 3. Water moves down a water potential gradient / from a <u>higher</u> to <u>lower</u> water potential/water potential is higher in the cells;	3	

Question	Marking guidance	Mark	Comments
03.1	Any three from: • Use a quadrat; • Key to identify the species; • (Tape measure to) set out a grid/co-ordinates; • Random number generator;	3 max	ACCEPT idea of separating field into squares

Question	Marking guidance	Mark	Comments
03.2	A large number of samples: To minimize the effect of an anomalous result OR So that an accurate/valid/reliable <u>mean</u> can be calculated OR So that stats tests can be carried out e.g. SD or t-test or standard error 95% confidence limit; Random samples: Random to avoid bias; Accept once only for either large or random To obtain representative data/samples;	2 max	

Question	Marking guidance	Mark	Comments
03.3	6.4;,,;	3	If the answer is incorrect: Allow one mark for 3422 or (59x58) and Allow one mark for 538 Allow two marks for 6.36... If the data for the treated field has been used allow two marks for 4.6 ALLOW ECF for two marks if graph has been mis-read but all other steps are correct

Question	Marking guidance	Mark	Comments
03.4	Species richness 1. Is the total number of different species; Index of diversity 2. Is the total number of different species and includes the number of individuals in each species;	2	

Question	Marking guidance	Mark	Comments
03.5	Accept answers in either order 1. mRNA; 2. Protein/polypeptide;	2	

Question	Marking guidance	Mark	Comments
03.6	Allow any two from: • Greater variety of food; • Greater number of habitats/niches; • Herbicide may be toxic to animals;	2 max	DO NOT ACCEPT more food

Question	Marking guidance	Mark	Comments
04.1	Active site;	1	

Question	Marking guidance	Mark	Comments
04.2	Water/H ₂ O;	1	

Question	Marking guidance	Mark	Comments
04.3	Enzyme-substrate complex/ES complex;	1	

Question	Marking guidance	Mark	Comments
04.4	1. Provides <u>specific</u> shape for the <u>active site</u> ; 2. (so that) substrate fits/is complementary to/binds into/attaches to the active site;	2	

Question	Marking guidance	Mark	Comments
04.5	1. Induced fit; 2. (idea that) the <u>active site</u> changes shape to become complementary/fits/binds OR <u>Active site</u> can't fit/bind/be complementary to the exact shape for just one substrate;	2	

Question	Marking guidance	Mark	Comments											
05.1	A tick in the box representing haploid and 2 cell divisions;	1	ALLOW a cross if the correct box is the only box marked ALLOW answers with crosses if only the correct box contains a tick											
	<table><tr><td rowspan="2">Type of cells produced</td><td colspan="2">Number of cell divisions</td></tr><tr><td>1</td><td>2</td></tr><tr><td>Haploid</td><td></td><td>✓</td></tr><tr><td>Diploid</td><td></td><td></td></tr></table>			Type of cells produced	Number of cell divisions		1	2	Haploid		✓	Diploid		
	Type of cells produced				Number of cell divisions									
				1	2									
	Haploid				✓									
Diploid														

Question	Marking guidance	Mark	Comments
05.2	Crossing over 1. (Chromatids are produced with) different/new combinations of alleles; 2. Correct example e.g. Ef/eF; Independent segregation 3. Different combinations of chromosomes (1 and 2)/maternal and paternal chromosomes are produced; 4. Correct example e.g. the alleles EF could be in the same gamete as D or d;	4	1. REJECT new alleles are produced 4. ALLOW other correct allele combinations

Question	Marking guidance	Mark	Comments
05.3	(In meiosis 1) 1. Homologous chromosomes/pairs are separated from one another; (In meiosis 2) 2. (Sister) chromatids are then separated/split from one another; 3. The idea of each chromatid carrying one allele; 4. Spindle (fibres) pull the chromosomes/chromatids to opposite poles of the cell;	3 max	IGNORE crossing over/independent assortment/reference to stages of meiosis ALLOW chromosomes for chromatid if the context is correct

Question	Marking guidance	Mark	Comments
06.1	Molecule contains more than one polypeptide (chain);	1	REJECT has a non-protein/prosthetic group/haem

Question	Marking guidance	Mark	Comments
06.2	1. At low <u>partial pressure</u> of oxygen / <u>partial pressure</u> between 0-2, little increase (in saturation of oxygen); 2. At higher <u>partial pressure</u> of oxygen / <u>partial pressure</u> between 2-12, larger/steeper increase (in saturation of oxygen);	2	ALLOW values between 0-2 ALLOW oxygen concentration/amount for partial pressure/kPA ALLOW values between 2-12 ALLOW oxygen concentration/amount for partial pressure/kPa

Question	Marking guidance	Mark	Comments
06.3	(ensures/results in) greater uptake of oxygen (by Hb) in the lungs/exchange surface;	1	ALLOW more transport of oxygen to the tissues only if in context of greater overall uptake;

Question	Marking guidance	Mark	Comments
06.4	1. X is hepatic artery; 2. Y is hepatic portal vein; 3. Z is hepatic vein;	3	

Question	Marking guidance	Mark	Comments
06.5	2/2.1/1.9;;	2	ALLOW 1 mark if answer is correct but incorrect values have been used e.g. $6.2 - 4.2 = 2.0$ ALLOW 6.5/6.4 and 4.5/4.4 for one mark

Question	Marking guidance	Mark	Comments
06.6	(oxygen lower in diseased rats) because cancer cells are more metabolically active/respiring more;	1	

Question	Marking guidance	Mark	Comments
06.7	Any two from • Species; • Sex; • Size; • Age; Any two from • Diet; • Same environment; • Same activity level; • No other diseases present;	3 max	ALLOW named example e.g. same concentration oxygen in air/temperature

Question	Marking guidance	Mark	Comments
07.1	2857;	1	DO NOT ALLOW 2,857.1 or any other value

Question	Marking guidance	Mark	Comments
07.2	Differences in environmental factors/a combination of the effects of genes and environment;	1	

Question	Marking guidance	Mark	Comments
07.3	1. <i>C. coli</i> and <i>C. jejuni</i> ; 2. They share the same <u>genus</u> ;	2	IGNORE Campylobacter unqualified

Question	Marking guidance	Mark	Comments
07.4	Kingdom;	1	ALLOW name of kingdom e.g. Eubacteria/Monera IGNORE domain/phylum

Question	Marking guidance	Mark	Comments
07.5	1. Asexual reproduction/can't reproduce together and make fertile offspring/can't sexually reproduce; 2. Horizontal transmission/conjugation; 3. Difficult to observe/identify physical characteristics; 4. Issues accessing the bacteria	1 max	

Question	Marking guidance	Mark	Comments
07.6	Less gut inflammation / improved mental health;	1	

Question	Marking guidance	Mark	Comments
07.7	1. Diet e.g., sugar/salt/fat/alcohol/meat/dairy/probiotics levels; 2. Microorganism exposure/competition with pathogens; 3. Lifestyle 4. Exposure to antibiotics;	2 max	ALLOW relevant examples e.g., Salmonella ALLOW relevant examples e.g., sleeping patterns/exercise levels/fitness level/smoking; IGNORE age/gender/body mass