

Question		Answer	Marks	Guidance
1	(a)	Characteristics are passed on to the next generation	W ;	DO NOT CREDIT if letter is unclear DO NOT CREDIT if more than one letter is given DO NOT CREDIT if an incorrect letter is given DO NOT CREDIT if an incorrect letter is given
		There is a struggle for existence	Y and Z ;	
		Individuals with beneficial characteristics are among the few who survive	X and Y and Z ;	
	(b)	MRSA / it, is harder to treat / may become untreatable ; potential for, disease outbreak / epidemic / pandemic / killing many people ; developing new / more powerful, <u>antibiotics</u> , is expensive / takes time ;	2 max	ACCEPT MRSA / it, can't be killed (by antibiotics) ACCEPT antibiotics will no longer work on, MRSA / it IGNORE new antibiotics are hard to discover

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1	(c)		<p>1 fossils show that organisms have changed over time ;</p> <p>2 <i>idea that</i> fossils or rocks can be dated ;</p> <p>3 <i>idea of</i> fossils showing intermediate forms / sequences ;</p>	3	<p>1 CREDIT many fossil organisms dissimilar from modern organisms</p> <p>2 ACCEPT idea of fossils in chronological order</p> <p>3 e.g. <i>Archaeopteryx / Tiktaalik / horse</i></p> <p>3 general trend from, small / simple, to, large / complex</p>
			Total	8	

Question			Expected Answers	Mark	Additional Guidance
2	(a)	(i)	<p>3 parts to body ;</p> <p>head + thorax + tail ;</p> <p>segmented ;</p> <p>lateral spines / spines from both sides of head ;</p> <p>thorax / tail , similar shape ;</p>	3 max	<p>Mark the first answer on each numbered line.</p> <p>ACCEPT wherever seen</p> <p>ACCEPT 'a lateral spine'</p> <p>ACCEPT description of thorax / tail shape</p>
2	(a)	(ii)	<p>anterior spine (from head) on A ;</p> <p>longer lateral spines on B ;</p> <p>less rounded / AW , head on B ;</p> <p>any other reasonable difference ; ;</p>	2 max	<p>Mark the first answer on each numbered line.</p> <p>Answers must state either species A or species B</p> <p>ACCEPT ora throughout</p> <p>e.g. (greater) fusion of tail segments in B</p> <p>grooves around edge of head in B</p> <p>outline of tail section (more) curved in A</p> <p>A has more segments</p> <p>CREDIT any clear description of a difference</p>
2	(b)		<p>1 <i>idea of</i> fossils show changes over time ;</p> <p>2 <i>idea that</i> there are methods to date fossils ;</p> <p>3 <i>idea of</i> simplest / most different from modern , species / AW , in oldest rocks ;</p> <p>4 <i>idea of</i> showing , links / relationships , between , groups / species / organisms / taxa ;</p> <p>5 many fossils organisms no longer exist ;</p> <p>6 <i>idea of</i> compare DNA extracted from some fossils ;</p>	2 max	<p>2 ACCEPT it is possible to date fossils</p> <p>4 ACCEPT ref to common ancestor of two species</p> <p>Answers could refer to links between species A and species B</p>
			Total	[7]	

Question			Expected Answer	Mark	Additional Guidance
3	(a)	(i)	genes / genetic / mutation ; environment(al) ;	2	Mark the first answer on each line IGNORE inherited / DNA
3	(a)	(ii)	1 no defined categories ; 2 range of values / intermediate values ; 3 influenced by, environment / many genes / genes and environment ; 4 quantitative / has to be measured / cannot be counted ;	3 max	2 ACCEPT ref to bell-shaped curve / binomial distribution 3 ACCEPT any ref to 3 or more genes 4 ACCEPT metric
3	(a)	(iii)	B ;	1	DO NOT CREDIT if more than one letter is given
3	(a)	(iv)	1 growth too rapid ; 2 increased susceptibility to, disease / named abnormality ; 3 <u>inbreeding</u> ; 4 reduces <u>gene pool</u> / <u>genetic</u> variation / <u>genetic</u> diversity ;	2 max	2 e.g. bone / skeletal abnormalities or low immunity 3 DO NOT CREDIT if implies inbreeding causes mutations 4 IGNORE refs to biodiversity

Question			Expected Answer	Mark	Additional Guidance
3	(a)	(v)	<p>1 maintain biodiversity ;</p> <p>2 aesthetic (reasons) / tourism ;</p> <p>3 ethical (reasons) ;</p> <p>4 part of a food chain / web ;</p> <p>5 maintain / increase <u>gene pool</u> ;</p> <p>6 genetic resource / availability to breed with domestic chickens ;</p>	2 max	<p>3 ACCEPT religious</p> <p>4 ACCEPT food source for local population</p> <p>6 CREDIT description, e.g. 'source of desirable genes' or 'source of genetic variation'</p> <p>6 ACCEPT specific example of genetic resource e.g. disease resistance / strong bones / longevity / heat tolerance / idea of domesticating wild population</p>

Question			Expected Answer	Mark	Additional Guidance
3	(b)	(i)	<p>1 reduces / prevents (infectious) disease ;</p> <p>2 prevent, problems / named problem, with gut ;</p> <p>3 digest food more, efficiently / easily / quickly ;</p> <p>4 greater proportion of, food / energy, can contribute to growth ;</p> <p>5 reduce risk of transmitting, pathogens / named pathogen, to humans ;</p>	2 max	<p>Mark the first two answers only</p> <p>1 IGNORE illness</p> <p>2 e.g. diarrhoea</p> <p>4 ACCEPT faster growth as AW for contribute to growth 4 IGNORE larger chickens</p> <p>5 ACCEPT 'meat less likely to be infected with bacteria'</p>
3	(b)	(ii)	<p>1 (antibiotic) resistant, pathogens / bacteria ;</p> <p>2 antibiotics kill useful, <u>bacteria</u> ;</p> <p>3 <i>idea of:</i> antibiotic passing into <u>human</u> food ;</p>	1 max	<p>1 ACCEPT microorganisms / microbes 1 IGNORE germs 1 DO NOT CREDIT immune</p> <p>2 DO NOT CREDIT if any ref to viruses</p>
			Total	13	

Question		Expected Answer	Mark	Additional Guidance
4	(a)	placing, living things / organisms / named organisms, into, groups / categories / taxa / named taxonomic groups ; based on / AW, similarity / difference ;	2	ACCEPT 'grouping living things' Look for the idea of similar organisms being placed in the same group or different organisms being placed in different groups
4	(b) (i)	<p>1 morphology / anatomy / (observable / physical) features / appearance / AW ;</p> <p>2 biochemistry / cytochrome C ;</p> <p>3 genes / DNA / genetics / RNA ;</p> <p>4 behaviour / physiology / embryology ;</p> <p>5 idea of shared, evolutionary past / phylogeny ;</p>	3 max	<p>ACCEPT suitable examples for mps 1 to 4</p> <p>1 CREDIT cell features e.g. nucleus / membrane-bound organelles / cell wall / prokaryotic-eukaryotic features / unicellular</p> <p>2 CREDIT component of cell wall</p> <p>3 IGNORE chromosomes</p> <p>4 ACCEPT 'how they feed' / nutrition / 'how they reproduce'</p> <p>5 ACCEPT 'how closely related' IGNORE refs to interbreeding / fertile offspring</p>
4	(b) (ii)	T S R W U Q ; ; ;	3	<p>Mark the order of letters (ignoring the dotted lines)</p> <p>All 6 in correct order = 3 marks</p> <p>If any incorrect, then credit</p> <p>T S in order at beginning = 1 mark</p> <p>U Q in order at end = 1 mark</p> <p>R before W anywhere in the sequence = 1 mark</p>

Question	Expected Answer	Mark	Additional Guidance
4 (c)	<p>1 <u>3</u> domains AND <u>5</u> kingdoms ;</p> <p>2 domains are, bacteria / eubacteria, AND, archaea / archaeobacteria, AND, eukarya / eukaryotes ;</p> <p>3 kingdoms are prokaryotes AND protocists AND fungi AND plants AND animals ;</p> <p>4 eukaryotes split into different kingdoms / all eukaryotes are in the same domain ;</p> <p>5 all prokaryotes are in the same kingdom / prokaryotes split into different domains ;</p> <p>6 domain classification based on, rRNA / ribosomes / RNA polymerase / protein synthesis / enzymes / flagella / membrane structure ;</p>	4 max	<p>ACCEPT phonetic spellings throughout</p> <p>ACCEPT alternative terms for names of kingdoms and domains throughout (e.g. plants / plantae)</p> <p>2 ACCEPT 'eukaryota'</p> <p>3 DO NOT CREDIT protists / protozoa</p> <p>6 IGNORE RNA unqualified DO NOT CREDIT other forms of RNA ACCEPT any detail of protein synthesis</p>
	Total	12	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	nucleus / nuclei ;	1	<i>If more than 1 answer given = 0</i>
5	(a)	(ii)	<i>mildew ...</i> (usually) chitin / not cellulose (cell) , wall ; <u>external</u> digestion / secretes enzymes externally ; heterotrophic / saprophytic / saprotrophic / saprobiont ; no , plastids / chloroplasts / amyloplasts ; spores ; hyphae / mycelium ; multi-nucleate / coenocytic / aseptate ;	2 max	<i>If 1st statement INCORRECT, max 1</i> Must be external or outside or equivalent CREDIT syncytium / syncytial
5	(a)	(iii)	<i>pear tree ...</i> <u>cellulose</u> cell walls ; multicellular ; has , chloroplasts / plastids / chlorophyll / photosynthetic pigment ; (photo)autotrophic / <u>performs</u> photosynthesis ;	2 max	<i>If 1st statement INCORRECT, max 1</i> IGNORE any references to vacuoles or other organelles 'makes its own food' is not enough
5	(a)	(iv)	Prot <u>o</u> ctista / Prot <u>o</u> ctist(s) ; Animalia / animal(s) ;	2	CREDIT in either order DO NOT CREDIT Protista / Protist <i>look for the 'c'</i>

