10 Classification and evolution
Answers to practice questions

Question number	Answer	Marks	Guidance
1	B	1	
2 (a)	Echiniscus ; order ; phylum ; Animalia ; Eukaryota	5	
2 (b)	1 (phylogeny) is evolutionary relationships (between organisms) ; 2 (phylogeny is study of) closeness of (evolutionary) relationships ; 3 Phylogeny is basis of / used in, natural / scientific / modern, classification ; 4 Idea that the closer the (evolutionary or genetic) relationship the closer the (taxonomic) grouping ; 5 Correct use of example ;	Max 3	1 IGNORE 'evolution' without further qualification 1 & 2 phylogeny is the closest of evolutionary relationships = 2 marks 1 ACCEPT phylogeny is evolutionary history 3 ACCEPT new 3 IGNORE related to classification 4 ACCEPT ref to recent common ancestors as AW for close relationship 4 ACCEPT named taxonomic group for 'grouping' 4 ACCEPT 'if DNA is very different then the group is not the same' 5 e.g. gorillas and chimpanzees (closely grouped)
2 (c)	Too small to see ; (unable to see them) until invention of microscope / development of suitable viewing apparatus / AW ' Only 0.3 mm in length ;	2	'can only be seen under microscope' = 1 mark (mp1) IGNORE 'can't see it' without the idea of size, e.g. can't see it clearly = 0 marks, Can't see its features = 0 marks ACCEPT implication of being too small to see, e.g. 'you need a microscope to see them' = mp1 'people couldn't see them in the past because we didn't have microscopes' = 2 marks (mp1 and mp2) IGNORE type of microscope if stated ACCEPT 'magnifying glass' ACCEPT ± 0.1 mm
3 (a)	<table><tr><td>kingdom</td><td>Membrane-bound organelles</td><td>Cell wall</td><td>Type(s) of nutrition</td></tr><tr><td></td><td></td><td></td><td>Heterotrophic and</td></tr></table>	6	Mark the first answer in each box. If the answer is correct and an additional answer is given that is correct or contradicts the correct

				autotrophic		answer then = 0 marks
	Protoctists/ protoctista					IGNORE case of initial 'P'
		present				ACCEPT '✓' or 'yes'
	Plant(s)/ Plantae		(present and made of) cellulose			IGNORE case of initial 'P'
		present				ACCEPT '✓' or 'yes'
3 (b)	fungi;				1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks ALLOW fungus/ fungal/ fungae IGNORE case of initial 'f'
3 (c)	Assume answers refer to 3 domain classification unless otherwise stated based on (differences in) , DNA / RNA / nucleic acids / polynucleotides ; idea that more accurately reflects origins (of, prokaryotes / eukaryotes) ; (domain) divides / AW , prokaryotes ; ora idea that domain reflects differences / AW , between (eu)bacteria and archaea ; example of two differences to support point 3 or 4 ; (domain) groups / AW , eukaryotes together ; ora idea that domain reflects the fact that there are similarities between eukaryotic kingdoms ; example of two or more similarities to support point 6 or 7 ;				 1 2 3 4 5 6 7 8 3 max	CREDIT Latin forms of domain names throughout IGNORE case of initial letter 1 CREDIT in the context of an example 3 'prokaryotes are split into groups because bacteria and archaea are different' = 2 marks (mp 3 and 4) 4 ACCEPT phonetic spellings of 'archaea' 4 ACCEPT 'archaebacteria' 4 IGNORE multiple examples for this mp, must be a general statement 5 IGNORE if mp 3 or 4 not awarded 5 e.g. (differences between) cell wall / cell membrane / flagella / (named) RNA enzymes / ATPase / proteins bound to genetic material / DNA replication / transcription etc 6 IGNORE as part of a list of domains. Answer must state that eukaryotes have been placed in the same group. 6 'eukaryotes are placed in the same group because they have similarities' = 2 marks (mp 6 and 7) 6 IGNORE 'are similar' 7 IGNORE multiple examples for this mp, must be a general statement 8 IGNORE if mp 6 or 7 not awarded 8 e.g. all eukaryotes have,

			nuclei / membrane bound organelles / 80S ribosomes / large cell size / linear DNA / chromosomes / histones etc.
4 (a)	behavioural adaptation – the way an organism acts; physiological adaptation – process which takes place inside an organism	1	
4 (b)	Any three from: Curled leaves – to minimise the surface area of leaf exposed to the wind Hairs on the leaf inner surface – to trap moist air close to leaves, reducing the diffusion gradient Sunken stomata – making them less likely to open and lose water Thick waxy cuticle – reducing water loss through evaporation	 1 1 1 1 3 max	
4 (c)	Unrelated species which show similar traits; which have evolved separately, but under similar evolutionary pressures	1 1	
6 (a)	natural / directional , selection ; mutation ; (mutation / genetic variation, is) random / due to chance / spontaneous / pre-existing ; selection pressure is lack of / competition for , food / prey ; individuals with mutation(s) / allele(s) / gene(s) (for echolocation) , survive ; ora (echolocation) allele(s) / gene(s) / mutation(s) , passed on (to next generation) ; over many generations frequency of , echolocation / allele / characteristic , increases ;	1 2 3 4 5 6 7 4 max	2 DO NOT CREDIT if implied as a consequence of selection pressure 4 ACCEPT 'selection pressure is ability to hunt' 4 ACCEPT 'selective pressure' 5 IGNORE refs to breeding / reproduction 5 ACCEPT 'individuals that can echolocate survive' ora 5 DO NOT CREDIT if answer implies that echolocation is a learned behaviour 6 IGNORE 'genetic trait(s)' 7 Answers must imply multiple generations 7 ACCEPT 'over time' as an alternative to 'over many generations' but must be further qualified
6 (b) (i)	*Pipistrellus* ;	1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks IGNORE case of initial letter 'P' DO NOT CREDIT if species name given as well
6 (b) (ii)	similar / same, (body) mass ; similar wingspan ; `similar / same, colour ; all characteristics , similar / same, except echolocation / wingspan ;	1 max	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0

	previously unable to measure echolocation (frequency);		marks IGNORE 'similar appearance' ACCEPT 'both 5.5 g' IGNORE 'same' ACCEPT 'almost the same' or 'small difference' or ref to figures ACCEPT 'both (medium to dark) brown'
6 (b) (iv)	(inter)breed / AW ; determine if offspring are fertile ; if offspring are infertile / no offspring produced, then different species ; ora	2 max	ACCEPT 'mate' / 'reproduce' CREDIT 'observe to see if populations are reproductively isolated' as resitting A2 candidate might consider phylogenetic species definition This mark is for assessing the fertility of the offspring 'if they belong to the same species they will be able to breed with each other and produce fertile offspring' = 2 marks (1st and 3rd)
6 (c)	Most marks (apart from C2, C5 and D5) are stand alone and do not need to be linked to context. However, max 5 if any statements are mismatched. continuous ; (continuous / AW , is) effect of , many genes / polygenic / genes and environment / genetic and environmental / environment ; quantitative ; there is a range / any value is possible / intermediate values / no distinct groups / AW ; example to illustrate any C marking point ; discontinuous ; (effect of) one / few, genes ; little / no, environmental effect ; discrete categories / no intermediates / AW ; example to illustrate any D marking point ;	C1 C2 C3 C4 C5 D1 D2 D3 D4 D5	For example ' some variation is controlled by only one gene this variation will have intermediates' AWARD D2 and C4 but max 5 for the whole question and DO NOT AWARD QWC and put CON in the margin C2 IGNORE alleles C2 IGNORE example of environmental factor, e.g.diet C2 Must be linked to context of continuous variation C3 No ora for discontinuous C5 must be linked to another C mark CREDIT only , body mass / wingspan / colour / range of pitch within species D2 ACCEPT 'there is a gene for pitch' or 'there are high-pitched and low-pitched alleles' D2 ACCEPT any suggestion of a low number of genes D2 IGNORE 'variation is genetic' D3 ACCEPT 'only influences by genes' / AW D3 IGNORE unqualified refs to genes D4 ACCEPT 'set groups' D5 Must be linked to another D mark

			D5 CREDIT only these examples: low-pitched or high-pitched / pitch variation between species / sex / no bat call between 47 and 52 Hz D5 IGNORE 'colour' as an example to support a D mark
	QWC – Award for successfully relating continuous or discontinuous variation to the effect of genes or environment ;	1 7 max	Award if candidates have been awarded Either C2 and any other C mark or D2 / D3 and one of D1, D4 or D5 DO NOT AWARD QWC if any mark has been given in the wrong context