18. Classification, Biodiversity and Conservation

18.1 Classification

Paper 4

Marking Scheme

Q1.

(b)	*any **six** from*: *biological species (concept)* **1** no / not separate species / same species ; **2** as can, interbreed / breed together, to produce, fertile offspring / pizzly bears **or** they are not reproductively isolated ; *morphological species (concept)* **3** yes / separate species / different species ; **4** as have different, colours / mass / size / hump size ; *ecological species (concept)* **5** yes / separate species / different species ; **6** as have different, niches / diets / habitats ; *genetic / phylogenetic, species (concept)* **7** unsure / don't know ; **8** as no information about genetic similarity ; **9** AVP ;	**6**

Q2.

(a)	*any **four** from:* **1** both, eukaryotic / eukaryotes / in domain Eukarya ; **2** example of eukaryotic feature ; *Protoctista* **3** example of way in which they vary *(must give both)* ; *Fungi (max 3)* **4** cell wall of, chitin / mannan / glucan ; **5** hyphae / mycelium ; **6** multinucleate / syncytium / many nuclei per cell ; **7** heterotrophic / saprotrophic / parasitic ; **8** store glycogen ; **9** reproduce by spores ;	**4**

Q3.

(a)	Bacteria **and** Archaea ;	**1**

Q4.

(c)(i)	*Haematopus / Larus* ;	**1**
(c)(ii)	*any **two** from:* **1** eukaryotic (cells) ; **2** autotrophic / photosynthetic ; **3** cellulose cell wall ; **4** aquatic ; **5** not motile / sessile ; **6** multicellular ; **7** no, vascular tissue / xylem / phloem ;	**2**

Q5.

(d)	*any **two** from:* 1 eukaryotic (cells) / described ; 2 heterotrophic / saprotrophic / parasitic / described ; 3 chitin cell walls ; 4 (most have) hyphae / mycelium ; 5 multinucleate (cells) ; 6 multicellular and unicellular ;	**2**

Q6.

(a)(i)	Eukarya ; Animalia ;	**2**

Q7.

(d)	*any **four** from:* 1 multicellular ; 2 eukaryote / eukaryotic / (cells) contain a nucleus ; 3 specialised cells / tissues / organs ; 4 heterotrophic (nutrition) / described ; 5 nervous system ; 6 cilia / flagella ; 7 mobile / motile ;	**4**

Q8.

(a)(i)	*any **three** from:* **1** multicellular ; **2** have, specialised cells / tissues / organs ; **3** heterotrophic / described ; **4** *ref. to* nervous system ; **5** vacuoles / vesicles, are, small / temporary / not permanent ; **6** are eukaryotes / have eukaryotic cells ; **7** detail of eukaryote ; e.g. nucleus / (named) membrane-bound organelle / 80s ribosomes **8** *ref. to* mobility ;	**3**
(a)(ii)	*any **three** from:* **1** records / assesses, biodiversity ; **2** so conservation decisions can be made / AW ; **3** example of conservation action 1 ; **4** example of conservation action 2 ; e.g. (IUCN) red list of threatened species / identifying endangered species (CITES) regulation of trade ref. assisted reproduction or ref. captive breeding seed banks place in, zoos / national parks / marine parks / botanical gardens **5** (taxonomic hierarchy is) internationally, recognised / standardised / AW ;	**3**

Q9.

(a)(i)	*any **three** from:* *(individuals / organisms / members of a species are similar / same)* **1** morphologically ; **2** physiologically ; **3** biochemically ; **4** genetically ; **5** ecologically / occupy same niche ; **6** behaviourally ; **7** can (inter)breed to form fertile offspring ; **8** reproductively isolated (from other species) ; **9** share, an evolutionary lineage / recent common ancestor ; **10** share a, binomial / Linnaean, name ;	**3**
(a)(ii)	*domain:* Eukarya ; *kingdom:* Animalia ;	**2**
(a)(iii)	*any **two** from:* **1** classification / taxonomy, reflects / shows / depends on, evolutionary / phylogenetic, relationships ; **2** organisms / species, that, are closely related / share recent common ancestor, should be classified together ; **3** help identify, larger taxonomic groups / orders / families / genera ; **4** AVP ;	**2**
(b)(i)	(1478 × 103 × 2 =) 304 468 ;	**1**
(b)(ii)	*any **three** from:* **1** to, store / analyse / process ; **2** large quantity of data ; **3** to, compare / match, (many) sequences ; **4** to, calculate / measure / quantify, (percentage), similarity / difference ; **5** *ref. to* fast / accurate / efficient ;	**3**

Q10.

(e)	*any **two** from:* 1 morphological / physiological / behavioural / biochemical, similarity to mainland tigers / *Panthera tigris* ; 2 genetically similar to, mainland tigers / *Panthera tigris* ; 3 may be able to breed with, mainland tigers / *Panthera tigris*, to produce fertile offspring ;	**2**

Q11.

(a)	**5** 1 8 6 2 4 3 **7** ;; *all correct = 2 marks* *four in correct consecutive sequence = 1 mark*	**2**
(b)	<table><tr><th></th><th>Fungi</th><th>Plantae</th><th></th></tr><tr><td>method of nutrition</td><td>heterotrophic</td><td>autotrophic</td><td>;</td></tr><tr><td>storage polysaccharide</td><td>glycogen</td><td>starch</td><td>;</td></tr><tr><td>main component of cell wall</td><td>chitin</td><td>cellulose</td><td>;</td></tr></table>	**3**
(c)	bacteria ;	**1**
(d)	RNA or DNA ; single-stranded or double-stranded ;	**2**

Q12.

(a)(i)	*any **two** from:* 1 group of (morphologically) similar organisms ; 2 that interbreed to produce fertile offspring ; 3 occupy same niche ; 4 AVP ; e.g. detail of molecular similarity	**2**