Question	E Answers		Marks	Additional Guidance
1 (a)	***5 / 6 RIGHT = 4*** ***4 RIGHT = 3*** ***3 RIGHT = 2*** ***1 / 2 RIGHT =1*** ***0 RIGHT = 0***	go to 2 | go to 3 | *Aulostomus maculatus* | **F** *Gymnothorax moringa* | **E** go to 4 | go to 5 | *Dasyatis americana* | **G** *Bothus ocellatus* | **D** go to 6 | *Epinephelus striatus* | **A** *Pseudupeneus maculatus* | **C** *Chaetodon capistratus* | **B**	[4]	sequence is: **E** **G** **D** **A** **C** **B** **I** letters placed in grey blocks
(b) (i)	mutation **;**		[1]	
(ii)	**1** retina / pigments, adapted for detecting different, colours / wavelengths **;** **2** colours / wavelengths, for different depths **;** **3** fish are adapted to live at different depths **;** **4** as a group fish will occupy a larger habitat **;** **5** blue/red, retinal detector mates with relevant, type / species / AW **;** **6** avoid competition **;**		[max 2]	**R** simple restatement of the question stem

Question	E	Answers	Marks	Additional Guidance
1 **(c)**	**1** **2** **3** **4** **5** **6** **7** **8**	reduces ability of blue fish to find mates **;** reduces reproduction in blue fish **;** number of blue fish, decrease / become rare / extinct **;** gene / allele, for blue, pigment / receptors, not passed on **;** water has less effect on red fish **;** number of red fish increase **;** red fish have less competition (because fewer blue fish) **;** red fish extend their range **;**	[max 4]	**A** reference to 'shallow' and/or 'deep' water fish in place of blue/red if sufficiently qualified **I** idea of differential predation, effect on plant life, etc.
			[Total: 11]	

Question	Expected Answers	Marks
2	*one mark per row, treat blank spaces and crossed ticks as crosses* *if ticks and crosses and blanks in the same row, treat as incorrect* *allow 'yes' and 'no' for ticks and crosses*	

feature		amphibian	reptiles	birds	mammals
mammary glands	×	×	×	×	✓
fur / hair	×				✓ ;
scales / scaly skin	✓	×	✓	✓ **A** × (except feet/legs)	× ;
external ears	×				✓ ;
feathers	×			✓	× ;

[4]

[Total: 4]

Question	scheme	Comments
3 **(a)**	feature / bac / virus / fungus produces spores ✓ × ✓ hyphae × × ✓ capsule ✓ × × nucleus × × ✓ [3]	one mark per row treat blank spaces and crossed ticks as crosses – if ticks and crosses and blanks in the same row, treat as incorrect allow 'yes' and 'no' for ticks and crosses
(b)	*treat independently* 1 (feeding) hypha(e) **;** **R** roots **ignore** mycelium 2 branched / branching **;** 3 has a large surface (area) **;** 4 grow, over / through / on / into, (named) food / substrate **;** 5 produce / release, enzymes **;** 6 external / extracellular / described, digestion **;** 7 absorb, food / nutrients / products / glucose / AW **;** [3 max]	*fungus may be saprotrophic or parasitic* **ignore** 'roots' when awarding points 2 to 7 *MP3 refers to fungus not food* **A** 'spread across' food, **A** substrate for food **R** excrete enzymes **R** digestion unqualified, **A** external implied **R** obtain **A** absorbed even if no digestion
(c)	1 spores **;** 2 carried in the, wind / air / atmosphere **;** **A** sporangium / 'sack' / AW, bursts / opens 3 grow, longer / more, (feeding) hyphae / mycelium spreads [2 max]	**A** blown / floats – as suggests in the air **A** new mycelium forms / mycelium increases in size *ecf for roots from **(b)***
	[Total: 8]	

Question 4

(a) *ignore absence of feature(s)* *ignore slime*
shell **;**
muscular foot **;** **R** leg / false foot
(soft) unsegmented body **;**
tentacles **;**
mantle / mantle cavity **;**
gills **;**
AVP **;** e.g. visceral mass **R** exoskeleton [max 2]

(b) *species name* *ignore refs to generic name*
second name / follows genus name **;**
begins with small letter / all small letters **;** [max 1]

(c) *asexual = 0 marks*
sexual / external **;**
involves, gametes / fertilisation **;** [2]

(d) **(** *current of water provides*
(good) source of oxygen **;** **A** ref to obtaining oxygen
R 'from gills' / 'easy to breathe'
low carbon dioxide concentration **;** **A** ref to losing carbon dioxide
food source **;**
protection / hiding, from predators **;**
blood / mucus (from gills), may be food source **;** [max 1]

(ii) *one of the following* *ignore growth / maturity*
increase in complexity
differentiation / specialisation, of cells / tissues
formation of, new structures / organs / tissues / different types of cells
A change in, structure / form [1]

(e) *one mark for named species, two max for details. If no species = no marks,*
*NB species **may** be identified in outline of conservation*

named species **;** *must be an endangered species* **R** whale(s), **A** rhino(s)
if in doubt check IUCN red list *http://www.iucnredlist.org*
[1]

nature reserve / game park / sanctuary / AW **;**
protection of habitat / stop habitat destruction / fenced area / restore habitat
A example **;**
control of, predators / grazers / parasites / disease **;**
provide food supply **;**
prevent hunting / reduce poaching / reduce fishing / AW **;**
A wardens / rangers
education (of local population) **;**
captive breeding / provide breeding sites **;**
release of captive bred organisms **;**
AVP **; ;** e.g. dehorn rhinos, ban trade [max 2]

[Total: 10]

5 **(a) (i)** fur / hair / whiskers / vibrissae **;** **A** teat / nipple / breast / AW
external ears / pinna(e) **;** **A** ear flaps [max. 1]

(ii) internal development / young develops in uterus / 'gives birth to live young' / AW **;**
sweat glands **;**
feeding of young with milk / breast feeding **;**
mammary glands / breasts / nipples **;** **R** if given in **(i)**
four types of teeth / named teeth (incisors, canines and molars) **;** **A** two sets of teeth
three, bones in (middle) ear / ossicles **;**
diaphragm **;**
red blood cells without nuclei **;**
neocortex **;**
seven neck vertebrae **;**
external testes **;**
dentary / single bone forming lower jaw / secondary palate **;** [max. 1]

(b) (i) (light conditions) bright / AW **;**
(explanation) narrow / small, pupils **;** **A** enlarged iris [2]

(ii) *answer must be linked with answer given in **(i)***
less light enters eyes / prevents too much light entering eyes **;**
receptors / retina / rods / cones / light sensitive cells, protected from damage / AW**;**
R 'damage to eyes'
*allow ecf if **(b)(i)** incorrect*
more light enters eyes **;**
enough light to stimulate, retina / rods / cones **;** [2]

(c) ref. to, no cones present / <u>only</u> rods **;** **R** 'many rods' **R** no, yellow spot / fovea [1]

(d) ref to image (of zebras) on, fovea / retina **;** **R** 'picture'
ciliary body / ciliary muscles, relax **;** **R** 'cilia muscle'
suspensory ligament(s) becomes taut / AW e.g. 'pulled' **;** **R** 'contract', 'stretched'
lens is, made thin(ner) / less convex / flat(ter) / AW **;** *ignore* long
less refraction of light **;** **A** bending, correct ref to focal length

R if answer implies that the iris is responsible for shape of lens
R change in iris for depth of field (would not change in this bright light) [max. 3]

(e) maintains natural habitat / AW **;** e.g. prevent, human interference / development
prevention of extinction **;**
less, hunting / poaching / killing / AW **;**
tourism / economic reason **;**
maintain (bio)diversity **;**
maintain, gene, pool / diversity **;** **A** ref to source of genes / alleles
maintain, food chains / balanced ecosystems **;**
available for scientific study / AW **;**
retain for future generations / AW **;** e.g. aesthetic value
R any aspect(s) of management of reserves [max. 3]

[Total: 13]

6 **(a** ciliated tissue – moves dust and bacteria up the bronchi ;
root hair tissue – absorbs water and minerals from soil ;
xylem tissue – transports water and minerals through the stem ;
muscle tissue – contracts to cause movement ; **[4]**

(b) a leaf contains different types of cells / a tissue only contains one type ;
at least two named examples of tissues in a leaf ;
leaf/organ + carries out a number of functions (or vice versa for tissue) ; **[3]**

[Total: 7]

7 **(a)** ref. to presence of <u>feathers</u>; Ⓡ wings
ref. to presence of beak; ◯ **[2]**

(b)(i) each organism is given two names/ref. to <u>genus</u> and species/trivial;
suitable example (*Oxyura jamaicensis* or *Oxyura leucocephala*); **[2]**

(ii) cross-mating results in a fertile + duck/variety/offspring/sub-species/ new species;
they both belong to the + same genus/genus Oxyura;
they are attracted to each other AW; **max. [2]**

(c)(i) they also exist in America; Ⓡ they exist in Spain
Ⓡ refs to other parts of the world unqual. **[1]**

(ii)

- ref. to hunting/more predators;
- ref. to destruction of habitat;
- ref. to pollution;
- ref. to disease;
- ref. to loss of food/more competition for food or other named factor;
- ref. to change in climate/sudden change in environment;
- ref. to very small population; **max. [1]**

(d)

- food chains only show one source of food for each level in a food chain AW;
- ref. to two different organisms at secondary consumer level AW;
- ref. to no information about link between seeds and insect larvae AW;
- Ruddy duck feeds + as herbivore and carnivore/at two different levels/ as an omnivore AW/has two different sources of food;
- Ruddy ducks have two different predators AW;
- A is a straight line/a food web is a network AW; **max. [2]**

Total 10