

## Q1.

- 1 (a) 1. killed / hunted, qualified ; e.g. for meat / for fur / blood sport / takes human food / thought to be dangerous    A poaching (unqualified)  
2. war ;  
3. sale of live young ;  
4. habitat destruction / AW ;  
5. loss of / competition for food ;  
6. AVP ; e.g. disease [3 max]
- (b) (i) 1. fewer animals need to be caught (for zoos) ;  
2. ref. becoming pregnant ; e.g. IVF / finding a mate  
3. reintroduction into the wild ;  
4. research easier with captive animals / AW ;  
5. ref. increase in numbers ;  
6. ante or postnatal care ; [3 max]
- (ii) 1. inbreeding / AW ;  
2. gene pool too small ;  
3. no fear of humans / difficulty in socialising with other gorillas ;  
4. difficulty in, finding food / reproducing ;  
5. ref. transfer of pathogens ;  
6. ref. effects of captivity ; e.g. stress [2 max]
- [Total: 8]

## Q2.

- 1 (a) higher population (growth), higher (rate of) deforestation / ora ;  
ref. 2 named countries (or letters) and paired figs ;  
ref. Vietnam (not fitting trend) ; [2 max]
- (b) (i) 1 ref. variety of, species / organisms / plants / animals ;  
2 variation **within** species / AW ;  
3 genetic diversity **between** species / AW ; [2 max]
- (ii) *economic*  
1 (some, species / plants / animals may have) uses in the future ;  
2 medical uses / example ;  
3 resource material ; e.g. wood for building / fibres for clothes  
4 food (for humans) / agriculture ;  
5 tourism / example ;  
6 ref. maintain gene pool / genetic diversity ;  
7 prevention of natural disasters ;  
8 AVP ; e.g. ref. biological control (predators / parasites reduce pest populations) [4 max]
- [Total: 8]

## Q3.

- 3 (a) 1 loss of habitat ; **A** deforestation  
2 building / industry / farming / localised use of wood ; *ignore logging / timber production*  
3 difficulty in finding food ; **A** increased competition **R** no food  
4 poaching / hunting ;  
5 ref. ivory trade ; [3 max]
- (b) 1 of no use to humans ;  
2 protected in burrows ;  
3 variety of food ;  
4 small quantity of food required ;  
5 short gestation ;  
6 large number of offspring ;  
7 camouflaged ;  
8 (sophisticated) early warning system ; [3 max]
- [Total: 6]**

#### Q4.

- 1 (a)  $\frac{275-90}{10}$  or  $\frac{185}{10}$  or  $\frac{1705}{10}$  for 1 mark  
18.5;; **A** 19 **R** 18 [2]
- (b) 1 avoid disturbance to, nest sites/nesting females ; **R** ref. to mating  
2 protect, nest sites/young, from predators ;  
3 avoid sea pollution ;  
4 example of pollution ; e.g. do not throw rubbish into sea / avoid discharge from boats/light pollution (beaches)  
5 take care when fishing (with nets) ;  
6 stop hunting of adults ; **A** trading ban on turtle products  
7 captive breeding programmes/AW ;  
8 conservation areas/zoos ;  
9 education/ecotourism ; [5 max]
- [Total: 7]**

**Q5.**

- 1 (a) 1 more nests in, areas of low salinity/less salty areas ; **ora**  
2 comment about result for salinity 16-20 not following trend ;  
3 2 paired figs with units ; *linked to 1* [3]

- (b) (i)  $\frac{(31-8)}{8} (\times 100)$   
287.5/288 ;;  
*allow one mark for suitable working if incorrect answer* [2]

- (ii) *any two from*  
1 (ensure) low salinity or more freshwater ;  
2 nest sites protected ;  
3 education/ecotourism ;  
4 assisted breeding ;  
5 ban on hunting ;  
6 preventing pollution ; [2 max]

**[Total: 7]**

**Q6.**

- 1 (a) 36 ;;  
*allow one mark for number not rounded up i.e. 35.7*  
**or**  
*allow working of  $\frac{X}{7} \times 100$*  [2]

- (b) 1. reduction in extent of ice sheet ;  
2. reduction in number of, seals / prey / food **or** increased competition for food ;  
3. idea of increased distance to travel to find food ;  
4. loss / destruction, of breeding sites ;  
5. result of named human activity ; e.g. mining / drilling / killing / building / pollution  
6. disease ; [3 max]

- (c) *applies to U. maritimus but accept ora*  
1. DNA linear ;  
2. DNA in nucleus **or** has, nuclear membrane / nucleus ;  
3. DNA, associated with protein / in chromosomes ;  
4. ribosome, 22 nm diameter / 80s ;  
5. membrane bound organelles / named organelle ;  
6. no cell wall ;  
7. size up to 40µm ; [3 max]

**[Total: 8]**

**Q7.**

- 1 (a) 1. pools drying up ;  
2. pools, affected by the sea / more salty ;  
3. disease / parasite, (causing high death rate) ;  
4. changes to sand dunes ; e.g. by humans or natural causes  
5. increase in predators ;  
6. decrease in food ;  
7. named pollution ; e.g. acid rain affecting pH of pools  
8. named human activity ; e.g. taking toads / road kill / food for humans  
9. increased competition ; [3 max]
- (b) 616 or 617 ;  
*allow one mark for working if incorrect answer* [2]
- (c) (i) idea of feeding on other organisms ;  
to obtain organic compounds ; [2]  
(ii) animalia **and** fungi ; [1]
- (d) people more interested in vertebrates  
**or**  
vertebrates, larger / more visible ; [1]
- [Total: 9]**

**Q8.**

- 6 (a) 1 large, so easy to detect ;  
2 taken by collectors ;  
3 destroyed due to smell ;  
4 habitat destruction / named example ; e.g. effect of grazing / building / agriculture  
5 AVP ; e.g. not easily pollinated / detail of *Rafflesia* / flowers infrequently [3 max]
- (b) (i) diversity of ecosystems in a region ;  
the number of different species in each ecosystem ;  
the genetic diversity within populations of each species ; [1 max]
- (ii) 1. (some, species / plants / animals may have) uses in the future ;  
2. medical uses / example ;  
3. resource material ; e.g. wood for building / fibres for clothes / food (for humans) / agriculture ;  
4. ecotourism ;  
5. maintain, gene pool / genetic diversity ;  
6. prevention of natural disasters ;  
7. aesthetic reasons ;  
8. to maintain stability in, ecosystems / food chains ; [4 max]

[Total: 8]

Q9.

- 6 (a) (i) may be of use in the future ;  
(may produce) medicines / AW ;  
resources (for humans) ;  
e.g. wood for building / fibres for clothes / fuel / food / agriculture  
maintain, gene pool / genetic diversity ;  
to maintain stability in ecosystems ;  
aesthetic reasons ;  
(eco)tourism ; [3 max]
- (ii) dried / kept cool ; [1]
- (b) (i) positive correlation / number of plant genera increases as rainfall increases ;  
paired figs ; *genera number & rainfall in 2 countries showing the trend*  
China does not fit the pattern ; [2 max]
- (ii) temperature ;  
light intensity ; *ignore sunlight / light / sun*  
day length ;  
humidity ;  
carbon dioxide concentration ;  
wind ; [2 max]
- [Total: 8]**

Q10.

1 (a) P = 2.15 and R = 19 for 3marks ;;

Allow one mark for working if incorrect answer(s)

[3]

		unicell P	unicell R
(b)	kingdom	prokaryote	protocista ; <i>R eukaryote alone</i>
(c)	features	1 0.5 – 5 μm 2 <u>DNA</u> circular <i>ignore plasmid</i> 3 <u>DNA</u> free / in cytoplasm <i>R no nucleus</i> 4 <u>DNA</u> naked 5 70s / 18nm, ribosomes 6 No ER 7 few organelles 8 no organelles surrounded by membrane / no named organelle	up to 40μm ; <u>DNA</u> linear ; <u>DNA</u> in nucleus / AW ; <u>DNA</u> associated with protein / histones ; 80s / 22nm, ribosomes ; ER ; many types of organelle ; organelles surrounded by membrane / named organelle ;

[5 max]

notes

look for pairings if not side by side and link with red line

give credit for two paired statements in same box

no credit for single statements

allow ecf if P and R kingdoms swapped

[Total: 9]

Q11.

- 2 (a) 1 ref. variety of, species / organisms ;  
2 genetic diversity within species / AW ;  
3 genetic diversity between species ;  
4 wide range of, habitats / ecosystems ; [3 max]
- (b) 1 ref. rapid growth of plants / high rate of photosynthesis ;  
2 large number of plant, species / types ;  
3 flowers / fruit / leaves, (for animals) throughout the year ;  
4 provides, niches / habitats ; [2 max]
- (c) *allow up to two good examples for each role*
- 1 *ecological role*  
e.g. ;; (nutrient cycling / climate)
- 2 *economic role*  
e.g. ;; (food / medication / timber / ecotourism)
- 3 *ethical role*  
e.g. ;; (indigenous people)
- 4 *AVP*  
e.g. ;; (gene bank / interdependence of species) [4 max]
- [Total:9]**

**Q12.**

Question	Expected Answers	Marks															
1 (a)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">eukaryotic</th> <th style="width: 10%;"></th> <th style="width: 40%; text-align: center;">prokaryotic</th> </tr> </thead> <tbody> <tr> <td>1. linear / strands</td> <td style="text-align: center;"><b>or</b></td> <td>circular ;</td> </tr> <tr> <td>2. in nucleus</td> <td style="text-align: center;"><b>or</b></td> <td>(free) in cytoplasm ;</td> </tr> <tr> <td>3. associated with, proteins or histones</td> <td style="text-align: center;"><b>or</b></td> <td>naked ;</td> </tr> <tr> <td>4. in chromosomes</td> <td style="text-align: center;"><b>or</b></td> <td>not in chromosomes ;</td> </tr> </tbody> </table> <p><i>assume eukaryotic if not stated</i></p>	eukaryotic		prokaryotic	1. linear / strands	<b>or</b>	circular ;	2. in nucleus	<b>or</b>	(free) in cytoplasm ;	3. associated with, proteins or histones	<b>or</b>	naked ;	4. in chromosomes	<b>or</b>	not in chromosomes ;	[2 max]
eukaryotic		prokaryotic															
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3. associated with, proteins or histones	<b>or</b>	naked ;															
4. in chromosomes	<b>or</b>	not in chromosomes ;															
(b)	1 habitat destruction / deforestation ; 2 disease ; 3 fall in prey numbers / difficulty in finding food ; 4 increased competition (with other carnivores) ; 5/6 ref. named human activities ; ; e.g. killing / agriculture / logging <b>R</b> pollution	[3 max]															
(c)	1 national parks ; 2 zoos ; 3 captive breeding programmes ; 4 AVP ; e.g. banning hunting / gamete banks / education qualified	[2 max]															
		<b>[Total:7]</b>															

**Q13.**

Question		Expected Answers	Marks
1	(a)	1 species threatened with extinction ;	[2 max]
		2 numbers reduced to critical level / population <u>too</u> small ;	
		3 <u>such low numbers</u> that reproduction is affected ;	
	(b)	1 (maintain colony) in zoo ;	[4 max]
		2 captive breeding (programme) ;	
		3 assisted reproduction ; e.g. IVF	
		4 educate public ;	
		5 national parks / conservation areas ;	
		6 habitat protection ;	
		7 ban, hunting / poaching ;	
			<b>[Total:6]</b>

**Q14.**

Question		Expected Answers	Marks																																																					
1		<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">process or feature</th> <th colspan="5">kingdom</th> </tr> <tr> <th>Prokaryotae</th> <th>Protoctista</th> <th>Fungi</th> <th>Plantae</th> <th>Animalia</th> </tr> </thead> <tbody> <tr> <td>80s ribosomes</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>cell walls contain chitin</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗ ;</td> </tr> <tr> <td>circular DNA</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗ ;</td> </tr> <tr> <td>endoplasmic reticulum</td> <td></td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓ ;</td> </tr> <tr> <td>most species unicellular</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✗ ;</td> </tr> <tr> <td>autotrophic</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗ ;</td> </tr> <tr> <td>heterotrophic</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✗</td> <td style="text-align: center;">✓ ;</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 5px;"><i>one mark for each correct row</i></p> <p style="text-align: center; margin-top: 5px;"><i>if there are any blanks in a row then award no marks for that row</i></p>	process or feature	kingdom					Prokaryotae	Protoctista	Fungi	Plantae	Animalia	80s ribosomes	✗	✓	✓	✓	✓	cell walls contain chitin	✗	✗	✓	✗	✗ ;	circular DNA	✓	✗	✗	✗	✗ ;	endoplasmic reticulum		✓	✓	✓	✓ ;	most species unicellular	✓	✓	✗	✗	✗ ;	autotrophic	✓	✓	✗	✓	✗ ;	heterotrophic	✓	✓	✓	✗	✓ ;	[6]
		process or feature		kingdom																																																				
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		circular DNA	✓	✗	✗	✗	✗ ;																																																	
		endoplasmic reticulum		✓	✓	✓	✓ ;																																																	
		most species unicellular	✓	✓	✗	✗	✗ ;																																																	
		autotrophic	✓	✓	✗	✓	✗ ;																																																	
		heterotrophic	✓	✓	✓	✗	✓ ;																																																	
			<b>[Total: 6]</b>																																																					

**Q15.**

- 1 (a) 1 mallard numbers have increased **and** the others have decreased ;  
*decrease due to*  
2 pesticides / pollution / fertilisers ;  
3 change in temperature or pH of water ;  
4 lack of ~~named~~ food source ;  
5 ~~increased~~ competition / AW ;  
6 direct human interference on **lake** ; e.g. fishing / sailing etc  
*not related to marking point 2*  
*mallard increase due to*  
7 doesn't eat, insects / molluscs / fish ;  
8 less other birds so ~~less~~ competition ; [4 max]
- (b) 1 cultural / aesthetic / leisure, reasons ;  
2 moral / ethical, reasons ; e.g. right to exist / prevent extinction  
3 resource material ; e.g. wood for building / fibres for clothes / food for humans  
4 ecotourism ;  
5 economic benefits ;  
6 ref. resource / species, may have use in future / AW ; e.g. medical use  
7 maintains, food webs / food chains ; **A** description  
8 nutrient cycling / protection against erosion ;  
9 climate stability ;  
10 maintains, large gene pool / genetic variation ; [4 max]

Q16.

- 1 (a) 1 pollution ;  
2 environment / habitat, change qualified ; e.g. increase in water temperature / change in water pH  
3 ~~over~~fishing ;  
4 loss of food / more competition for food ;  
5 direct human interference qualified ; e.g. pleasure boats [3 max]
- (b) variety of / different / total number of, species ;  
genetic diversity of species / AW ; [2]
- (c) *any three from*  
1 tourism / leisure ;  
2 economic benefits ;  
3 food for humans ;  
4 ref. resource / species, may have use in future / AW ;  
5 maintains, food webs / food chains ; A description  
6 nutrient cycling ;  
7 maintains, (large) gene pool / genetic variation ; [3 max]
- [Total: 8]**

### Q17.

- 1 (a) allopatric ; [1]
- (b) 1. packs / populations, isolated from each other ;  
2. inbreeding / no interbreeding ;  
3. little mutation ;  
4. AVP ; e.g. small population to start with / small gene pool to start with [2 max]
- (c) 1. agriculture / buildings / AW ;  
2. *idea of* wolves dying ;  
3. hunting / trapping / AW ;  
4. hybridisation / infertility / change in (wolf) gene pool / loss of wolf alleles / AW ; [4]
- (d) 28(%) ; [2]  
*allow one mark for number not rounded up or incorrect answer but correct idea regarding working*

**[Total: 9]**

**Q18.**

1 (a) 96 ;; [2]  
*allow one mark for correct working with either incorrect answer or answer not rounded down*

- (b)
1. stop killing ;
  2. education ;
  3. stop trade in tiger parts ;
  4. zoos / national parks ;
  5. captive breeding / AW ;
  6. release back into wild ;
  7. replant forests / AW ;
  8. protect remaining forest / stop deforestation ;
  9. AVP ; e.g. incentives to indigenous people / ban use in circuses or as pets [4 max]

- (c) *assume animalia unless otherwise stated*
1. heterotrophic / AW ;
  2. locomotion ; **ora**
  3. male gametes motile ; **ora**
  4. detail cell structure ; e.g. no cell wall / no tonoplast **ora** *ignore ref. to cellulose* [2 max]

**[Total: 8]**

**Q19.**

- 7 (a) *corals*
1. (cells) have no chloroplasts ;
  2. (cells) have no, cell walls / large vacuoles ;
  3. are heterotrophic / not autotrophic / not photosynthetic ; [2 max]

(b) biotic and abiotic components **or** living and non-living components ;  
correct ref. to interaction ; [2]

(c) (i) Indian Ocean = 22(%)  
Pacific Ocean = 9(%) ;  
*both correct for 1 mark* [1]

- (ii) any three from
1. named marine pollutant ; e.g. oil / sewage
  2. example of climate change ; e.g. sea level rising /  
change in sea temperature / decrease in oxygen concentration of sea  
(increasing carbon dioxide) decrease in pH of sea ;
  3. intensive fishing ;
  4. tourism qualified ;
  5. removal of parts of reef ;
  6. reclaiming land ; [3 max]

**[Total: 8]**

**Q20.**

- 8 (a) any number between 873 – 882 inclusive ;;

*allow one mark for correct working or for number not rounded up*

[max 2]

- (b) *named species (no mark)*

*four relevant reasons for a named species ; ; ; ;*

*e.g. animal species*

*direct human effect e.g. hunting / fishing / collection / skins*

*habitat destruction*

*climate change qualified*

*increase in pollution*

*spread / increase, in disease or new disease*

*lack of food*

*increased predation*

*e.g. plant species*

*direct human effect e.g. specimen collection / logging*

*habitat destruction*

*climate change qualified*

*increase in pollution*

*spread / increase, in disease or new disease*

*loss of pollinators*

*increased competition from introduced plants*

[4]

**[Total: 6]**

## Q21.

- 8 (a) 7 500 ;;

*allow one mark for correct working*

*allow one mark for 7.5 tonnes*

[2]

- (b) 1. stop / reduce, fishing ;    **A** correct ref. to quotas / moratorium

2. ref. to size of nets ;

3. ref. to methods of fishing ;

4. control pollution ;

5. education ;

6. captive breeding and release / restocking from fish farms ;

7. ref. to marine reserves ;

[max 3]

**[Total: 5]**

## Q22.

- 7 (a) any five from:
1. (touching hairs causes), action potential / depolarisation ;
  2. auxin increase triggered in hinge cells ;
  3.  $H^+$  / hydrogen ions, pumped into cell walls ;
  4. calcium pectate 'glue' in cell wall dissolved ;
  5.  $Ca^{2+}$  ions enter hinge cell ;
  6. water follows by osmosis ;
  7. hinge / midrib, cells expand ;
  8. trap lobes, flip from convex to concave / change in elastic tension ;
- [max. 5]
- (b) (i) random sampling using frame quadrats ; [1]
- (ii) Simpson's index of diversity ; [1]
- (iii) Spearman's rank correlation coefficient ; [1]
- [Total: 8]

### Q23.

- 4 (a) 1 maintains biodiversity ;
- 2 maintain, genetic diversity/genetic variation / gene pool ;
- 3 (loss of a species) may affect food, chains/webs ;
- 4 use by humans ; e.g. medical use/building materials/ food
- 5 (eco)tourism ;
- 6 ethical / moral / aesthetic, reasons ; [max 3]
- (b) (i) *assume answer refers to the botanic garden population unless otherwise stated*
- statement about position relative to **A**, **B** or **C** ; e.g. closest to **B**/lower than **A** and **B**/ higher than **C**
- use of comparative figures ; e.g. 30.74 plus one other [2]

- (ii) 1 small number/(only) 10, sampled ;  
2 some, variants/alleles, were not included in the sample ;  
3 C may be smaller than the other populations ;  
4 C may have developed from only a small number of original plants ;  
5 (so) only a small number of, alleles/variants, (present in the original population) ; A small gene pool/less genetic diversity [max 2]
- (iii) 1 *idea of* better chance of survival in changing conditions ;  
2 example of change ; e.g. climatic/increased competition/new disease/new pest  
3 less chance of, two harmful recessive alleles coming together/inbreeding depression ; [max 2]
- (iv) 1 (environmental) conditions similar to those in the, wild/natural habitat ;  
2 within pollination distance/ AW ;  
3 *ref. to* possible reintroduction of plants to the wild ; [max 2]
- (c) (i) *assume answer refers to the seeds unless otherwise stated*  
1 *idea that* seeds are small **and** easier to store ;  
2 seeds can be stored for a long time ;  
3 little maintenance required ;  
4 less prone to, disease/being eaten ;  
5 seeds can be stored anywhere in the world ; [max 2]
- (ii) 1 to check that seeds are still, viable/ able to germinate ;  
2 to produce new plants from which fresh seeds can be collected ;  
3 to, find/verify, conditions for breaking seed dormancy (should plants be needed) ; [max 2]
- [Total: 15]**

**Q24.**

- 2 (a) 1 supplied with food ;  
2 monitor health of the, mother/offspring ;  
3 (sperm/ eggs) stored/frozen ; **A** sperm bank  
4 artificial insemination/in vitro fertilisation ; **A** AI/IVF  
5 *ref. to* cloning/surrogacy/fostering (of young) ;  
6 fertilised eggs incubated artificially ;  
7 transfer of breeding partners between zoos ;  
8 maintenance of records ;  
9 maintains genetic diversity ;  
10 protection from, predators/ shooting /disease ; [max 4]
- (b) 1 no longer living in natural habitat ;  
2 stress ;  
3 behavioural changes ;  
4 *idea of* disruption to normal reproductive cycles ;  
5 reject mate ; [max 2]
- (c) 1 may find difficulty in moving around (due to previously been captive) ;  
2 *idea of* difficulty obtaining food/short of food/outcompeted for food ;  
3 difficulty integrating with others of members of their species ;  
4 disease ;  
5 *idea of* lack of survival skills ; **A** lack of fear of, humans/predators [max 2]
- (d) lead poisoning/lead is an enzyme inhibitor ; [1]
- [Total: 9]

Q25.

- 1 (a) (existence of many) different species;  
with (a wide range of) different, genes/alleles;  
(many) different, habitats/ecosystems; max 2
- (b) has a very high, species diversity/biodiversity;  
is being lost rapidly;  
may be a carbon sink/ref. to global warming;  
loss may affect rainfall patterns;  
loss may affect, soil erosion/flooding; max 3
- (c) (i) more variety of plants in system A than (B, C or) D;  
ref. to different levels of vegetation in original forest (canopy,  
understory);  
therefore greater variety of habitats for birds;  
greater variety of food sources for birds; ref. pesticides; max 2
- (ii) more coffee trees grown in a (unit) area;  
no competition with other trees;  
better availability of light;  
loss of habitats for pests;  
increased use of fertilisers;  
increased use of pesticides; max 2
- (iii) populations of pests (on coffee trees) can become very high in D;  
plentiful food source for them;  
fewer bird species to predate them/fewer predators; max 2
- (d) nitrogen fixation;  
bacteria/*Rhizobium*/root nodules, provide nitrate/ammonium; 2
- (e) pay premium for coffee grown, in system A/in sustainable way;  
provide, grants/subsidies, to coffee farmers to use system A;  
encourage/educate/inform, consumers to encourage them to buy  
coffee grown in system A;  
find uses for the non-coffee trees in system A; max 2
- [Total 15]

## Section B

1.

- 9 (a)
1. cultural/aesthetic / leisure, reasons;
  2. moral/ethical, reasons ; e.g. right to exist/prevent extinction;
  3. resource material ; e.g. wood (for building)/fibres for clothes/food for humans/(herbal) medicine
  4. (eco)tourism;
  5. economic benefits;
  6. ref. resource / species, may have use in future/AW;  
e.g. medical use
  7. maintains, food webs / food chains;  
**A** description
  8. nutrient cycling;
  9. protection against erosion;
  10. climate stability;
  11. maintains, (large) gene pool/genetic variation;
  12. scientific research;

[max 7]

- (b) *advantages* (max 5)
13. can monitor health of mother;
  14. can monitor development of foetus;
  15. storage of, sperm/eggs/gametes;
  16. artificial insemination;
  17. IVF;
  18. ref. surrogate mothers;
  19. international cooperation;
  20. genetic records kept;
  21. can prevent extinction/extend range of a species/used in restoring ecosystem;
- disadvantages* (max 5)
22. unnatural environment;
  23. stress in captivity;
  24. behavioural changes;
  25. reproductive cycles disrupted;
  26. may reject selected mate;
  27. examples of problems with release ;;
  28. difficulty in finding food  
may not integrate into groups  
more susceptible to disease  
very little natural habitat left to release animals into

[max 8]

**[Total: 15]**

2.

9 (a) *similarities*  
eukaryotic (cells) ;

detail of eukaryotic cell ;; e.g. nucleus/linear DNA  
/chromosomes associated with histones  
/(named) membrane-bound organelles/80S  
ribosomes

*differences*  
single-celled **or** colonial/ multicellular ;

autotrophic **or** heterotrophic ;

motile **or** unable to move ;

cell wall **or** no cell wall ;

vacuole **or** no vacuole ;

different life cycles ;

[max 7]

(b) fall in numbers ;

danger of becoming extinct ;

ref. (IUCN/International Union for Conservation of Nature)/red list ;

*one mark for idea, additional mark if qualified with point specific to named example*

*e.g.*

habitat destruction ;  
detail ;

climate change ;  
detail ; e.g. rise in temperature

increase in disease ;  
detail ;

increase in, predators/grazers ;  
detail ;

decrease in food ;  
detail ;

named pollutant and habitat affected ;  
detail ;

hunting/ killing/ poaching/ removal (plant) ;  
detail ; e.g. trade in animal parts, selling rare plants

increased competition ;  
detail ;

lack of human education ;  
detail ;

disturbance to breeding sites ;  
detail ;

[max 8]

[Total:15]

3.

- 9 (a) multicellular ;  
differentiated cells ;  
(most) have, vascular tissue /xylem and phloem ;  
eukaryotic (cells) ;  
ref. meristems ;  
(most) are not motile ;  
motile gametes **only** in mosses and ferns ;  
autotrophic nutrition /photosynthesis ;  
cells have:  
chloroplasts ;  
large /central, vacuole ;  
walls made of cellulose ;

[max 8]

- (b) place in zoos ;  
protected against, disease /predation ;  
captive breeding programme ;  
ref. assisted reproduction /cloning/ sperm banks ;  
released into wild ;  
ref. national parks/reserves ;  
rangers patrol parks ;  
human access restricted ;  
controlled agriculture ;  
controlled industry ;  
visitor centres/education ;  
habitat/breeding sites, protected ;  
banning sale of protected animals or their products ;  
banning hunting ;

[max 7]

[Total:15]

[Online Classes : Megalecture@gmail.com](mailto:Megalecture@gmail.com)  
[www.youtube.com/megalecture](http://www.youtube.com/megalecture)  
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