

# Biodiversity

## Mark Scheme 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Biodiversity, classification and conservation
Sub Topic	Biodiversity
Booklet	Theory
Paper Type	Mark Scheme 2

Time Allowed : 70 minutes

Score : / 58

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 (a) 550(%);;

allow one mark for  $\frac{104 - 16}{16} ( \times 100)$

[2]

(b) 1. limiting/density dependent, factors or described;

2. reached carrying capacity/ ;

3. competition/ ;

4. for, food/nesting sites/resourc ;

5. large population attracts predato ;

6. large population spreads disease more easi ;

[max 4]

(c) 1. not many to begin with;

2. are carnivoro ;

3. prey numbers fe ;

4. slower reproductive ra ;

5. more likely to migrate (to other area ;

[max 2]

**[Total: 8]**

CHEMISTRY ONLINE  
— TUITION —

- 2 (a)
1. cultural/aesthetic / leisure, reasons;
  2. moral/ethical, reason ; e.g. right to exist/prevent extinction;
  3. resource materia ; e.g. wood (for building)/fibres for clothes/food for humans/(herbal) medicine
  4. (eco)touri ;
  5. economic benefi ;
  6. ref. resource / species, may have use in future/ ;  
e.g. medical u
  7. maintains, food web / food chains;  
A description
  8. nutrient cycli ;
  9. protection against erosi ;
  10. climate stabil ;
  11. maintains, (large) gene p /genetic variation;
  12. scientific resea ;

[max 7]

CHEMISTRY ONLINE  
— TUITION —

**(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. ;
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. behaviour 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]**

3 (a) ignore Y  
X = mitosis ;  
Y = meiosis / mitosis [1]

(b) chromosome number is halved /  $2n \rightarrow n$  / diploid  $\rightarrow$  haploid ;  
A 2 sets of chromosomes  $\rightarrow$  1 set of chromosomes

*explanation to max 1*

- 2 restore diploid number on fusion ; R restore full set if not qualified
- 3 avoids number doubling with each generation ;
- 4 allows expression of (recessive) alleles / AW ;
- 5 allows variation / new combinations of chromosomes ;

[2]

(c) if only use formulae, these must be correct – otherwise ignore

- 1 nitrification / nitrifying / oxidation ;
- 2 ammonium ions to nitrite ions ;
- 3 nitrite ions to nitrate ions ; A one mark for ammonium to nitrate
- 4 one named microorganism in correct context  
Nitrosomonas / Nitrobacter ; R Rhizobium
- 5 ammonium / nitrate / AW, absorbed by plants / leached / AW ;  
R used by plant

[max 3]

(d) ammonium ions are (positively) charged ; A hydrophilic / polar / water-soluble  
2 cannot pass through, phospholipid bilayer / membrane ;

*either*

- 3 active transport ;
- 4 moved against concentration gradient ;

*or*

- 3 facilitated diffusion ;
- 4 moves down its concentration gradient ;

[max 2]

[Total: 8]

- 4 (a) **G** ;  
**A** ;  
**B** ;  
**F** ;

[4]

(b) *do not accept list ATP, DNA, RNA, phospholipid as these must be qualified*

- 1 idea of, increase in cell numbers / more cells ; **A** ref. to mitosis / cell division
- 2 ATP, qualified ; e.g. for, cell growth / anabolic reactions
- 3 (activated) nucleotides for, DNA / RNA, synthesis ;
- 4 phospholipid for membranes ;
- 5 DNA replication (for cell division) ;
- 6 RNA for, protein synthesis / AW ;
- 7 AVP ; e.g. activate glucose for glycolysis  
ref. NADP, light-dependent reaction

[max 3]

[Total: 7]

CHEMISTRY ONLINE  
— TUITION —

5 (a) (i) *max 3 if no reference to examples in passage*

*habitat*

location / place / area *or* (type of) local / AW, environment ;  
characterised by, its physical features / the freshwater environment / its dominant producers;  
where, an organism / a population, lives ;

*community*

all populations of all species / AW ;  
within a specified area / AW, at a particular time ;

[max 4]

(ii) phytoplankton ;

[1]

(iii) *accept plants for phytoplankton*

- 1 photosynthetic / carry out, photosynthesis / carbon fixation ; **A** autotrophic
- 2 conversion of light energy to chemical energy ;
- 3 equation ;
- 4 have light-absorbing pigments ; **A** chlorophyll
- 5 ref. to independence *or* dependence of other organisms ; *in context of energy*
- 6 ref. to input of energy to ecosystem ;
- 7 base of the food chain(s) / first trophic level / AW ; **A** consumed by, herbivores / primary consumers

[max 3]

(b) (i) *energy losses*

in, egestion / faeces / undigested material ;  
in excretion ; **A** urine / urea  
heat from respiration ;

*energy other uses*

ref. maintenance ;; e.g active transport / metabolic reactions / digestion  
for, muscle contraction / movement ;

[max 3]

(ii) *any one valid suggestion e.g.*

more confined space so less movement ;  
move more so greater energy loss (through respiration / as heat ) ;  
more predators so use more energy escaping from them ;

[max 1]

**[Total: 12]**

- 6 (a) 1. similar, morphological / physiological / biochemical / behavioural, features ;  
2. interbreed / reproduce, to produce fertile offspring ;  
3. occupy same niche ;  
4. reproductively isolated ; [2 max]

(b) *isolating mechanism* – geographical / land barrier / AW **or** behavioural / AW ; [1]

- (c) 1. no, breeding / gene flow, between populations ;  
2. (gene) mutations occur ;  
3. different selection pressures / different (environmental) conditions ;  
4. genetic change ; e.g. different alleles selected for / change in allele frequency / change in gene pool / advantageous alleles passed **on** ;  
5. different chromosome numbers ;  
6. genetic drift ;  
7. do not recognise song ;  
8. therefore cannot interbreed ;  
9. allopatric (speciation) ; [5 max]

[Total: 8]

CHEMISTRY ONLINE  
— TUITION —