Evolution

Mark Scheme 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Selection and evolution
Sub Topic	Evolution
Booklet	Theory
Paper Type	Mark Scheme 2

Time Allowed : **54 minutes**

Score : **/ 45**

Percentage : **/100**

Grade Boundaries:

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

1	**(a)**		*isolating mechanism* - geographical / mountains / physical barrier **;** *type of speciation* – allopatric **;**	[2]
	(b)	1 2 3 4 5 6 7 8	mouse populations separated by mountains **;** no, breeding / gene flow, between populations **;** mutations occur **;** different selection pressures / different (environmental) conditions **;** genetic change **;** e.g. different alleles selected for / change in allele frequency / change in gene pool / advantageous alleles passed **on ;** (results in) different chromosome numbers **;** genetic drift **;** (different populations ultimately) cannot interbreed **;** **R** different species	[5 max]
				[Total: 7]

2 **(a)** 1 allopatric speciation ;

2 geographical isolation / spatial separation ;

3 e.g. of barrier ;

4 e.g. of organism ; *must relate to 3*

5 sympatric speciation ;

6 example ;

7 meiosis problems ;

8 polyploidy ;

9 behavioural / temporal / ecological / structural, isolation ;

10 (isolated) populations, prevented from interbreeding / can only breed amongst themselves ;

11 no, gene flow / gene mixing, (between populations) ;

12 different selection pressures operate ;

13 natural selection ;

14 change in allele frequencies ;

15 different gene pool ;

16 over time (differences prevent interbreeding) ;

17 reproductively isolated ; [8 max]

(b) 18 humans ; *must be linked to, choosing / selecting / mating etc*

19 parents with desirable feature ;

20 e.g. organism **and** feature ;

21 bred / crossed ;

22 select offspring with desirable feature ;

23 repeat over many generations ;

24 increase in frequency of desired allele(s) / decrease in frequency of undesired allele(s) ;

25 background genes ;

26 loss of hybrid vigour / increase in homozygosity / ref. inbreeding depression ;

27 AVP ; e.g. detail of breeding techniques [7 max]

[Total: 15]

3 **(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.
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]

4 **(a)** 1. (either feature) reduces water loss by, transpiration / evaporation **;**
2. reduction in, number of stomata / surface area, (for, transpiration / evaporation) **;**
3. rolling leaves traps moist air **;**
4. idea of reduced, diffusion / water potential, gradient (between leaf and trapped air) **;**

[3 max]

(b) **(i)** cooked protein more digestible than raw protein **;**
use of figures **;** *accept any **named** comparison between cooked and raw* [2]

(ii) *cooked*
1. cooking breaks cross-links (in kaffirin) **; A** bonds
2. ref. to named bond **;** e.g. hydrogen / ionic / disulphide / covalent
3. tertiary / 3D / quaternary, structure disrupted / AW **;**
4. protease can now bind, more / easier, with polypeptides **;**
5. <u>enzyme-substrate complexes</u> can form **;**
6. so more protein is digested to amino acids **;** [3 max]

[Total: 8]