Classification

Mark Scheme 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Biodiversity, classification and conservation
Sub Topic	Classification
Booklet	Theory
Paper Type	Mark Scheme 1

Time Allowed : **64 minutes**

Score : **/ 53**

Percentage : **/100**

Grade Boundaries:

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

1 **(a** 1 two (complete) sets of chromosomes / diploid / 2n **;**

2 one of each chromosome, from each parent / maternal and paternal **;**

3 to allow (homologous) pairs to form during, meiosis / prophase 1 / reduction division **;**
[max 2]

(b) most / high % / more than 70%,
of females in **three** populations prefer calls from their own population **;**

less than half / 44%, of females in, **one** population / population 60,
prefer calls from their own population **; ora** [2]

(c) *yes*
1 different chromosome numbers **;**

2 cannot interbreed to form fertile offspring / hybrids infertile **;**

3 (because) not all chromosomes will be able to pair in meiosis **;**

4 live in different, habitats / climatic regions
OR
geographical isolation **;**

5 (so) unlikely to interbreed / reproductively isolated **;**

6 most females prefer males from their own population **; ora**

7 differences in mating, call / behaviour **;**

no
8 some females, willing to mate with / prefer, males from other populations **;**

9 phenotypically / morphologically, similar **;** [max 4]

[Total: 8]

2 **(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]

3 **(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]

4 **(a** 1. DNA not surrounded by nuclear membrane / no nucleus;

2. (prokaryote) DNA is circular;

3. DNA not associated with histones; **A** naked DNA

4. plasmids (may) be present;

5. no (double) membrane-bound organelles; **A** no, mitochondria / chloroplasts

6. no, ER / Golgi; **A** ribosomes not attached to membranes

7. ribosomes,70S / 18 nm / smaller (than eukaryotic cells);

8. cell wall made of, peptidoglycan / murein / amino sugars / AW;

9. (usually) unicellular;

10. 0.5 to 5.0 μm diameter; **A** any value between 0.5 and 5.0 as long as μm is used

11. AVP; (may) have, flagella / pili / capsule / slime layer [8 max

(b) 12. ores (may) contain metal sulfides;

13. example; e.g. iron / copper / zinc / cobalt / lead

14. insoluble in water so difficult to extract;

15. bacteria oxidise metal sulfide;

16. to soluble sulfate;

17. <u>bioleaching</u>;

18. example of bacteria; e.g. *A.ferrooxidans*

19. bacteria need to survive in acidic conditions;

20. mixture of bacteria required (in bioheap);

21. (in order to) survive a wide range of temperatures / range of bacteria with different temperature optima;

22. advantage;

23 e.g. low grade ores / spoil heaps, can be exploited
can get metal from industrial waste
does not produce sulfur dioxide
can be done in situ
low energy demand
less (heavy) machinery
not labour intensive
relatively cheaper (than other mining methods)

24. AVP; e.g. ref. gold / uranium [7 max]

[Total: 15]