

# Characteristics and Classification of Living Organisms

## Mark Scheme 3

<b>Level</b>	IGCSE
<b>Subject</b>	Biology
<b>Exam Board</b>	CIE
<b>Topic</b>	Characteristics and Classification of Living Organisms
<b>Paper Type</b>	(Extended) Theory Paper
<b>Booklet</b>	Mark Scheme 3

**Time Allowed:** 76 minutes

**Score:** /63

**Percentage:** /100

Question	Answers		Marks	Additional Guidance																								
1 (a)	<p>5 / 6 RIGHT = 4 4 RIGHT = 3 3 RIGHT = 2 1 / 2 RIGHT = 1  0 RIGHT = 0</p>	<table border="1"> <tr><td>go to 2</td><td></td></tr> <tr><td>go to 3</td><td></td></tr> <tr><td><i>Aulostomus maculatus</i></td><td>F</td></tr> <tr><td><i>Gymnothorax moringa</i></td><td>E</td></tr> <tr><td>go to 4</td><td></td></tr> <tr><td>go to 5</td><td></td></tr> <tr><td><i>Dasyatis americana</i></td><td>G</td></tr> <tr><td><i>Bothus ocellatus</i></td><td>D</td></tr> <tr><td>go to 6</td><td></td></tr> <tr><td><i>Epinephelus striatus</i></td><td>A</td></tr> <tr><td><i>Pseudupeneus maculatus</i></td><td>C</td></tr> <tr><td><i>Chaetodon capistratus</i></td><td>B</td></tr> </table>	go to 2		go to 3		<i>Aulostomus maculatus</i>	F	<i>Gymnothorax moringa</i>	E	go to 4		go to 5		<i>Dasyatis americana</i>	G	<i>Bothus ocellatus</i>	D	go to 6		<i>Epinephelus striatus</i>	A	<i>Pseudupeneus maculatus</i>	C	<i>Chaetodon capistratus</i>	B	[4]	<p>sequence is:</p> <p><b>E</b> <b>G</b> <b>D</b> <b>A</b> <b>C</b> <b>B</b></p> <p>I letters placed in grey blocks</p>
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(b) (i)	mutation ;		[1]																									
(ii)	1	retina / pigments, adapted for detecting different, colours / wavelengths ;	[max 2]	R simple restatement of the question stem																								
	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 ;																										

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.
<b>[Total: 11]</b>				

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

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

[4]

[Total: 4]

Question	scheme				Comments
3 (a)	feature	bac	virus	fungus	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
	produces spores	✓	✗	✓	
	hyphae	✗	✗	✓	
	capsule	✓	✗	✗	
	nucleus	✗	✗	✓	
(b)	treat independently 1 (feeding) <u>hypha</u> (e) ; <b>R</b> roots <b>ignore</b> 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 ;				fungus may be saprotrophic or parasitic <b>ignore</b> 'roots' when awarding points 2 to 7  MP3 refers to fungus not food <b>A</b> 'spread across' food, <b>A</b> substrate for food <b>R</b> excrete enzymes <b>R</b> digestion unqualified, <b>A</b> external implied <b>R</b> obtain <b>A</b> absorbed even if no digestion
	[3 max]				
(c)	1 spores ; 2 carried in the, wind / air / atmosphere ; <b>A</b> sporangium / 'sack' / AW, bursts / opens 3 grow, longer / more, (feeding) hyphae / mycelium spreads				<b>A</b> blown / floats – as suggests in the air  <b>A</b> new mycelium forms / mycelium increases in size ecf for roots from <b>(b)</b>
	[2 max]				
<b>[Total: 8]</b>					



(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 / only 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 ; [3]  
leaf/organ + carries out a number of functions (or vice versa for tissue) ;
- [Total: 7]**

- 7 (a) ref. to presence of feathers; (R) wings [2]  
ref. to presence of beak; ( )
- (b)(i) each organism is given two names/ref. to genus and species/trivial; [2]  
suitable example (*Oxyura jamaicensis* or *Oxyura leucocephala*);
- (ii) cross-mating results in a fertile + duck/variety/offspring/sub-species/  
new species; [2]  
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; (R) they exist in Spain [1]  
(R) refs to other parts of the world unequal.
- (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]

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**Total 10**  
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