Characteristics and Classification of Living Organisms

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Characteristics and Classification of Living Organisms
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 1

Time Allowed: 75 minutes

Score: /62

Percentage: /100

Question				Marks	Guidance Notes
1	**(a**	**(i)**	single celled / unicellular **;** no (true) nucleus / no nuclear membrane **;** loop of DNA **;** no, (membrane-bound) organelles **;** e.g. no mitochondria / chloroplasts (peptidoglycan / murein) cell wall **;** reproduce by binary fission **;** small(er) / 70S, ribosomes **;** plasmids **;**	[max 2]	**I** DNA strand unqualified **A** naked DNA **I** flagella, capsule, pili, cilia **R** cellulose cell wall
		(ii)	swim / movement / AW **;**	[1]	
	(b)		harmless / attenuated / dead / AW, form of, (named) pathogen / antigen used **;** (vaccine) injected / swallowed **;** ref to <u>specific / unique / AW</u>, antigen **;** <u>lymphocytes</u> make <u>antibodies</u> **;** ref to memory cells **;** ref to <u>active immunity</u> **;** <u>rapid,</u> immune response / AW, if exposure to <u>same</u> pathogen **;** herd immunity **;** AVP **;** e.g. detail of active immunity / smallpox became extinct	[max 4]	**A** long term immunity
	(c)	**(i)**	12 – 0.4 **;** 11.6, <u>au</u> / <u>arbitrary units</u> **;**	[2]	
		(ii)	large / rapid / immediate increases **;** peaks at, <u>50</u> s / <u>12</u> AU **;** then decrease to, around 5 – 4.6 AU / by 125 –150 s **;** fluctuates / stays (fairly) constant, between 125 – 150 s and 250 s / 4.4 and 4.8 ± 0.2 AU **;**	[max 3]	**I** comparisons to 'without toxins' on graph **A** increases and decreases from 50 s

Question			Marks	Guidance Notes
	(iii)	active transport; (through) <u>protein</u> (molecules / gates / pumps / AW) ; (protein) in cell membrane ; using, energy / ATP (from respiration) ; (movement) against a concentration gradient / AW ;	[max 3]	
(d)	**(i)**	(small) intestine ;	[1]	**A** large intestine / duodenum / jejunum / ileum / rectum / colon
	(ii)	<u>oral rehydration</u> (therapy / salts / treatment / solution) ; drink mixture of, sugar / nutrients <u>and</u>, salt / ions ; <u>replace lost</u>, water / fluids ; water must be, uncontaminated / boiled / sterilised / clean / AW ; antibiotics ;	[2]	**A** receive intravenous fluids **I** drink more water
			[Total: 18]	

Question	Answers	Marks	Additional Guidance
2 **(a)**	**E** **A** **B** **D** **C** **[max 3]**		all 5 correct = 3 marks 3/4 correct = 2 marks 1/2 correct = 1 mark
(b)	soft body **;** not segmented **;** mantle **;** visceral mass **;** (muscular) foot **; ignore** feet / legs produce slime / have slimy body **; A** mucus radula / rasping tongue / AW **;** hydrostatic skeleton **;** **[max 2]**		
		[Total: 5]	

Question	E	Answers	Marks	Additional Guidance
3 (a (i)		<table><tr><td>go to 2</td><td></td></tr><tr><td>go to 5</td><td></td></tr><tr><td>*Gymnopis multiplicata*</td><td>**B**</td></tr><tr><td>go to 3</td><td></td></tr><tr><td>*Triturus cristatus*</td><td>**C**</td></tr><tr><td>go to 4</td><td></td></tr><tr><td>*Necturus maculosus*</td><td>**D**</td></tr><tr><td>*Ambystoma tigrinum*</td><td>**G**</td></tr><tr><td>go to 6</td><td></td></tr><tr><td>*Oreophrynella quelchii*</td><td>**E**</td></tr><tr><td>*Polypedates leucomystax*</td><td>**F**</td></tr><tr><td>*Rana temporaria*</td><td>**A**</td></tr></table> [max 3]	5 / 6 right = 3 3 /4 right = 2 1 /2 right = 1 0 right = 0
(b)	1 2 3 4 5 6 7 8 9	habitat, destruction / change **;** **A** examples of destruction, e.g. deforestation, soil erosion (named) pollution **;** **A** global warming / climate change / acid rain (fungal) disease **;** hunting (for pet trade / food) **;** lack of food / starvation **;** **ignore** competition for food competition, with alien / introduced / exotic, species **;** predation by introduced species **;** roadkill **;** AVP **;**	[max 3]	
		Total:	**[6]**	

Question					Marks	Additional Guidance
4	(a	(i)	reptiles ;		[1]	
		(ii)				5/6 right = 3 3/4 right = 2 1/2 right = 1 0 right = 0

go to 2		;;;
go to 3		
go to 4		
Chalcides minutus	B	
go to 5		
go to 6		
Brookesia perarmata	G	
Calumma parsonii	C	
Amblyrhynchus cristatus	A	
Cyclura lewisi	E	
Abronia graminea	F	
Varanus komodoensis	**D**	[3]

Question				Marks	Additional Guidance
4	**(b)**		encourages biodiversity ; **ora** prevents extinction ; encourages genetic diversity (within each species) ; maintain food, webs/chains ; food for predators ; increasing research/source of medicine ; AVP ;; e.g. maintain habitats for other organisms/ethical/moral/aesthetic reasons/tourism	max [3]	**A** species diversity **A** an example of feeding
	(c)	**(i)**	reduced genetic diversity ; identical offspring ; negative traits passed on ; more competition for local resources ; less chance of survival in a varying environment ; one disease could wipe out total population ; AVP ; e.g. less chance of evolving	max [2]	**A** no genetic diversity **A** unfavourable/bad traits.
		(ii)	offspring may not be as well adapted to environment ; slower process/takes longer (than asexual reproduction) ; requires partner/two parents ; less energy efficient/requires more energy/many eggs is wasteful ; AVP ;	max [2]	**A** description e.g. good characteristics are not always passed on.
	(d)	**(i)**	reduction division/chromosome number is halved/one set of chromosomes ; diploid to haploid ; for production of gametes ; daughter cells are not genetically identical/genetically different ;	[2]	to each other or parent

Question			Marks	Additional Guidance
4	**(ii)**	for adaption to, new / changed environment ; causes (genetic) variation ; competition for survival ; best suited reproduce ; allows natural selection ; allows evolution ; AVP ;	max [3]	**ignore** mutations unqualified.
			[Total: 16]	

5	(a)	1	antennae ;		
		2	elongated bodies ;		
		3	<u>segmented</u> body / many <u>segments</u> ;		
		4	many (⩾10) legs ;		
		5	(one or two pairs of) legs on each segment ;		
		6	exoskeleton ;		
		7	<u>jointed</u> legs ;	max [3]	
	(b)	1	length of antennae ;		
		2	number of sections on antennae ;		
		3	presence / absence, of tail pieces / AW ;		
		4	length of tail pieces ;		
		5	length of legs ;		
		6	number of leg joints ;		
		7	total number of legs ;		
		8	position of legs on body ;		
		9	number of legs per segment ;		
		10	size / shape of segments ;		
		11	number of body segments ;		
		12	length of body ;		
		13	head shape ;		
		14	presence / absence 'spots / markings' ;	max [3]	

	(c)	**(i)**	nucleus ;	[1]	**Ignore** chromosomes
5		**(ii)**	**1** *idea that* animals are identified <u>accurately</u> ; **R** identify unqualified **2** barcoding is, cheap / easy / quick / efficient ; **3** barcoding is useful if distinguishing characteristics / dichotomous key are difficult ; **4** identify previously unknown species ; **5** helps to identify, threatened / endangered species ;	max [2]	
		(iii)	**1** ref to genes ; **2** codes for (specific) proteins ; **3** <u>stores</u> genetic information ; **4** can be <u>copied</u> to pass on information to new cells ;	max [2]	
	(d)	**(i)**	**1** <u>all</u> arrows point from food to feeder ; **2** millipedes eat dead leaves <u>and</u> fungi ; **3** food chain : bacteria → nematodes → springtails → centipedes ; **4** centipedes eat millipedes, springtails and earthworms ;	[4]	
		(ii)	**1** ref to, respiration / decomposition ; **2** release <u>carbon dioxide</u> ; **3** carbon dioxide is taken in by, plants / photosynthesis ;	max [2]	
				[Total:17]	