Mark scheme

Characteristics and classification of living organisms

Biology 0610 · Questions from Paper 3, Paper 4 and Paper 6

Total marks

89

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
4	4	7	9	9	9	10	11	13	13	**89**

Question 1 [4]

1	**E** *E. robustus ;* **B** *A. marsupialis ;* **A** *D. bicornis ;* **C** *M. rufus ;* **D** *H. sapiens ;*	max [4]	4 or 5 correct = 4 marks 3 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark
		[Total: 4]	

Question 2 [4]

2(a)	arthropods ;	**1**	
2(b)(i)	*any 2 from:* does not have a backbone ; 3 pairs of legs / 6 legs ; has (1 pair of) wings ; has jointed legs ;	**2**	
2(b)(ii)	*Heterometrus* ;	**1**	

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Question 3 [7]

3	(a)	segmented body / segmentation ; jointed, limbs / legs ; exoskeleton / outer skeleton ;	3	
	(b)	*5 / 6 RIGHT = 4* *4 RIGHT = 3* *3 RIGHT = 2* *1 / 2 RIGHT =1* *0 RIGHT = 0*	4	
		[Total: 7]		

Abaliella dicranotarsalis	**E**
go to 2	
go to 3	
go to 4	
Tegenaria domestica	**A**
Odielus spinosus	**G**
Chelifer tuberculatus	**D**
go to 5	
Poecilotheria regalis	**F**
go to 6	
Tyroglyphus longior	**C**
Ixodes hexagonus	**B**

Question 4 [9]

4	(a) (i)	ref. to vertebral column / backbone ; skull ;	[max. 1]	
	(ii)	dry skin ; ref. to scales ; eggs with, dry shell / leathery shell ;	[max. 2]	
	(iii)	no limbs / legs ;	[1]	
	(b) (i)	amphibian ;	[1]	
	(ii)	smooth skin / no scales ; gas exchange using skin ; spend part of life (cycle) in water and land/ AW ; ref. to metamorphic life cycle / AW ;	[max. 2]	
	(c)	better survival of egg ; fewer eggs need to be produced ; less risk of predation ; maintains suitable temperature ; reduces risk of disease AW ; protected from external environment ;	[max. 2]	
			[Total: 9]	

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Question 5 [9]

5	**(a) (i)**	**3** body parts / head + thorax + abdomen; **Two or one pair** of **antennae**; **six legs / three pairs** of (jointed) legs; **one pair / two** (compound) eyes;	**Max[3]**	Ignore segmented body, segmentation of the abdomen, 3 body segments, exoskeleton. Ignore antennae alone, 'things on head, feelers. Ignore 'same number of legs'. Need number to be qualified.
	(ii)	**A** and **B –** one pair v two pairs of wings / length of abdomen / thickness of legs / AW; **A** and **C –** wings v no wings / C has no wings [alone] / A has wings [alone]	**Max[2]**	A. if only half of the answer is given e.g. B has 2 pairs of wings this implies that A doesn't. A. if mention number of wings. Ignore wings alone. Ignore different size but allow the shape of abdomen. Ignore length of leg comparison.
	(iii)	Insects / Insecta ;	**[1]**	

(b)	Crustacean / Crustaceae; two pairs of antennae / claws, clamp or chelopeds / more than 6 legs or more than 3 pairs / hard or calcareous exoskeleton, hard covering or hard shell / tough covering AW;; **or** Arachnids / Arachnida; 4 pairs or 8 legs / simple eyes / pedipalp / cephalothorax and abdomen or 2 body parts / AW;; **or** Myriapods / Myriapoda; one or two pairs of legs per segment; elongate body;	**[3]**	If named an example e.g. crab instead of crustacean then no group name mark but accept up to 2 differences. Accept more than 3 pairs of legs, more than 1 pair of antennae. Ignore no wings / many legs / compound eyes / not one pair of antennae / body not divided into three parts. If named an example e.g. spider, scorpion, mites instead of arachnids then no group name mark but accept up to 2 differences. Ignore more than 3 pairs of legs. [need to know how many more. Ignore negative features e.g. no wings / no compound eyes / no antennae. Ignore no separate thorax and abdomen / no wings / many legs. If incorrect group given e.g. molluscs. No mark for group name but allow only **one** difference with insects but it must be a positive feature e.g. hard shell present in mollusc. Name of group = one mark. 2 marks for two correct differences in positive features. These three groups are the only ones listed in the syllabus.
		[Total:9]	

Question 6 [9]

6(a)	(dietary) fibre **/** carbohydrate / starch / (named) sugar / vitamin C ;	**1**	
6(b)(i)	external ears / pinnae ; fur ;	**2**	
6(b)(ii)	*any five from:* *for (giant panda closer to red panda):* same diet / herbivores / AW ; terrestrial / similar, ecosystems / habitats ; fur markings described ; ear position ; *against:* shorter (branch) distance between giant panda and polar bear (than to red panda) ; fewer, DNA (base sequence) / gene, differences between giant panda and polar bear (than to red panda) ; (red panda) first appeared, 40±3 million rather than 20±3 million, years ago (giant and polar) ; more time for, mutations / evolution (for red panda) ; common, ancestor / branch / relationship, 20±3 million, (giant and polar), than 47±3 million years ago (red) ; DNA data is likely to be more, accurate / quantitative / not subjective ;	**5**	
6(b)(iii)	anatomy **/** ability to produce fertile offspring **/** AVP ;	**1**	

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Question 7 [10]

7(a)	genus **AND** species ;	**1**	
7(b)	fungus / fungi ;	**1**	
7(c)(i)	*any two from:* **1** chloroplast ; **2** cell wall ; **3** (large permanent) vacuole ; **4** AVP ;	**2**	e.g. starch grains
7(c)(ii)	*any four from:* *species **X*** **1** fern ; **2** spores ; **3** fronds ; *species **Y*** **4** monocotyledon ; **5** narrow / long / AW, leaves ; **6** parallel veins ;	**4**	
7(c)(iii)	*any two from:* **1** use, base / amino acid / nucleotide / gene, sequences **OR** sequence, DNA / RNA / AW ; **2** (crops with) recent ancestors / closely related species, will have more, sequences / genes / alleles in common / will have similar, sequences / genes / alleles ; **3** **AVP** ;	**2**	

Question 8 [11]

8(a)	a group of organisms that can reproduce ; to produce fertile offspring ;	**2**	
8(b)(i)	*Lithobius* ;	**1**	
8(b)(ii)	*myriapod:any one from:* many pairs of legs / more than 16 legs / more than 8 pairs of legs ; one or two pairs of legs on each segment ; *arthropod: any one from:* segmented body ; exoskeleton ; jointed legs ;	**2**	
8(b)(iii)	*any two from:* insects ; arachnids ; crustaceans ;	**2**	
8(b)(iv)	*any two from:* chloroplasts / chlorophyll ; cell wall / cellulose ; (permanent) vacuole ; AVP ; e.g. starch, grain / granule	**2**	
8(c)(i)	(hard) shell / exoskeleton / carapace ;	**1**	
8(c)(ii)	animal ;	**1**	

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Question 9 [13]

9(a)

characteristic	arthropod group		
	arachnids	crustaceans	myriapods
four pairs legs	✓		
one pair antennae			✓
two main body parts	✓		

;;;

3 one mark for each correct row

9(b)

movement ;
respiration ;
sensitivity ;
growth ;
reproduction ;
excretion ;
nutrition ;

4

9(c)(i)

oxygen used by arthropods ;
correct reference to (aerobic) respiration ;
carbon dioxide / water (vapour), is given out / released ;
carbon dioxide / water (vapour), is absorbed ;
(so) volume of air (in the container) decreases / pressure in the container decreases ;

3

9(c)(ii)

as the temperature increases the (rate of) dye movement increases / AW ;

1

9(c)(iii)

90(%) ;;

2

Question 10 [13]

10(a)

features / AW ;
binomial ;
genus ;
species ;

4

MP3 and MP4 **A** either order

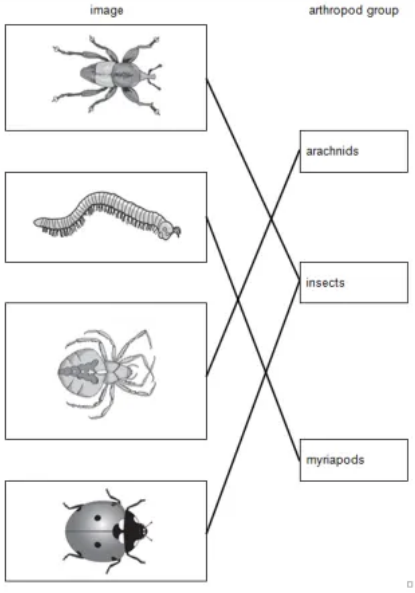
10(b)

Minuca pugnax	**E**
Maja brachydactyla	**A**
Astacus leptodactylus	**D**
go to 5	
Daphnia pulex	**C**
Porcellio expansus	**B**
Porcellio haasi	**F**

;;;;;

5

6 correct = 5 marks
4 or 5 correct = 4 marks
3 correct = 3 marks
2 correct = 2 marks
1 correct = 1 mark

10(c)		**4**	one mark for each correct line from the image box **R** each additional line

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