Mark scheme

Practical skills

Biology 0610 · Questions from Paper 3 and Paper 6

Total marks

71

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	Total
5	6	6	6	6	8	10	12	12	**71**

Question 1 [5]

1(a)	increased / AW ; paper ; plastic ; metal ;	**4**	
1(b)	18(%) ;	**1**	

Question 2 [6]

2	*independent variable:* 1 at least two different volumes of water added ; *dependent variable:* 2 number of seeds germinated / time taken for seeds to germinate ; *3, 4, 5 method ;;;* • method of maintaining temperature • watering at regular intervals • reference to placing seeds in trays / petri dish / test-tube / planting in soil • check seeds at regular intervals / at a set time period • AVP, e.g. calculation of rate described *6, 7 constant variables ;;* • temperature • type of seeds • oxygen concentration • pH • type / amount of, soil / growing medium • light (intensity) 8 repeat at least two times (three trials) ;	**6**	

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Question 3 [6]

3	*independent variable:* **1** at least two different temperatures **;** *dependent variable:* **2** time for dye to reach the leaves or a set distance **or** distance moved by dye in a set time **or** number of cut sections containing dye **;** **3 and 4** *detail of method – max two from* **;;** • method of maintaining (at least one) air temperature • *idea of* slicing the end off the celery before immersion • cutting sections (with a, knife / scalpel) **5, 6 and 7** *variables kept constant - max three from* **;;;** • wind-speed • humidity • light intensity • length / height / size, of, celery / stalk • number of leaves / surface area of leaves • species / type / age, of, celery • (named) colour / concentration / volume, of dye • time (in dye) / time stated • thickness of cut sections / sections cut in the same plane / AW **8** two or more replicates at each temperature / repeat the investigation at least two more times **;** **9** suitable safety precaution **;**	**6**	e.g. cutting sections on a flat or stable surface / cut away from body / gloves / goggles

Question 4 [6]

4	*total of six from:* **1** *independent variable* at least two pH values , tested / stated **;** **2** *dependent variable* time for iodine solution to stay yellow-brown / time for disappearance of starch/colour of iodine (solution) after a set period of time **;** **3, 4 + 5** *variables kept constant* **;;;** • concentration of amylase / enzyme (solution) • volume of amylase / enzyme (solution) • temperature • volume of starch (suspension) • concentration of starch (suspension) • sampling interval time, stated / described • buffer / pH (solution) volume • iodine concentration / volume / number of drops **6 & 7** *method* **;;** • equilibration (both solutions in the water bath before mixing) • take samples • use of, spotting / white, tile • use of buffer **8** repeat investigation twice more / at least two replicates **;** **9** relevant safety precaution **;**	**6**	

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Question 5 [6]

5	**1** *independent variable* different intensities of exercise / different exercises / exercise for different lengths of time ; **2** *dependent variable* after / during, exercise measure, heart rate / pulse rate ; **3 and 4** *detail of method* ;; • description of named exercise of different intensities • ensuring heart rate returns to resting rate • use of a heart rate monitor **5, 6 and 7** *constant variables* ;;; • same speed / distance / time, of exercise • same age of people • same sex of people • same, person / fitness level / mass of person / height of person / BMI • same, place / time of day / temperature / weather **8** at least three trials / two more repeats ; **9** relevant safety precaution ;	**6**	

Question 6 [8]

6(a)	*independent variable:* **1** (at least) two different, enzyme / lipase, concentrations ; *dependent variable:* **2** measuring pH after a set time OR measuring time to reach a certain pH ; *detail of method:* **3** use of pH meter / pH paper / (named) indicator ; **4** measure / same, initial pH / initial colour ; **5** control **and** description of the control e.g. using boiled enzyme / water instead of enzyme ; **6 & 7** *variables kept constant – max two from* ;; • volume of milk • type of milk / same milk / fat content of milk • volume of, lipase / enzyme • temperature • volume of indicator **8** two or more repeats / total of three or more trials ; **9** relevant safety precaution e.g. use of goggles / gloves ;	**6**	
6(b)	add ethanol and (then) water ; shake ;	**2**	

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Question 7 [10]

7	**(a)**	<table><tr><th>feature</th><th>male</th><th>female</th></tr><tr><td rowspan="3">(end of) abdomen / body /AW</td><td>rounded / blunt / AW</td><td>pointed / AW;</td></tr><tr><td>black / dark / AW</td><td>white / light / AW;</td></tr><tr><td>short / AW</td><td>long / AW;</td></tr><tr><td rowspan="3">bands / stripes (on abdomen / body) /AW</td><td>wide / AW</td><td>thin / AW;</td></tr><tr><td>three or four / less</td><td>six or five / more;</td></tr><tr><td>dark / black / AW</td><td>white / light /grey / AW;</td></tr></table><u>two</u> correct features in first column; correct descriptions in each row, one mark each for any two descriptions;;	**max 3**	**A.** comparative answers / presence or absence of features **A.** round vs oval
	(b)	<u>one pair</u> of antennae; wings;	**2**	**A** compound eyes
	(c)	independent variable: different colours (of flowers / paper / AW); controlled variables: (max 2) similar flowers for shape / size / AW; same type of attraction mechanism / scent / honey guides / nectar / same plant species; same area (in open) / same number of bees and flies (if in enclosed chamber) / AW; same time / period; method: count / observe / video / film / record the number of visits / AW; repeats / AW; handling of data: calculate average / tally chart / graph / table / AW; AVP; e.g. a safety point with reference to bees	**max 5**	**A** only two different colours / named colours **A** same paper flowers /shapes
			[Total: 10]	

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Question 8 **[12]**

8 **(a)** **(i)** **A –** axes;
S – size;
P – correct plots;
L – line; [4]

(ii) line falls;
rate of activity increases / enzyme works faster / more collisions of molecules (as temperature rises) (or vice versa);
line rises;
rate of activity decreases / enzyme denatured (as temperature rise above 50°C);
figures quoted in support;

reference to optimum/best temperature;
AVP; [Max: 4]

(b) **(i)** increased reliability;
identify / reduce errors / anomalies;
identify the end point clearly;
to check method / technique;
AVP; [Max: 2]

(ii) *suggest and explain*

variable	explanation
milk concentration	will alter time to end point
milk freshness	pH can be changed – alters enzymes activity
type of milk	alters enzyme activity /substrate conc.
volume / conc. enzyme	alter amount of reactions vary enzyme rate
pH	vary activity of enzyme

[2]

[Total: 12]

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Question 9 [12]

9(a)(i)	red blood cells do not have a nucleus / white blood cells have a nucleus ; red blood cells, have a light area in the centre / are biconcave ; there are more red blood cells / fewer white blood cells ; red blood cells contents not granular AW / white blood cells contents granular ; red blood cells smaller than phagocytes / **ora** ; red blood cells are overlapping / white blood cells do not overlap ;	**2**	
9(a)(ii)	**O** single clear lines on both cell membranes <u>and</u> no shading in the nucleus ; **S** monocyte larger than 2,5 cm and neutrophil larger than 2 cm provided ; **D1** monocyte is larger than the neutrophil ; **D2** neutrophil nucleus has two distinct parts joined by a narrow section, larger part at least twice the size of the smaller part ;	**4**	
9(b)(i)	<table><tr><th>type of blood cell</th><th>diameters / mm</th><th>average diameter / mm</th></tr><tr><td>red blood cell</td><td>13±1 12±1</td><td>12,5±1</td></tr><tr><td>lymphocyte</td><td>12±1 11±1</td><td>11.5±1</td></tr><tr><td>phagocyte</td><td>22±1 18±1</td><td>20.0±1</td></tr></table> ;;;	**3**	mp1 for header units mp2 for six measurements mp3 for three correct averages from candidates results
9(b)(ii)	8 or 9 (μm) ;;;	**3**	**A** ecf from **2(b)(i)**

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