SCOTTISH QUALIFICATIONS AUTHORITY

2005 Biology

Standard Grade – Credit

Finalised Marking Instructions

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.

GENERAL MARKING ADVICE: BIOLOGY

The marking schemes are written to assist in determining the 'minimal acceptable answer' rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessments and course assessments.

1. There are no **half marks**. Where three answers are needed for two marks, normally one or two correct answers gain one mark.

2. In the mark scheme, if a word is **underlined** then it is essential; if a word is (**bracketed**) then it is not essential.

3. In the mark scheme, words separated by / are **alternatives**.

4. There are occasions where the second answer negates the first and no marks are given. There is no hard and fast rule here, and professional judgement must be applied. Good marking schemes should cover these eventualities.

5. Where questions on data are in two parts, if the second part of the question is correct in relation to an incorrect answer given in the first part, then the mark can often be given. The general rule is that candidates should not be penalised repeatedly.

6. If a numerical answer is required and units are not given in the stem of the question or in the answer space, candidates must supply the units to gain the mark. If units are required on more than one occasion, candidates should not be penalised repeatedly.

7. Clear indication of understanding is what is required, so:

    - if a description or explanation is asked for, a one word answer is not acceptable
    - if the questions ask for **letters** and the candidate gives words and they are correct, then give the mark
    - if the question asks for a word to be **underlined** and the candidate circles the word, then give the mark
    - if the result of a calculation is in the space provided and not entered into a table and is clearly the answer, then give the mark
    - **chemical formulae** are acceptable eg CO_2, H_2O
    - contractions used in the Arrangements document eg DNA, ATP are acceptable
    - words not required in the syllabus can still be given credit if used appropriately eg metaphase of meiosis

8. Incorrect **spelling** is given. Sound out the word(s),

    - if the correct item is recognisable then give the mark
    - if the word can easily be confused with another biological term then **do not** give the mark eg ureter and urethra
    - if the word is a mixture of other biological words then **do not** give the mark, eg mellum, melebrum, amniosynthesis.

9. **Presentation of Data:**

- if a candidate provides two graphs or bar charts (eg one in the question and another at the end of the booklet), mark both and give the higher score
- if the question asks for a line graph and a histogram or bar chart is given, then do not give the mark(s). Credit can be given for labelling the axes correctly, plotting the points, joining the points either with straight lines or curves (best fit is rarely used)
- if the *x* and *y* data are transposed, then do not give the mark
- if the graph used less than 50% of the axes, then do not give the mark
- if 0 is plotted when no data is given, then do not give the mark (ie candidates should only plot the data given)
- no distinction is made between bar charts and histograms for marking purposes. (For information: bar charts should be used to show discontinuous features, have descriptions on the *x* axis and have separate columns; histograms should be used to show continuous features; have ranges of numbers on the *x* axis and have contiguous columns.)
- where data is read off a graph it is often good practice to allow for acceptable minor error. An answer may be given 7.3 ± 0.1.

10. **Extended response questions:** if a candidate gives two answers where there is a choice, mark both and give the higher score.

11. **Annotating scripts:**

- put a 0 in the box if no marks awarded – a mark is required in each box
- indicate on the scripts why marks were given for part of a question worth 3 or 2 marks. A √ or *x* near answers will do.

12. **Totalling scripts:** errors in totalling can be more significant than errors in marking:

- enter a correct and carefully checked total for each candidate
- do not use running totals as these have repeatedly been shown to lead to more errors.

STANDARD GRADE BIOLOGY - 2005 CREDIT LEVEL FINALISED MARKING INSTRUCTIONS

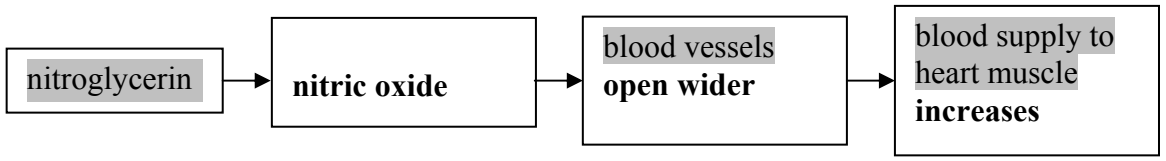
Qu	Acceptable answer	Mark	Unacceptable answer	Negates
1 a	**2** two pair of wings / more than one pair of wings 4 wings spider mite	**1** **1** **1**		
b	three pair of legs / 6 legs no wings / wings absent both correct =	**1**	can't fly	
2 a	Key: outside woodland; inside woodland Average daily light intensity (units) 30 15 0 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Month Y axis label and scale of 30 + minimum of one other = correct plot + key labels =	**1** **1**	x——x——x	yes
b	leaves on trees create shade inside woodland / leaves stop light entering accept 'canopy' 'foliage' as equivalent to leaves the trees have leaves	**1**	More sunlight in summer / less light due to trees trees in bloom all light stopped	

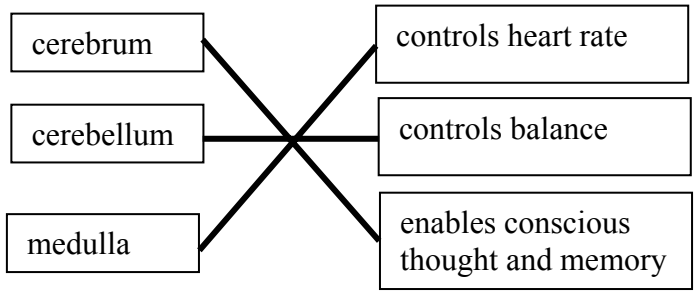
Qu	Acceptable answer	Mark	Unacceptable answer	Negates
3 a i	Dry	**1**	20-24	yes
ii	5 to 29 / 5-9 to 25-29	**1**		
b	*Advantage* - equally suited to habitat / good characteristics passed on / no vulnerable embryo stage / not dependent on fertilisation / not dependent on pollination / rapid (production of offspring) / young plant obtains nutrients / energy / food from parent / not dependent on wind etc / creates competition *Disadvantage* - equally liable to pests or disease / no improvement in characteristics / overcrowding / unable to adapt / bad characteristics passed on / not widely dispersed	**1** **1**	Only one parent needed Same as parent No variations Clone formed More offspring Use more resources from parent	
c	asexual / vegetative	**1**	a sexual	
d i	wind (or description) sycamore dandelion ash = airborne <u>animal external</u> (or description) burdock goosegrass = If answers are in wrong colums but match then <u>1 mark</u> If <u>one</u> plant misplaced then 1 mark	**1** **1**	animal/insects Any reference to pollination only one eg of each	yes
ii	fruit eaten by animals + seeds pass out / are not digested / dispersed in faeces / waste	**1**	Fruit eaten and passed out Fruit eaten and seeds dispersed	

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
4 a i	15	**1**		
ii	Any in range 264 - 269	**1**		
iii	Stop / slow down / stay at 1 bubble / min no bubbles / fewer bubbles	**1**	amount of bubbles less photosynthesis slow bubbling / no oxygen	
b i	50 – 150 mm ☐ 150 – 400 mm ☑ 400 – 500 mm ☐	**1**		
ii	temperature / carbon dioxide	**1**	Water / heat / pH / chlorophyll	
C	more reliable / more representative / reduces effect of atypical results make results reliable allows for variations in Elodea	**1**	reduces effect of **a typical** result accurate dependable	
5 a	73.1	**1**		
b	to allow for different number of beaches / for easier comparison to allow for different number of samples to allow for different number of tests	**1**	amount of beaches	
c	indicator (species)		indicators	

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
6 a	Death and decay **D** Action by denitrifying bacteria **C** Lightning **B** 3 correct = 1 / 2 correct =	**2** **1**		
b	Contain nitrogen-fixing bacteria / contain bacteria which convert N_2 → nitrates / contain root nodules / have root nodules which convert N_2 →nitrates	**1**	Have bacteria / nitrifying bacteria / denitrifying bacteria	
c	nitrate(s) / ammonium nitrate	**1**		
7 a	salivary gland / stomach / liver / pancreas / small intestine any 3 correct = any 1 / 2 correct =	**2** **1**		
b i	**Amylase** **starch** maltose **pepsin / trypsin** protein **peptides / polypeptides /amino acids** Lipase **fat / oil / lipids** 1 **fatty acids** 2 **glycerol** 6 correct boxes = 4/5 correct boxes = 2/3 correct boxes =	 **3** **2** **1**	carbohydrate protease	
ii	optimum optimum pH / optimum temperature	**1**		

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
8 a i	decreased / slowed / reduced the more ADH, the less urine	**1**	The more urine then the less ADH limited urine urinate less often	
ii	60	**1**		
iii	Any in range 5.6 – 5.9	**1**		
b	kidneys	**1**	bladder / brain / kidney tubules	yes
9 a	45	**1**		
b	45	**1**		
c i	prevents or reduces blood loss / bleeding prevents or reduces infection / entry of pathogens / bacteria	**1**	germs / foreign bodies	
ii	less / no enzyme Y + less / no fibrin	**1**	Needed to make blood clot	

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
10 a	coronary (artery)	**1**		
b	heart muscle not receiving enough blood / blocking / narrowing (of branches) of artery carrying blood to heart / blocking / narrowing (of branches) of coronary artery / this artery (only if 10 (a) correct)	**1**		
c	similar (in structure) to amyl nitrite	**1**	nitrate	
d	it is (a powerful and unstable) explosive	**1**	To avoid scaring people To make it safe Avoid poisoning	
e	 Accept correct information for boxes 3 + 4 if all given in box 3. Don't then penalise for extra information in box 4 unless it contradicts previous information.	3 correct = **2** 1 / 2 correct = **1**		

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
11 a i	**X** - contracts / contracted / relaxed to contracted / shortens **Y** - relaxes / relaxed / contracted to relaxed both correct =	**1**	lengthens / gets bigger	
ii	tendons	**1**	Ligaments	yes
b i	 3 correct = 1 / 2 correct =	**2** **1**		
ii	heart **sense organs** brain **central nervous system** circulation system skin **muscles** blood bones all correct =	**1**		

	Acceptable answer	Mark	Unacceptable answer	Negates
12 a i	0.15	**1**		
ii	1960 – 1970 ☐ 1980 – 1990 ☐ 1970 – 1980 ☐ 1990 – 2000 ☑	**1**		
b i	continuous	**1**		
c i	selecting individuals which possess desired characteristics for breeding / only the best organisms are bred together select individuals with good / best characteristics for breeding accept descriptions including named examples	**1**	Best organisms breed (answer must imply human management)	
ii	genetic engineering / genetic modification / genetic modifying	**1**	GM / genetically modified	
d i	change in genetic information / gene (structure) / chromosome (structure) / chromosome (number) genetic error / change in DNA	**1**	different genotype / phenotype different genetic information	
ii	radiation / heat / u-v light / X-rays / chemicals / temperature extremes increasing age of mother	**1**	temperature / age of parents / female nuclear waste / sunlight	
e	*Nutrients* - use of fertiliser / manure / compost / slurry *Reduce competition* - use of herbicides / weedkillers / physical removal of weeds / space out plants kill other plants in habitat	**1** **1**	Crop rotation / plant food pesticides	no no

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
13 a i	**aerobic**	**1**		
ii	***Muscle*** **A** and **B** *Yeast* **A** and **C**	**1** **1**		
b	**19 : 1 : 1**	**1**		
c	synthesis reactions / cell division / mitosis / muscle contraction / movement / growth / repair active uptake of chemicals	**1**	Reproduction heat chemical reactions uptake of chemicals	
14 a	152	**1**		
b	15.4	**1**		
c	haemoglobin	**1**	oxyhaemoglobin	
15 a	**Banana 75.7** **Grape 84.7** both correct =	**1**		
b	fat	**1**		
c	apple contains more carbohydrate / pears contain less carbohydrate accept correct actual quantities apple contains less water / pears contain more water apple contains less water, pears contain more water apple contains more carbohydrate, pears contain less carbohydrate } =1 (if no comparison made)	**1** **1**		
d	use several samples of each / repeat experiment + calculate average result (both needed)	**1**	use several different types of fruits / repeat experiment	

Qu	Acceptable answer	Mark	Unacceptable answer	Negates
16 a i	same type / volume / concentration / amount / same time in contact with cloth / same area of stain / same age of stain same intensity / mass / size / of stain	**1**		
ii	20 – 50^{o}C / below 50^{o}C biological better than non-biological 50 - 80^{o}C / above 50^{o}C no difference only penalise once if actual temperature not given ; At low temperature biological better than non-biological, at high temperature no difference =1	**1** **1**	At low temperature …….. At high temperature …….	
b i	stains digested / removed / broken down by enzymes / involve use of (digestive) enzymes	**1**	enzymes speed up reaction	
ii	work at lower temperatures + save energy / electricity / power / use less heat / cause less damage to clothes / save money both needed =	**1**		

[END OF MARKING INSTRUCTIONS]