2011 Biology

Standard Grade – Credit

Finalised Marking Instructions

Standard Grade Biology 2011 – Additional marking notes

Please use these notes alongside the finalised **'MARKING INSTRUCTIONS'**

Markers Meeting

Do take clear notes of all decisions taken and use them in your marking.
Do bring up reasonable different interpretations of a question which may lead to different acceptable answers.
Do provide other responses illustrating good biology.
Do only bring up alternative responses you have actually seen.
Do try to form an idea of the minimal acceptable answer based on the marking instructions and any discussion.

Do not bring up obviously different ways of saying the same thing.
Do not bring up repeated examples of clearly incorrect answers.
Do not raise issues not directly concerning the marking instructions – put them in your report.

During marking

There are **no half marks**.
In the marking instructions, if a word is underlined then it is essential; (bracketed) then it is not essential.
Answers separated by / are alternatives.

Negation. A correct answer can sometimes fail to gain the mark if it is negated. This happens when:
An extra **incorrect answer** is given together with the correct one.
Additional incorrect information is given which contradicts the correct answer, demonstrating a misunderstanding of the question. (Additional unrequired information will not negate a correct answer if it does not contradict that answer).

Do accept chemical formulae instead of chemical names.
Do accept subscript, superscript and normal script when used to identify generations in genetic crosses.
Do accept incorrect spelling if it looks or sounds reasonably correct – unless it could be confused with another biological term or is an amalgam of two or more words.
Do try to make a decision if you see a response not discussed at the markers' meeting. Make a note of your decision and use it if the same response is seen again.
Do put 0 in **every** mark box where zero marks have been awarded.
Do check the totalling of the script marks carefully.

Do not make any written comments on the scripts. Use ticks, crosses, underlining, etc to indicate marking decisions.

Referring scripts

Refer scripts to the Principal Assessor (*PA Referral*) only in extreme cases of indecision over an answer. A relevant referral form must be completed and included with the script. The script should be labelled ***PA Referral***.

Refer scripts for S*pecial Attention (M)* if there is suspected malpractice or offensive remarks on the script. A report should be written on a separate piece of paper and included with the scripts. The script packet should be labelled ***Special Attention (M)***.

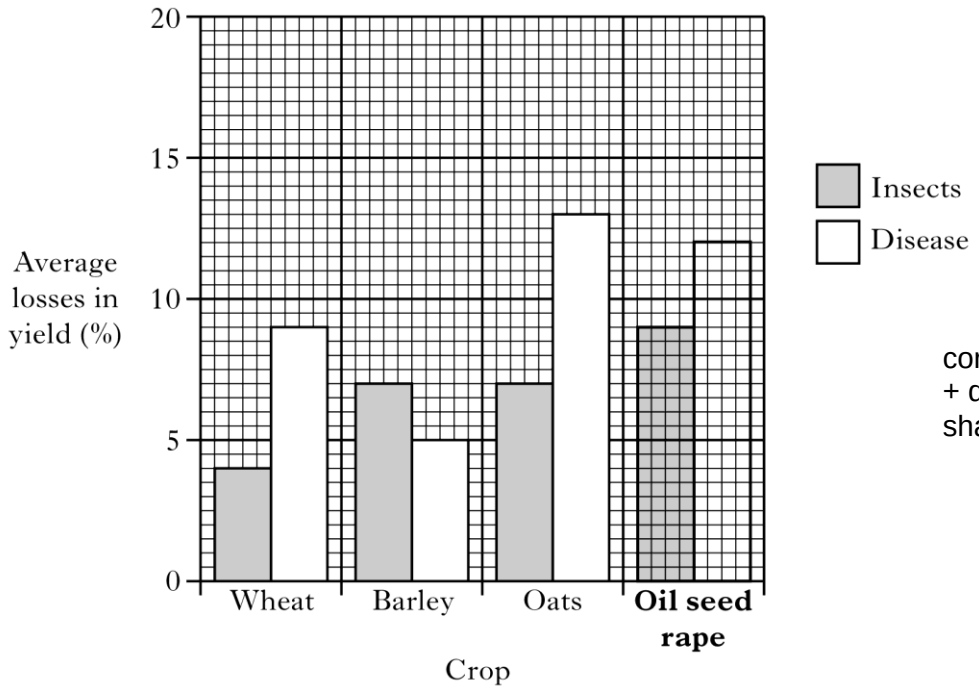
STANDARD GRADE BIOLOGY – 2011 CREDIT LEVEL MARKING INSTRUCTIONS

Qu	Acceptable answer	Mark	Unacceptable answer
1 (a)	(Average) Soil water (content) **or** description of that	1	Moisture / water
(b) (i)	Named abiotic factor + source of error when measuring (Answers relating to light intensity must be clear that shading is caused by sampler to be acceptable) If abiotic factor missed out, but other two parts ok = 1 (the second mark) Method of minimising error appropriate to technique	1 1	Answer relating to reliability of sampling Not wiping probe (error)
(ii)	Several measurements of the abiotic factors taken / Average values were calculated	1	Five areas sampled It was repeated / done more than once Random samples were taken Experiment carried out 5 times and an average taken

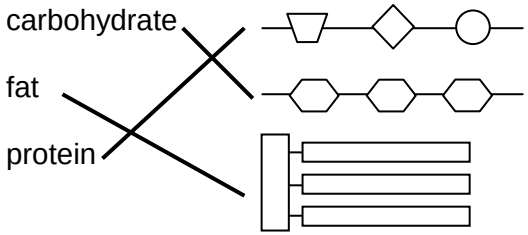
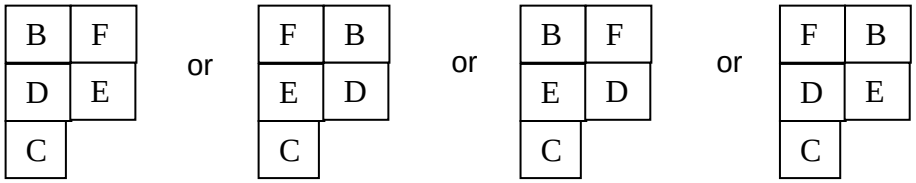
Qu	Acceptable answer	Mark	Unacceptable answer
2 (a) (i)	B C and D / D and C G 4 correct = 2 2/3 correct = 1	2	
(ii)	(nitrifying) <u>bacteria</u>	1	Denitrifying Nitrogen fixing Any other type of bacteria
(b)	30	1	

<table>
<tr><th>Qu</th><th>Acceptable answer</th><th>Mark</th><th>Unacceptable answer</th></tr>
<tr><td>3 (a) (i)</td><td>Diagram A ☐
Diagram B ☑</td><td>1</td><td></td></tr>
<tr><td>(ii)</td><td>High chance of pollen not achieving pollination / getting lost / not reaching destination
To increase the chance of some of their pollen reaching other plants
Low chance of pollination / less chance of pollination
Ensure pollination takes place
To increase chance of pollination</td><td>1</td><td>Some pollen gets lost /
Answers referring to fertilisation without referring to pollination
Make lots of pollen because insects don’t carry the pollen</td></tr>
<tr><td>(b)</td><td>More (species of) plants releasing pollen in May / pollen from grass, silver birch and oak releasing pollen / plants pollinating in April still releasing pollen / All species may be releasing pollen / silver birch and oak are still releasing pollen / 3 plants are producing pollen</td><td>1</td><td>Statement about grasses everywhere
Statement about grasses being wind pollinated
Number of plants producing pollen</td></tr>
<tr><td>(c) (i)</td><td>
<table>
<tr><th></th><th>sexual</th><th>asexual</th></tr>
<tr><td>Variation exists amongst the offspring</td><td>✓</td><td></td></tr>
<tr><td>Germination is not required</td><td></td><td>✓</td></tr>
<tr><td>Desirable characteristics are maintained</td><td></td><td>✓</td></tr>
<tr><td>Seeds are produced which can be dispersed</td><td>✓</td><td></td></tr>
</table>
4 rows correct = 2
2/3 rows correct = 1</td><td>2</td><td></td></tr>
<tr><td>(ii)</td><td>Clone</td><td>1</td><td></td></tr>
</table>

Qu	Acceptable answer	Mark	Unacceptable answer
4 (a)	It increases up to 0·1 ppm. (Value and units needed at least once) then it decreases. (Increases then decreases = 1) References to length of shoot rather than increase in length	1 1	Wrong value for change = 1 Optimum instead of value = 1
(b)	To show that any result / change (to the shoot growth) was caused by the plant growth substance / To compare shoot growth with and without plant growth substance / To show that any change to the shoot growth was caused by the factor under investigation To prove plant growth substance was causing the effect / To see what plant growth is like without plant growth substance A control to investigate the effect of plant growth substance To show the effect of the solution	1	As a control / comparison (Does not negate)

Qu	Acceptable answer	Mark	Unacceptable answer
5 (a) (i)	Barley	1	
(ii)	162500	1	
(iii)	Don't know total yield / tonnes / amount for wheat and barley / other crops	1	Don't know numbers of other crops
(b)	 correct label + drawing and shading of bars =	1	Partial label at bottom of bar Incorrect order of words in label Daylight at top of bar which should not be there
	(Bars must have accurate straight tops Some shading needed for insects' bar)		Lines across top extending beyond width – ok Lighter shading on disease bar Labels instead of shading

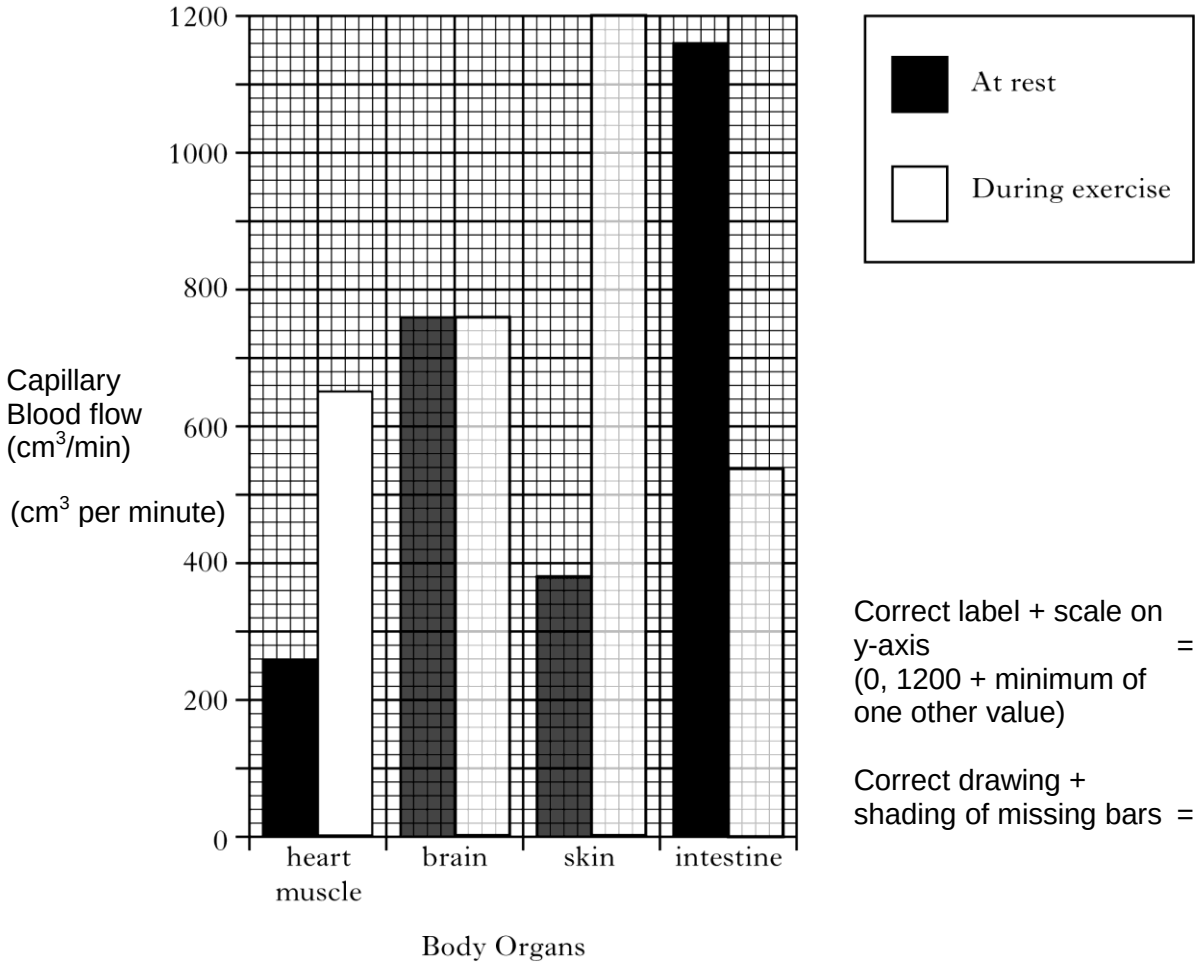
Qu	Acceptable answer	Mark	Unacceptable answer
6 (a)	1. lichens 2. dwarf mosses both needed (either order) =	1	
(b)	Trees (or equivalent) / woodland / forests have been cleared by humans / people (Trees + people involved in answer)	1	Cleared by humans Trees cleared over the centuries
(c)	Average / temperature / temp / during growing season / while plants are growing	1	Temperature during growing season Average temperature
(d)	1. high winds 2. wet conditions / a lot of rain both needed (either order) =	1	Wind and rain (Rain not negating after wet conditions) Wind speed Moisture A lot of moisture A lot of wind
(e)	Growing shoots are protected by surrounding vegetation	1	They are protected … It is protected Shoots are protected…
(f)	East (coast)	1	

Qu	Acceptable answer	Mark	Unacceptable answer
7 (a)	 3 correct = 2 1 / 2 correct = 1	2	Additional incorrect lines lose 1 mark each
(b)	 5 correct = 2 2 / 3 / 4 correct = 1	2	
(c) (i)	Villus / villi	1	Villa Villius
(ii)	A	1	
(iii)	C	1	

Qu	Acceptable answer				Mark	Unacceptable answer
8 (a)						
	Substance	oxygen	glucose	carbon dioxide		
(i)	Importance	needed for respiration / to release energy / removal of waste	needed for respiration / energy source	removal of waste/ needed for photosynthesis		Oxygen – waste product from photosynthesis / needed for chemical reactions
				appropriate use for named substance =	1	
(ii)	Location	lungs / alveoli / air sacs / cells / tissues / examples like muscle / placenta / mesophyll / capillaries / cell membrane / red blood cells / stomata	villus / small intestine / cells / tissues / placenta / capillaries	Lungs / alveoli / air sacs / cells / examples of tissues / mesophyll / placenta / capillaries / stomata		Specific organs named other than lungs or placenta Blood
				Appropriate site for diffusion (need not match importance) =	1	
(b)	Cell A (Cell) has increased in volume / (Cell) is turgid / (Cell) is swollen / (Cell) vacuole has swollen / cell wall stretched				1	Cell has absorbed water / bloated (not negating)

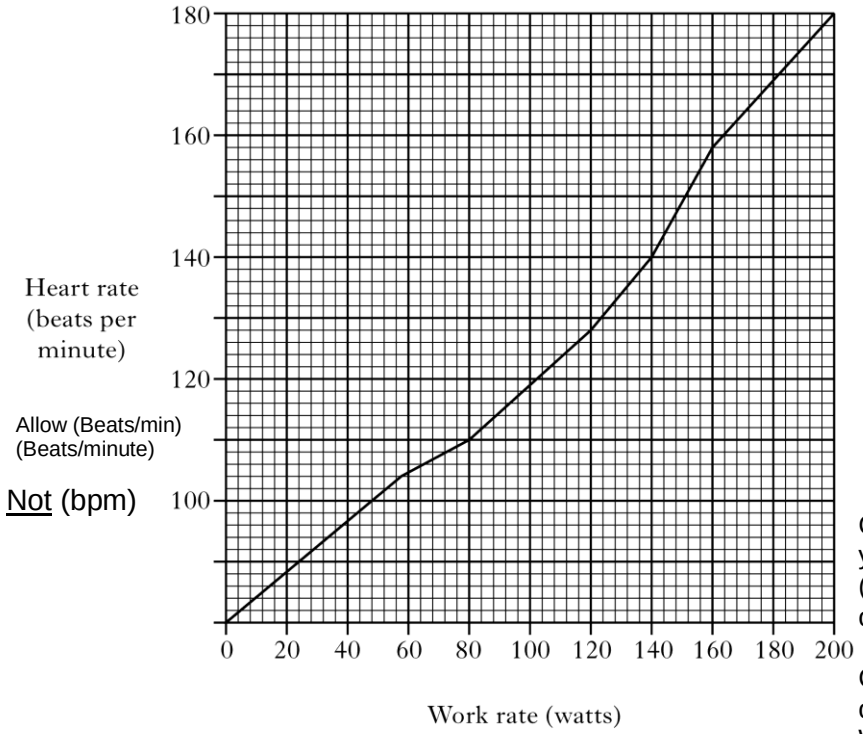
Qu	Acceptable answer	Mark	Unacceptable answer
(c)	Stage 2 Nuclear membrane disappears / breaks down **or** Spindle forms **or** Chromosomes / (pairs of) chromatids / they move to equator / middle of cell Stage 4 Chromatids / they separate **or** Chromatids / they are pulled apart **or** Spindle fibres shorten	1 1	Chromosomes shorten and thicken Chromatids join together at centromere Chromosomes / chromatids split Chromosomes separate
(d)	So there is no loss of information / So they have the same information (as parent cell) / So they have a full set of information / genes / all genes passed on	1	So they have all the characteristics of the species – negates So they function properly So they have correct information Same genetics To stop mutation (negates)

Qu	Acceptable answer	Mark	Unacceptable answer
9 (a)	The other enzymes act on / break down different substrates / substances Enzymes are specific	1	Only trypsin acts on protein / other enzymes don't act on protein (Restating question) Enzymes digest different substances Trypsin is specific for protein Substrate specific Only trypsin will break down protein There is one enzyme for one job
(b)	4·3	1	
(c)	Same concentration of protein / Same concentration of agar / Same temperature / Same volume **or** thickness of gel / Same concentration of enzyme / Same volume of enzyme (solution) / Same diameter **or** size of hole / same pH Amount **or** mass instead of volume Any two, 1 mark each	2	Answers referring to precautions for 'safe practice', biotechnology Same size Petri dish Same protein Same agar Even mixing of protein + agar Same space between enzyme Same surface area of enzyme

Qu	Acceptable answer	Mark	Unacceptable answer
10 (a)	 (Bars must have accurate straight tops Some shading needed for 'At rest' bars)	Correct label + scale on y-axis = 1 (0, 1200 + minimum of one other value) Correct drawing + shading of missing bars = 1	

Qu	Acceptable answer	Mark	Unacceptable answer
(b)	2 : 5	1	
(c)	To allow increased blood flow to other parts of body / skin / heart muscle / muscles Other parts of body / skin / heart muscle / muscles need more blood (Comparative needed)	1	Blood goes to other parts of body To allow more blood to go to the brain – negates
(d)	Increase in blood flow (to skin during exercise) (Comparative needed)	1	

Qu	Acceptable answer	Mark	Unacceptable answer
11 (a)	More heat lost to surroundings / air / Less heat absorbed by test tube than by metal can (*Allow converse*) Comparison between them needed	1	
(b)	Amount **or** mass **or** quantity of water / volume of water / starting temperature of water / total burning of food / distance between flame and container	1	Temperature / time food burns / Level of water Mass of food / type of food (given) Surface area of food Room temperature Distance between food + thermometer
12 (a)	As the number of attempts increased, the performance / score improved until the 5th attempt After that there was no further improvement / the performance remained the same *(Must identify 5th attempt as point where pattern changed)* (both parts needed)	1	
(b)	Repeat with other people / Repeat with same person after an interval	1	Do it again / Repeat investigation

Qu	Acceptable answer	Mark	Unacceptable answer
13 (a)	 Allow (Beats/min) (Beats/minute) Not (bpm) Correct label + scale on y-axis (180 + minimum of one other value) = 1 Correct plotting and joining of points = 1 Wrong scale – correct plot to their scale = 1 overall mark		Label – units reduced to (bpm)
(b)	125	1	
(c)	(Heart and) lungs	1	

Qu	Acceptable answer	Mark	Unacceptable answer
14 (a) (i)	Semi circular canals	1	
(ii)	They are at 90^{o} to each other / They are at right angles (to each other)	1	They are in 3 planes / **or** 3 different planes Two vertical + one horizontal There is one in every plane **or** direction of movement
(b)	He would have better judgement of the distance (of the ball) / better depth of vision / better sense of distance / better perception of depth (Comparative needed)	1	
(c)	D A C B Sensory nerve cell → relay nerve cell → motor nerve cell → muscle	1	

Qu	Acceptable answer	Mark	Unacceptable answer
15 (a)	Both (alleles) are the same / Both (alleles) are dominant **or** both are recessive Only one form of allele / Identical alleles Parents are either GG **or** gg	1	Both have the same alleles Homozygous Both genes are the same
(b)	genotype Gg phenotype green both correct =	1	G, g Heterozygous (Not negating) What looks like two different genotypes because of spacing
(c) (i)	chromosomes / genes / chromatids	1	Alleles
(ii)	Radiation / atomic radiation / radioactivity / nuclear radiation / UV radiation / UV light / sunlight / X-rays / high temperatures / mustard gas / cochicine	1	Age Nuclear waste Temperature Mutagenic agent
(iii)	2162	1	Answers including decimal places
(d)	Selective breeding	1	

Qu	Acceptable answer	Mark	Unacceptable answer
16 (a) (i)	Continuous flow (processing)	1	Continuous processing
(ii)	Enzymes / They can be reused / Enzymes do not need to be replaced Product is easily separated / No need to stop for cleaning / refilling reaction vessel Cheaper Any two, 1 mark each	2	Faster Efficient removal of enzymes More efficient Less waste disposal No need to stop
(iii)	Reduce the rate at which substrate enters the vessel / slow down flow Reduce the rate at which the product leaves the vessel / Use more enzyme(s) / Increase the concentration of enzyme(s) / Decrease the concentration of the substrate / add less substrate Use smaller beads to increase surface area of enzyme Put it through again / use a longer column of beads Any one	1	Provide longer period of contact Increase surface area of immobilised enzyme Increased temp to optimum
(b)	They are specific / No antibiotic can kill / act on all microbes / People may be allergic to some antibiotics / Bacteria can become resistant to antibiotics / New strains of bacteria appear	1	Answers referring to fighting diseases / viruses / germs All negate Because there is a range of bacteria
(c) (i)	7 am 3 pm 11 pm	1	
(ii)	63	1	

Qu	Acceptable answer	Mark	Unacceptable answer
17 (a)	0·1	1	
(b) (i)	Remained the same / steady until 2003 / for the first 3 years After that it increased (Remains the same then increased = 1)	1	
(ii)	0·07	1	
(c) (i)	carbon / carbon dioxide / phosphorus / phosphates / potassium / magnesium / calcium	1	Ammonia / ammonium compounds Nitrogen
(ii)	To kill <u>resistant</u> bacteria / fungal spores To kill endospores	1	To kill spores / bacteria / fungi To kill harmful spores / bacteria / fungi

[END OF MARKING INSTRUCTIONS]