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General Certificate of Education (A-level)
June 2012

Biology BIO6X

(Specification 2410)

Unit 6X: Externally Marked Practical Assignment

Final

Mark Scheme

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BIO6X 2012: TASK 1

Question	Marking guidance	Mark	Comments
Table	No marks awarded		
1(a)	Allow any method that does not involve any element of conscious choice;	1	E.g. number and select numbers from a 'hat' Do not accept methods such as measure every other seed 'Use random number generator' insufficient must be a table/calculator for example
1(b)	Selector influenced (by some feature)/selector makes conscious choice;	1	No marks awarded for using the words random and bias as these are given in the question
2(a)	Principle that magnification is apparent size divided by real size; 4.0 – 4.2;;	2	E.g. Measured size of scale divided by scale size itself
2(b)	Two marks for correct answer in range 5.7 – 6.5;; One mark for incorrect answer in which incorrect measured length of seed has been divided by magnification / measured length of seed has been compared to given scale;	2	Two marks can be awarded if error in the magnification calculation is carried forward
3(a)	(Involves lengths of) all the seeds/shows spread (of all lengths);	1	Do not accept answers using 'range'
3(b)	1. Large standard deviation means greater variation (in seed length/size); 2. Greater variation in distance (from the parent plant) / more spread out; 3. Description of why seed size/mass affects distance travelled;	3	Allow 'range' as equivalent to variation in this instance 3. suggestion must be reasonable
	Total	**10**	

BIO6X 2012: TASK 2

Question	Marking guidance	Mark	Comments
4(a)	Clear statement of null hypothesis. E.g. height has no effect on distance travelled;	1	
4(b)	Standard error (and 95% confidence limits);	1	
4(c)	Comparing means;	1	
4(d)	Test statistic calculated correctly;	1	Allow wrong stats test calculated correctly
4(e)	***If Overlap:*** 1 Probability greater than 0.05 / 5% that (differences in) results are due to chance; 2 Accept null hypothesis; ***OR If no overlap*** 1 Probability less than 0.05 / 5% that (differences in) results are due to chance; 2 Reject null hypothesis;	2	Use student's value of test statistic even if it has been calculated incorrectly 1 Must refer to both probability and chance 2. Reject 'hypothesis is true/false'
	Total	**6**	

BIO6X 2012: WRITTEN TEST

Section A

Question	Marking guidance	Mark	Comments
5	**2 marks** Method fixes height dropped and orientation of seeds, would be repeatable;; **1 mark** Method fixes either height dropped or orientation and would be repeatable; **0 marks** Method may fix either height dropped or orientation, but unlikely to be repeatable	2 max	
6	Allows horizontal distance to be measured accurately;	1	
7	(Yes) 1. Seeds exposed to wide range of wind speeds; 2. Would cancel out in the average; (No) 3. Will affect those dropped from higher more; 4. Longer time for wind to have effect/wind more noticeable higher from floor;	2 max	Ignore references to anomalies
8(a)	Minimises the effect of factors/named factor other than height;	1	Accept “that’s how they are released naturally by plant” Do not accept ‘quicker’
8(b)	May interfere with each other; Will not all be released in the same position/same orientation;	max 1	

9	1. Stick to/land on tyres/radiator/vehicle; 2. Draft/turbulence;	2	
	Total	**9**	

BIO6X 2012: WRITTEN TEST

Section B

Question	Marking guidance	Mark	Comments
10	1. Quadrats placed at intervals along transect; 2. Number of seeds counted per quadrat to calculate seeds per m^2;	2	
11(a)	1. Wind from North East; 2. Seeds blown further;	2	1. Accept blowing to South West
11(b)	1. Seeds have different distances to fall / seeds have different times in air; 2. Blown by wind a different amount; 3. (Candidates investigation) shows that seeds travel further when dropped from higher;	2 max	3. Supported by reference to candidate's investigation
12(a)	1. Produces large number of seeds / produces seeds blown by wind; 2. Greater probability (of colonising);	2	2. Accept greater chance
12(b)	1. Small size; 2. Too little food in seed to become established; 3. Not enough light for photosynthesis;	2 max	
13(a)	Each treatment occurs in each row <u>and</u> each column;	1	Ignore references to random

13(b)	1. Different environments or different variables in the field/in different plots; 2. Variables change across rows / down columns / from one side to another; 3. Minimises/removes the effect of variables;	2 max	
14	Standardising any two relevant factors, for example: 1. Water; 2. Fertiliser/manure/ soil nutrient; 3. Weed killer; 4. Soil pH;	2 max	To gain credit here, factor must be something that the scientists could do and must relate to field conditions Reject answers such as keep light/carbon dioxide/temperature constant
15(a)	1. Survival falls as time increases; 2. Survival falls as sowing density increases; 3. Up to 15/25 seeds per m^2 all survive/above 250 seeds per m^2 survival falls rapidly;	3	
15(b)	1. Intraspecific competition/ competition between bean/soya plants; 2. For water/nutrients/light; 3. Greater as plants grow/increase in size;	2 max	
16(a)	1. Competition; 2. (From) parent tree; 3. (From) large number of seeds; 4. For light/nutrients/water;	3 max	
16(b)	1. Few seeds/young plants; 2. Interspecific competition/unsuitable conditions means not all survive;	2	
	Total	**25**	