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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology 6416

Specification B

BYB5/W Environment

Mark Scheme

2008 examination - June series

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Question 1

(a) Use a co-ordinate system;
Idea of randomisation/random number tables;
Repeat many times/10 or more times;
(*Reject several)*
Take a mean;
Use stats to check results; eg Chi^2, t -test or other suitable method; 4

(b) Lower light intensity/temperature;
Reduces the rate of growth because less sugars made/other suitable idea;
(Reject food)
Wouldn't reproduce to produce more plants; 2 max

Total 6

Question 2

(a) Population density increases rapidly then levels off/becomes steady/increases more slowly;
Because initially no limiting factors/factors become limiting later on; 2

(b) Interspecific competition;
B more successful competitor for a named limiting factor e.g. light, minerals, ions/B produces a toxin; 2 max

Total 4

Question 3

(a) Pesticide not biodegradable/broken down/not excreted;
Bioaccumulation/biomagnification;
Consumers higher up the food chain eat large numbers/lots/many organisms from levels below; 3

(b) (i) Blocks active site;
Prevents substrate binding/enzyme-substrate complex forming;

OR

Binds away from active site;
Changes shape of active site; 2

(ii) Human enzyme has different tertiary/3D structure/shape;
Prevents pesticide binding/joining/combining;

OR

Pesticides cannot cross plasma membranes/enter cells/not absorbed through gut lining;
Because no complementary carriers; 2

Total 7

Question 4

(a) kJ m^{-2} ;
y^{-1}; 2
(Accept any suitable units of energy, area and time)

(b) Some reflected;
Transmitted through leaf/does not hit chloroplast;
Wrong wavelength; 1 max

(c) Active transport/ATP needed;
Carrier proteins; 2

(d) Able to remain active when environmental temperature is low;
Optimum temperature for enzymes/reactions/metabolic processes; 2

Total 7

Question 5

(a) (i) Species of insect/community changes with time; 1

(ii) Action of species changes conditions/named conditions;
Making habitat suitable for later species; 2

(b) Break down proteins;
Amino acids to ammonium compounds;
Converted to nitrites and/or nitrates;
By nitrifying bacteria/named examples; 4 max

(c) Extracellular digestion/enzymes secreted/released;
(Reject excreted)
Insoluble macromolecules broken down by enzymes;
Soluble products absorbed; 3

Total 10

Question 6

(a) Low temperature and low precipitation;
Plants/animals species have adaptations to survive conditions;
Few species present/lower species diversity; 2 max

(b) Rolled leaves traps humid layer;
Sunken stomata trap humid layer;
Hairy surface traps humid layer;
Fewer leaves/reduced leaves/spines/reduced leaf surface area so fewer stomata;
Thick waxy cuticle so less evaporation/transpiration; 3 max

(c) Generates heat;
From respiration;
Air trapped/reduces air movement;
Gives insulation/air is a poor conductor of heat/reduces heat loss; 4

Total 9

Question 7

(a) Treatment L; 1
(2 max if they choose the wrong treatment)

1 Largest mass of roots to reduce erosion/anchor soil;
2 Leaves/shoots/ reduce wind speed;
3 Large leaf mass allows faster growth/more photosynthesis;
4 Produces seeds which will increase plant density;
5 Produces seeds which reduces cost of reseeding; 3 max

(b) Phosphate used to produce more chemicals needed for a named process e.g. cell division/ respiration/photosynthesis/cell membranes; 1
(Reject new cells)

Named examples e.g.:
ATP;
DNA/RNA/ tRNA/ mRNA/ nucleotides;
phospholipids;
NADP;
RuBP; 2 max
(Accept suitable other phosphate containing products)

(c) 1 Phosphate ions run off/ leached into rivers/ lakes;
2 Causes increased plant/number of algal bloom;
3 Reduction in light causes plants/algae to die;
4 Increase in number of microorganisms/decomposers;
5 Microbes/decomposers use oxygen for respiration/increased BOD;
6 Fish/animals die due to lack of oxygen; 5 max
(Reject organisms)

Total 12

Question 8

(a) 2 practices (P);; and 2 effects (E);;

	P1	Reduction in hedgerows;	
	P2	Use of pesticides;	
	P3	Monocultures grown;	
	P4	Increased area of land used for growing crops;	2 max
	E1	Fewer habitats/niches/food sources/nest sites;	
	E2	Reduces stability of food chains/bioaccumulation;	2

(b)

	1	Heat to separate strands/ break hydrogen bonds;	
	2	Add DNA polymerase/primers;	
	3	Cooled then heated up;	
	4	Repeat process;	3 max
	5	Name of process - dideoxy sequencing/Sanger method/chain termination;	
	6	Use restriction/endonucleases to make sections of DNA;	
	7	Use radioactively labelled bases;	
	8	DNA replication stopped at base/cytosine/guanine/adenine/thymine;	
	9	Electrophoresis/description used;	
	10	Shorter/smaller fragments move faster/further;	
	11	Autoradiograph made/photographic film used;	
	12	DNA sequences/bands/ finger prints match;	3 max

Total 10