ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme June 2003

GCE

Environmental Science

Unit ESC2

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Instructions: ; = 1 mark / = alternative response A = accept R = reject

Question 1

(a) (i) Weathering/erosion/denudation; 1
[**A** any named process]
[**R** "grinding", "breakdown"]

(ii) Pressure/metamorphism/compaction/compression; 1
[**R** "heat" alone]

(b) Limestone/chalk/$CaCO_3$; 1

(c) (i) Water freezes and expands; 1

(ii) Splitting of chemical bond/link by/in water/hydrogen ion replaces metal ions e.g. K^+; 1
[**R** "chemical weathering", "dissolves"]

Total marks = 5

Question 2

(a) Phosphate (ion)/PO_4^{3-}; 1
[**A** PO_4^{2-}]
[**R** "in solution"]

(b) Algae/phytoplankton absorb PO_4^{3-};
fish eats phytoplankton;
bird eats fish/fish converted to fertiliser;
guano/death and decomposition of bird/fertiliser applied to land;
OR
Ref: lithification (of phosphate-rich sediments);
uplift/sea level falling;
weathering/erosion;
mining/quarrying; MAX 3

(c) Sedimentary; 1
[**R** "evaporites"]

Total marks = 5

Question 3

(a) (Decaying) vegetation/fauna/leaves/litter; 1
[**R** "humus"]

(b) (i) Uptake by plants/leaching/carried by H_2O OWTTE; 1

(ii) Leaching/illuviation/eluviation/(chemical) weathering; 1

(c) (i) **B**; 1

(ii) Low organic matter in **B**/high clay content in **B**/high calcium or magnesium in **A**; 1
[**A** converse]

Total marks = 5

Question 4

(a) Overgrazing/overcultivation/salinisation;
qualified ref to contamination;
industrial obsolescence/closure;
inner city decay;
transport changes;
warfare/military uses; MAX 2
[**R** "earthquakes/floods" etc]

(b) (i) Increases/positive correlation; 1

(ii) Decay of vegetation/nitrogen fixation/application of nitrogenous fertilisers; 1
[**R** "legumes" – no explanation]

Total marks = 4

Question 5

(a) Land cost;
mining costs/accessibility of deposit/overburden depth/size of deposit/drainage needs/folding/faulting/reclamation;
labour/energy/processing costs/purity/form/industrial infrastructure;
transport costs;
market demand/cut-off grade;
ref to designation/legislation e.g. National Park/SSSI; MAX 3

(b) Quarrying/removal of surface deposits/shallow/overburden; 1

(c) (i) Aesthetic pollution/loss of amenity;
habitat loss;
loss of topsoil/reduced fertility/damage to soil structure;
visual scarring;
impact on water table/ground H_2O/aquifer;
subsidence;
dust/noise pollution; MAX 2
[**R** air pollution", "traffic"]

(ii) Alkaline/red mud;
named air pollution – e.g. CO_2/NO_x/dust; 2
[**R** "toxic waste"]

(d) Strengthens(al)/lightens(Fe); 1

Total marks = 9

Question 6

(a) Did not use (belt) transect/random sampling may not sample whole slope;
not random/throwing creates bias;
insufficient sample size; 3
[**R** "samples not evenly spread"]

(b) Same depth;
recalibration;
sufficient time to stabilise readings OWTTE;
probe in soil for same length of time; MAX 2

(c) Scorching/burnt off OM/incorrect temps used;
did not weigh to constant weight/may not have driven off all moisture;
did not use desiccator/keep dry;
used two different instruments (auger and trowel); MAX 2

(d) Exposure/vegetation (cover);
respiration of organisms;
colour/albedo;
texture;
depth;
ref to organic matter; MAX 3

Total marks = 10

Question 7

(a) Low maintenance;
native vegetation/ref to "natural"/climax community;
woods offer shelter (for people);
can hide/hold many visitors/psychological carrying capacity/absorb noise/act as screen; MAX 2

(b) Transport/communications;
bare rock/sand/shingle;
mineral workings;
leisure/recreation/parks;
military; MAX 2
[**R** "roads/rail"]

(c) Urbanised/planted with trees; 1

(d) Advantages and disadvantages are given a monetary value;
decision based upon net figure;
go ahead if benefits > costs; 2

Total marks = 7

Question 8

(a) Park activity/what they did/why they came;
frequency of visit;
satisfaction (with amenities)/suggested improvements or criticisms;
travelling times/distances/access/mode of transport;
which parts of the Park are used;
typical spend/willingness to pay;
types of visitor (age, sex, dependent/independent); MAX 3

(b) Sample at different times of year/day/weather;
different age groups/sexes/ethnic groups; 2
[**R** "adequate sample size"]

(c) Example of points that would gain credit (not exhaustive)

		National Parks	
Conflict (MAX 2)		**Why Arose (MAX 2)**	**Re/Solutions (MAX 6)**
Quarry:	heavy traffic; habitat destruction; dust/CO_2/ noise pollution	expansion of existing quarry/existing mining agreements; increase in population; need for roadstone/cement/fertilisers;	EIA; public enquiry; planning permission;
Camp Site:	increases tourist pressure; litter/noise pollution;	increased recreation time; increased disposable income; increased motor vehicle accessibility; growing interest in countryside;	CBA; protection by other designations e.g. SSSI, ESA;
Housing Development:	visual pollution; increased traffic; habitat destruction;	more £ in local economy/employment; popn increase; counterurbanisation; more 2º homes;	mining agreements including restoration; screening quarries/campsites; scheduling/restricting blasting/freighting; re-route and repair;
Footpath Erosion:	scarring of landscape; gulleying exacerbated;	as 'campsite' above	
		Greenbelts	
Housing estates:	CO_2/SO_2/ NO_x; traffic congestion; visual pollution; habitat destruction;	as housing development above	EIA; public enquiry;
Greenfield factories/ business park:		inner city dereliction; higher rates; greater accessibility in urban fringe;	planning permission; CBA; green wedges; grants to develop brownfield (elsewhere); gentrification of decaying urban areas; tax incentives e.g. no VAT on brownfield development;

10

Total marks = 15