



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme January 2003

GCE

Environmental Science

Unit ESC2

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Registered address: Addleshaw Booth & Co., Sovereign House, PO Box 8, Sovereign Street, Leeds LS1 1HQ
Kathleen Tattersall: *Director General*

Unit 2: The Lithosphere

General instructions

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

Question 1

- (a) X = igneous rock;
 Y = metamorphic rock;
 Process A = denudation/erosion/transport;
 Process B = (intense) heat/pressure/compaction/metamorphism; 4
- (b) Radioactive decay/nuclear reactions/nuclear decay; 1

Total marks = 5

Question 2

- (a) (i) Hard/resistant to wear or abrasion/
 can be cut into blocks; 1
 [R fissile]
- (ii) Inert/waterproof/provides smooth surface/can be polished/
 white/pure/non porous; 1
 [R soluble]
- (b) Percentage/concentration of a mineral/metal (in an ore);
 which it is economically worthwhile extracting; owtte 2
 [A figs]

Total marks = 4

Question 3

- (a) $100,000,000/100045780 = 99.9\%/99.95$; 1
 39000 ocean
 4000 ff
 1500 soil
 560 plants
 720 atmosphere
 If no working but correct = 1
 If stores written down, they must all be there and correct
- (b) Reference to photosynthesis absorbing/using CO₂/decomposition/burning/releasing CO₂/CH₄;
 decomposition/ ref to fossil fuels;
 reference to solar energy/temperature and weathering;
 reference to gas solubility;
 reference to plant growth/herbivores/food chains; MAX 3
- (c) No gas state/forms relatively insoluble compounds/occurs as oxidised state
 that combines with metals; 1

Total marks = 5

Question 4

- (a) Size of resource;
accessibility of site or deposit/deep water;
land cost;
[R ‘few people affected’] MAX 2
- (b) Damage to scenery/ref to erosion/visual pollution;
[R pollution]
damage to tourism/aesthetics;
damage to fisheries;
protected by designation e.g. SSSI/Heritage Coast;
[A e.gs]
disturbance to wildlife/habitats/qualified noise pollution; MAX 2
- (c) Relative low cost of shipping;
high demand from SE;
low land values in Scotland; MAX 2

Total marks = 6**Question 5**

- (a) Increasing population/increasing number of households/living alone/high cost of existing houses/immigration/increasing desire for ‘country’ living/increasing number of second homes; 1
- (b) Green belt surrounds urban areas; 1
- (c) Contamination/toxic/instability/cost of reclamation/demolition/plant removal;
[R dangerous if unqualified] 1

Total marks = 3**Question 6**

Land management term	Definition
Countryside Stewardship Scheme;	Offers payments to landowners that sensitively manage important landscape features
National Park	Protect landscape;
Honey pot site/country park	Specific area designed to attract large numbers of visitors so that other areas are protected;

Total marks = 3

Question 7

- (a) Spoil scenery/unsightly;
attract crowds/cause congestion/act as honey pot/encourage development/car parks;
existing provision;
wildlife/habitat disturbance/trampling/waste/water pollution/litter; MAX 2
- (b) Will generate income for locals/economic purpose of park;
reference to recreation/attracting or catering for visitors/amenity; 2
[R 'will raise money']

Total marks = 4**Question 8**

- (a) (i) **A** = Clay loam;
B = Clay; 2
- (ii) **A** Sand/Clay Loam; 1
- (b) Add water;
allow to settle;
measure layers;
calculate %;
OR
Dry;
sieve/use meshes/filter;
weigh samples;
calculate %; MAX 3
- (c) Arrangement of soil particles/peds;
ref to platy, blocky, crumb/granular/prismatic/columnar; 2
- (d) (i) Easier/more practical/cheaper; 1
- (ii) Plough/add organic matter/lime/marl/cultivation; 1
- (e) Volume/intensity of precipitation;
structure;
topography;
humus/organic matter content;
bedrock;
iron/plough pan;
man-made drainage system;
existing water content/saturation/position of water table;
compaction; MAX 3
- (f) Same volume of water/rate of application;
same species/amount of grass;
repetition;
soils same (initially);
same trays; MAX 3

- (g)
- | | | |
|---|---|-------|
| 1 | decreased root binding; | |
| 2 | decreased organic matter | |
| 3 | decreased interception/decreased cover/increased raindrop impact/increased wind impact; | |
| 4 | increased over land flow/increased surface run off/gullyng; | |
| 5 | compaction by machinery; | MAX 4 |

Total marks = 20

Question 9

- (a) (Measuring tapes) to lay out a grid/ref to striding;
use of random numbers;
coordinate/intersection = sampling point; 3
- (b) $30 \times \frac{100}{2} / 0.2x = 30, x = \frac{30}{0.02}$;
1500; 2
- (c)
- | | | |
|---|--|-------|
| 1 | Number of stones of each aspect (very) different; | |
| 2 | material of stones differs; | |
| 3 | age of stones differs; | |
| 4 | may have measured area on each stone differently; | |
| 5 | subjective key/ref to fonts/depth of lettering; | |
| 6 | random numbers may produce a cluster; | |
| 7 | low sample size; | |
| 8 | position to road/chimney/shelter/vegetation cover/may affect weathering; | MAX 4 |
- (d)
- | | | |
|---------|--|--------|
| 1 | Loss of land/landscape/ref to visual pollution; | |
| 2 | loss of habitat/wildlife; | |
| 3 | noise; | |
| 4, 5, 6 | named air pollutants (dust; CO ₂ ; NO _x ; CH ₄); | |
| 7, 8, 9 | named water pollutants (turbidity; heavy metals; acid; oil; salinity;) | |
| 10 | traffic congestion/danger; | |
| 11 | toxic waste/leachate; | |
| 12 | subsidence/vibration/instability; | |
| 13 | flooding/impact on drainage; | |
| 14 | aquifers/drinking water; | |
| 15 | restoration to country park or other positive impact; | MAX 11 |

Total marks = 20