CAMBRIDGE
INTERNATIONAL EXAMINATIONS

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GCE Advanced Subsidiary Level

MARK SCHEME FOR the June 2002 question papers

8290 Environmental Science

8290 /1 Paper 1, maximum raw mark 100

8290 /2 Paper 2, maximum raw mark 80

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UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

GCE AS LEVEL

MARK SCHEME

MAXIMUM MARK : 100

SYLLABUS/COMPONENT : 8290/1

ENVIRONMENTAL SCIENCE
Paper 1

UNIVERSITY of CAMBRIDGE
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1

(a) 1.1 (1)
1.4 (1)
1.5 (1)
1.6 (1)
1.2 (1)
1.3 (1)

(b) (i) reflection / scattering of (EM)R\light ; (1)
by the Earth's surface / atmosphere; (1)

(ii) INCREASE
change of vegetation cover / increase in particulates; (1)
means more radiation is reflected; (1)
DECREASE
increase in carbon dioxide concentration; (1)
means less (IR) is reflected / temperatures rise and ice/snow melts; (1)

TOTAL MARK = 12

(2)

(a) sigma / sigmoid/S-shape ; (1)

(b) B; (1)

(c) $\frac{(510 \pm 10 - 60 \pm 10)}{6}$; (1)
75 ± 4 per day ; (1)

(d) lower/decrease in growth rate of A; (1)
decrease in max population size ; (1)
Type A becomes extinct / dies out / owtte ; (1)

(e) predation ; (1)
competition for food ; (1)
the waste products of type B are toxic to type A ; (1)

TOTAL MARK = 10

(3)

(a) (i) formed when solid particles settle; (A) "sedimentation of particles" (R) "sedimentation" (1)
and are then compressed; (R) "heat + pressure" (A) "pressure" (1)

(ii) formed when molten rock / magma / lava; (1)
cools and solidifies; (1)

(iii) formed when a rock is subject to high pressures; (1)
and / or high temperatures; (1)
(A) "heat + pressure";

(b) (i) 2,3,4 ; (1)

(ii) 1 (1)

(c) rocks at B are subjected to heat ; (1)
rocks at B are too far from the heat / rock 1 ; (1)

(d) a mineral has a definite chemical composition / elements or inorganic compounds with crystalline structure /
a rock does not (usually) have a definite chemical composition / made of (1)
more than one mineral;

TOTAL MARK = 11

4

(a) (i) example of the biological agent (eg. tree root); (1)
example of the effect it produces; (1)

(ii) example of the chemical agent (eg. acid rain); (1)
example of the effect it produces; (1)

(ii) example of the physical agent (eg. water freezing/expanding); (1)
example of the effect it produces; (1)

(b) 1 no humus; (1)
2 no flora / fauna; (1)
3 may not contain sand / silt / clay; (1)

(c) erosion- any valid example; (1)
transport- any valid example; (1)
deposition- any valid example; (1)

TOTAL MARK = 12

5

(a) B is evaporation; (1)
E is evapotranspiration; (1)

(b) (i) sun; (1)
(ii) B and E; (1)

(c) $E + C = D$
$E = D - C$
$E = (102 \times 10^{15} - 39 \times 10^{15})$; (1)
$= 63 \times 10^{15}$ kg year^{-1}; (1)

(d) largest - oceans, smallest - atmosphere ; (both required) (1)

(e) largest - ice caps/glaciers
smallest - rivers/streams; (both required) (1)

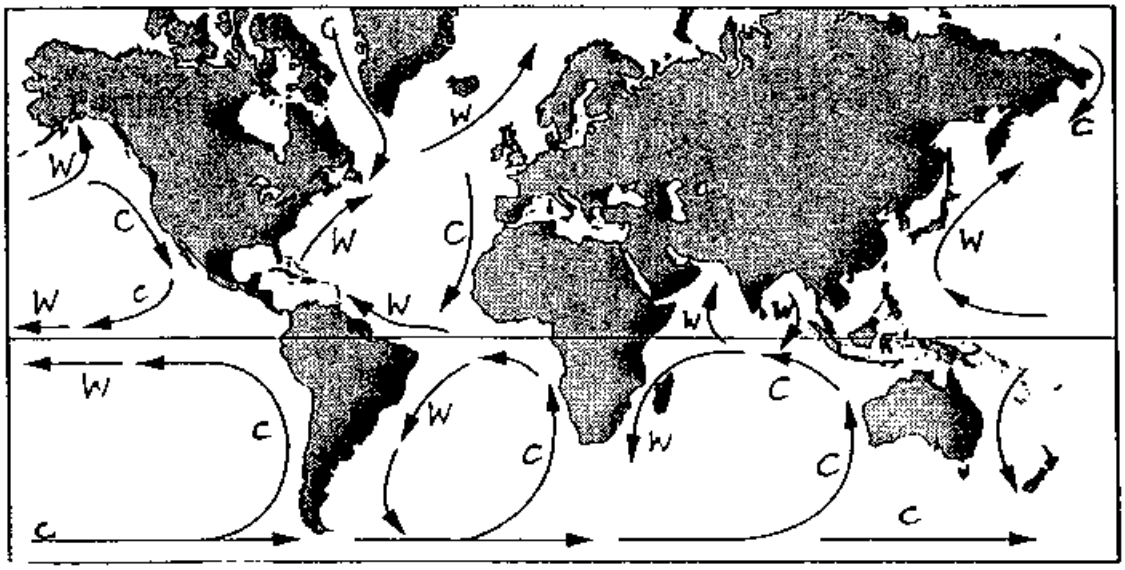
TOTAL MARK = 8

6

(a) in summer it absorbs a large amount of heat / slows down the warming of the land; (1)
in winter it releases a large amount of heat / slows down the cooling of the land; (1)
and therefore the annual temperature range is reduced/small ; ®low (1)
(MAX = 2)

(b) ~~(in N hemisphere) S winds are warmer than N winds;~~ ~~(1)~~
winds over land have a wider temperature range than winds over seas; (1)
OR
winds over seas have a higher humidity; (1)
and therefore bring more rain; (1)
(MAX = 2)

(c) (i) any two named ;; (2)



(ii) see above map for warm and cold currents – any two correct for each mark ;; (2)

(d) name of current ; (1)
influence on precipitation/
influence on coastal humidity/
influence on coastal temperatures; (1)
(MAX = 2)

TOTAL MARK = 10

7

(a) plants/animals/micro-organisms to (CO_2 in) atmosphere ; (1)
coal/oil/gas to atmosphere ; (1)
(CO_2 in) atmosphere to oceans ; (1)

(b) either
- coal/oil/gas; (1)
- burning of fossil fuels; (1)

or
- limestone; (1)
- cement production; ~~(1)~~

or
- green plants; (1)
- deforestation/desertification; (1)

or
- oceans; (1)
- global warming; (1)

(MAX = 2)

(c) carbon dioxide in atmosphere; (1)
burning fossil fuels / deforestation; (1)

(d) SOURCE - rate of loss is greater than rate of gain; (1)
SINK - rate of gain is greater than rate of loss; (1)

TOTAL MARK = 9

8

(a)
(i) carbon dioxide;
(ii) oxygen;
(iii) nitrogen;
(iv) ozone;
(v) carbon dioxide / water;

½ mark for each correct rounding up to max. (3)

(b)

(i) indication that warm air above the sea rises; (1)
indication that cool air from land replaces warm air over the sea; (1)
indication that the sea is warmer than the land; sea loses heat more slowly than land; (1) (MAX = 2)

(ii) indication that warm air above the land rises; (1)
indication that cool air from sea replaces warm air over the land; (1)
indication that the sea is cooler than the land; sea warms more slowly than land; (1) (MAX = 2)

TOTAL MARK = 7

9

(a) (i) (primary) succession; (1)
(ii) pioneers / colonisers; (1)
(iii) climax (1)

(b) manufactures complex / organic molecules; (1)
from simple / inorganic molecules; (1)
OR organism that makes its own food; (1)
~~by photosynthesis;~~ ~~(1)~~
(MAX = 2)

(c) detritivore / decomposer; (a) bacteria / fungi; (1)

(d) insufficient soil / nutrients in the early stages; (1)
when they are able to grow they shade out smaller competitors / outcompete for, water / minerals; (1)
eating plants; (1)
thereby preventing their growth / reproduction; (1)
o ✓ p ;;

TOTAL MARK = 10

10

(a) (i) aphid / beetle / worm / squirrel; (1)
(ii) finch; (1)
(iii) spider, hedgehog, fox, hawk; (1)
(iv) spider; (1)
(v) woodlice; (1)

(b) big population increase due to no predators; (1)
squirrels eat tree seeds, therefore trees do not reproduce / replace themselves existence of trees threatened; (1)

(c) Fig. 10.3; (1)
Fig, 10.2 has to be the pyramid of numbers as there is one tree / primary producer; (1)

(d) level 1-2 . 0.16 / 14000 ÷ 84000
level 2-3 · 0.114 / 1600 ÷ 14000
level 3-4 0.05 / 80 ÷ 1600
} ; (comparison needed) (1)
Level 1 to Level 2 ; (1)

TOTAL MARK = 11