

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

**5014 ENVIRONMENTAL MANAGEMENT**

**5014/02**

Paper 2, maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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<b>Page 2</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE O LEVEL – October/November 2009</b>	<b>5014</b>	<b>02</b>

- 1 (a) (i) both axes labelled;  
number of species;  
distance from road (m);  
2 marks for correctly plotting points (must have suitable scale for plots and either a key or clear alternative);;  
allow one plot error per road [4]
- (ii) species increase up to 20 m; then remain constant/eq;  
species in higher numbers up to 20m then same constant for new road/eq; [2]
- (iii) yes, the numbers increase away from road(s);  
new road has higher species count in first 12/16 m/eq;  
(allow 'no' for second marking point only) [2]
- (iv) the same transect lines need to be repeated (twice more)/ so averages can be found/eq;  
(allow controlling other variables) [1]
- (v) to compare/use as a control; [1]
- (vi) use of random number tables/generator/eq;  
to guide random walk;  
random throwing;  
use of compass bearings chosen at random;  
other valid randomised method;  
use of grid;  
reject systematic methods [2]
- (b) (i) (the road will be longer so) they get more money/eq; [1]
- (ii) B/D would damage plant life on both sides of the road;  
A/C damage to plants on inland side only/eq;  
(allow fewer plants at A/C) [2]
- (iii) access to the sea could lead to pollution/environmental damage;  
destruction of seashore/ too much fishing;  
AVP;  
reject flooding unless linked to pollution [2]
- 2 (a) (i)  $28 \times 0.1 = 2.8$  (kg) [1]  
 $2.8 \times 365$  days = 1022 (kg) [1]  
(allow other correct answers with units)
- (ii) plants die (back)/retreat underground during the dry season/eq; [1]
- (iii) four good questions related to pressure on the environment at least two must relate to change;;;  
good layout with alternative answers for at least two questions;  
e.g. food intake, goat numbers in the past, grazing time, numbers of adults, young goats,  
breed of goat [5]

<b>Page 3</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE O LEVEL – October/November 2009</b>	<b>5014</b>	<b>02</b>

- (b) (i) ask person in charge;  
sample all villagers/ask every third household/sampling idea/eq;  
read the questionnaire to the goat keepers and record answers;  
AVP;;  
reject age [2]
- (ii) to compare with other villages to see if worse/better or about average grazing  
pressure/eq; [1]
- (c) (i) sensible number 5–25;  
if same number drawn then either randomly or systematically distributed; [2]
- (ii) number of each species;  
number of stalks/flowers;  
height; or diameter;  
mass; of plants;  
AVP;; e.g. suitable table [2]
- (iii) loss of plant cover/eq;  
leading to wind/water erosion;  
loss of top soil;  
loss of minerals/nutrients; [3]
- 3 (a) fish yield similar over time; so must be able to reproduce/replace themselves; small  
boats/nets do not seem to have led to overfishing/eq; they only catch what they need/not for  
export/for sale; fishing/spawning grounds not damaged; [3]
- (b) sea cucumber, not able to reproduce fast enough; so fished out/become extinct; decrease in  
small/large fish;  
sharks, not able to reproduce fast enough; so fished out/become extinct; loss of food for  
sharks;  
[OR sharks removed so increase in large fish; so decrease in small fish; so increase in sea  
cucumber; so run out of algal food;] [4]
- (c) valid comments about quota/net size/shape/number of boats = fishing effort/number of boat  
days at sea/AVP;;; [4]
- (d) create licences for mainland boats;  
exclusion zone for boats;  
enforcement by fishery patrols;  
legal action; fishing season;  
size/age limits for fish; [2]

<b>Page 4</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE O LEVEL – October/November 2009</b>	<b>5014</b>	<b>02</b>

- 4 (a) (i) to protect the species tourists come to see;  
to stop widespread damage by uncontrolled building;  
control where tourists go;  
keep village life undisturbed/depend on agriculture;  
AVP; [2]
- (ii) a visitor who wants to see the wildlife/environment; [1]
- (iii) the climate is more comfortable/eq; AVP [1]
- (b) allowed developments, small number of extra hotels;  
places to stay in some villages;  
some diving; expand the harbour as more imports/fishing will be needed to support extra people;  
some medical facilities/hospital;  
guided tours on designated routes;  
AVP;;; e.g. sewage treatment; only limited drinking water available; hospitals; electricity; police;
- Important restrictions*, ban hunting; picking wild plants; tourists must have a licensed guide; camp only in designated places; dive only from specific sites; penalties for illegal acts in the development free zone; AVP;;; e.g. do not pollute the sea; [max 8]