**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

# MARK SCHEME for the May/June 2010 question paper

# for the guidance of teachers

## 5014 ENVIRONMENTAL MANAGEMENT

**5014/22**        Paper 22, maximum raw mark 60

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**1** **(a)** **(i)** to be able to find a mean/average; to make data more reliable/eq; reference to variability of data/eq; find range of data/eq;
(ignore accurate/valid/fair/fair test) [1]

**(ii)** increase in grazing = increase in soil erosion/eq;
(ignore reference to years) [1]

**(iii)** 2002, 2007, 2008; (more or less years =0) [1]

**(iv)** 2001 (any two of 2000, 2003, 2004); [1]

**(v)** rods moved/eq by animals; soil erosion; only 5 points measured; soil might be deposited after erosion; AVP; [2]

**(b)** **(i)** description of a random or systematic method; further detail; at least 10 quadrats from each area; construct recording table/notebook; record/count/calculate total number of plants; identify species/name using books; (ignore reference to metres squared) [3]

**(ii)** hooves/teeth damage some plants so they die/vegetation cover removed; plant growth cannot keep up with rate of grazing/eq; plants survive but cannot regenerate/reproduce/ flower/set seed; reference to root damage; reference to changes in numbers of palatable and unpalatable species; [2]

**(c)** **(i)** orientation;
both axes labelled (minimum is a reference to number, year);
plot data from column one in table; plot data from column two in table; (allow one error per plot) [4]

**(ii)** increase in species (until 2008), then a plateau/eq;
species fluctuate/no increase or decrease/eq; (allow no trend ignore reference to plateau) [2]

**(iii)** some plants cannot grow/species now extinct; seeds have not entered area yet; other species have taken their place; soil not now suitable for growth of some species; one area (2004) able to recover more; [2]

**(d)** steep slopes encourage surface run-off/soil movement; cooler temperatures means slower plant growth; recovery of plant cover to slow; so limited interception/described; thin topsoil easily lost/more soil erosion; full recovery now not possible; loss of soil fertility/nutrients lost/reference to leeching;
(mark the ideas not the exact wording) [2]

**2** **(a)** **(i)** can be broken down/decomposed by living organisms/microbes/bacteria/enzyme action/ eq; [1]

**(ii)** C 2.3(3);  D 2.2(1)/ 2.20; [2]

**(iii)** polluted plants grow slower than control; all grow the same/similar by day 12 /end of period; polluted grass grows taller/faster from day 13 to 24/eq;
(must have reference to B C D if 'polluted' is not in the answer) [3]

**(iv)** (BCD have) more root growth/absorption/so more water/minerals/named mineral for more growth/photosynthesis/more minerals now available as oil has broken down/A/ control plants grow quicker at the beginning as not inhibited by oil/eq; (allow converse statements) [1]

**(b)** **(i)** animals will not have much food/grow slowly; toxic chemicals absorbed (by animals); might be poisoned/die; meat might taste bad/be toxic/poor quality/cannot be sold to local people/eq; [2]

**(ii)** more food for animals; gives soil time to recover/grass to grow; less risk of poisoning/ healthier for animals; healthier for humans [2]

**(iii)** overgrazing not likely/likely to be sustainable/eq; more yield of plants/animals after one year/eq; plant grass prevents soil erosion; plant grass reduces toxicity/eq; some oil has biodegraded/eq; some income earlier than plan B/eq; [2]

**(c)** **(i)** yes;
the plants show reduced growth for the first 10 metres/near factory; (accept converse statements) [2]

**(ii)** sulfuric acid/$H_2SO_4$; (accept sulfurous acid $H_2SO_3$)
reject sulfur hydroxide [1]

**(iii)** changes pH of soil water; makes it more acidic/lowers pH; so lower quantity of minerals available to roots; reduced plant growth; reduced photosynthesis; AVP; (reject plants die unqualified) [2]

**3 (a) (i)** 40 (%); [1]

**(ii)** some fish might not have migrated to Gulf in later years; reference to disease; large fish caught in early years/only small fish now; under recording; cannot reproduce fast enough to replace stock/less reproduction; AVP; (ignore reference to nets) [2]

**(iii)** size/length; sex; age; sexual maturity; [2]

**(iv)** table drawn for a <u>week</u>; two characteristics labelled;;
(allow any characteristics identified in part **(iii)**) [3]

**(b)** three relevant questions about fishing activities such as quantity caught, method used, number of days, details about boats;;;
layout similar to question 1 (for 2 questions); [4]
reject questions about sport fishing/nets

**(c) (i)** could overfish sardines/eq; pollution/disease from cages; [1]

**(ii)** number of sardines will increase; number of small fish will decrease; as more sardines to eat them; whales/sharks decrease; due to lack of food; if more sardines eaten by whales/sharks then small fish increase; reference to change of algae numbers in correct context; [2]

**(d)** *sports fishing*   control number of fishing days/season/fishing zone; catch per fisherman; number of boats; sports fishermen pay for licence; throw back in water; (reject reference to nets)

*fishing for food*   closed season (in April–June) to allow spawning; set quota for each boat/eq; fishing patrols to enforce rules/times; regulate fishing gear; no fishing zones; regulate number of boats/fishermen; (reject reference to nets)
(max 4 for each subsection) [6]