

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

**MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers**

5038 AGRICULTURE

5038/01

Paper 1, maximum raw mark 100

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.

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Section A

- 1** (a) N = nitrogen, P = phosphorus, K = potassium;;
3 correct = 2 marks, 2 or 1 correct = 1 mark [2]
- (b) fertiliser: B
reason: high(est) proportion of potassium;
potassium promotes flower/fruit development; [2]
- (c) (i) suitable example (such as ammonium nitrate); [1]
- (ii) advantage – cost/availability/soil improver/OVP;
disadvantage – bulky to handle/store/unknown content/OVP; [2]
- [Total: 7]**
- 2** (a) (i) advantage – durability/easy to clean/doesn't harbour pests/OVP;
disadvantage – lacks insulation/cost/availability/OVP; [2]
- (ii) appropriate example, e.g. thatch – no mark
advantage – appropriate to example;
disadvantage – appropriate to example; [2]
- (b) control temperature/avoid damp conditions/discourage fungal conditions/parasites/respiratory disease/OVP; [1]
- (c) clean housing/removing dung/bedding;
clean feeders/drinkers;
clean food/water;
control flies;
use of disinfectants;
use of foot bath;
other example;
vaccination;
use of prophylactic drugs;
OVP; [max 3]
- [Total: 8]**
- 3** (a) c of g higher in **B**/lower in **A**
B has narrower wheelbase than **A**;
In **B** – (vertical line drawn from) c of g falls outside wheel base;
In **A** – (vertical line drawn from) c of g falls inside wheel base; [max 3]
- (b) availability of machinery/spares/fuel;
availability of skilled labour;
size of farm/fields; [max 2]

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- (c) any 2 examples, each with explanation

$2 \times 2 =$

terracing;;

contour cultivation/ploughing/;;

contour drainage;;

grass bunds;;

maintaining crop cover;;

[4]

[Total: 9]

- 4 (a) (i) 2000;

[1]

- (ii) untreated – 6600;

treated – 600;

[2]

- (b) (i) natural predators/life cycle of pest/competition;

[1]

- (ii) *description* – (rapid) reduction in numbers for 2 weeks/minimum population reached in 2 weeks; never reaches zero;

population then begins to increase;

continues over 5 weeks;

[3]

explanation - remaining pests are resistant to/pests develop resistance to insecticide/a few untouched by insecticide so can reproduce;

[1]

- (iii) apply second treatment/direct spray more effectively/use greater concentration;

[1]

- (c) wear protective clothing;

use respirator;

do not use in windy conditions;

do not eat/smoke when using;

OVP's related to use, **not** storage;

[2]

[Total: 11]

- 5 (a) Tt;

[1]

- (b) cross to show Tt x Tt;

produces three genotypes TT, Tt, tt;

with two phenotypes – TT and Tt are tall, tt are short;

[3]

- (c) (i) uniformity → easier harvesting/all ready at same time/known quality/OVP;

[1]

- (ii) reduces costs/variation may reduce pest attack/OVP;

[1]

[Total: 6]

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- 6 (a) (i)** crop and gizzard labelled correctly; both required for the mark [1]
- (ii)** muscular walls (to churn food);
presence of grit/stones (to break up hard food); [2]
- (b) (i)** label to rumen; [1]
- (ii)** rumen; [1]
- (iii)** animals can't digest/have no enzyme to digest cellulose;
cellulose forms (large) part of plant matter;
is a carbohydrate/an important source of energy;
wasted/value of food much reduced, if not digested; [max 3]
- [Total: 8]**
- 7 (a)** clean and dry/dry storage to remove/avoid moisture;
oil to exclude air/oxygen and moisture;
prevents rusting/corrosion; [3]
- (b)** levelling;
producing fine tilth;
so seeds are in close proximity to (moisture on) soil particles; [3]
- [Total: 6]**

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Section B

- 8 (a) (i)** name of crop [no mark]
- (ii)** ref. to land clearance;
primary cultivation;
purpose;
secondary cultivation;
purpose;
incorporation of fertiliser/manure; [max 4]
- (b) (i)** weeds compete with crop;
for light;
moisture;
nutrients;
harbour pests;
and disease;
reduce yield;
contaminate crop;
reduce quality;
may be poisonous;
may hamper harvesting; [max 6]
- (ii)** digging/ploughing in (annual) weeds before planting;
early planting;
manual weeding;
use of hoe/cultivator;
use of herbicide;
named example/detail of selective/non-selective re. timing;
use of clean seed;
crop rotation;
mulching/cover crops; [max 5]
- [Total: 15]**
- 9 (a) (i)** growing two or more crops on one field/piece of land;
in sequence over consecutive growing seasons; [2]
- (ii)** arable and livestock farming;
on one farm; [2]
- (iii)** one/the same crop is grown on a piece of land;
over several growing seasons; [2]

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- (b) (i) reduces depletion of soil nutrients;
 incorporating a legume can improve nutrient status;
 different rooting depths use nutrients at different levels;
 helps prevent soil pan forming;
 helps prevent soil structure deteriorating;
 reduces likelihood of (soil-borne) disease;
 reduces pest build up;
 by breaking life cycle (of pests);
 reduces weeds (associated with particular crop);
 reduces costs on spraying;

- (ii) spreads risk/avoids dependence on one enterprise;
 may make best use of land;
 where some is unsuitable for crops/grazing/OWTTE;
 economically effective;
 crop residues may be used as fodder;
 animal waste used on crops/as manure/soil improver;

[min 3 marks for each of (i) and (ii) to max 9]

[Total: 15]

- 10 (a) (i) stocking rate must be correct;
 avoid overstocking;
 to prevent overgrazing;
 causes loss of/prevents rapid regeneration of palatable/nutritious grasses;
 poorer grass/weeds colonise(s);
 use of fertilisers;
 irrigation;
 re-seeding;

- (ii) avoid overgrazing/control grazing;
 leads to loss of vegetative/soil cover;
 soil easily eroded;
 by wind/water;
 and animals;

- (iii) avoid overgrazing; (only if not given in (i) or (ii))
 bare patches allow weeds to establish; (only if not given in (i))
 may be less nutritious than grasses;
 may be poisonous;
 use of burning;
 herbicides;

[min 2 marks for each of (i), (ii) and (iii) to max 9]

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- (b) grazing can be controlled;
 cattle kept in paddocks/camps;
 ref. to rotational grazing;
 prevents selective grazing;
 can avoid overgrazing;
 fenced pasture can recover/be improved;
 becomes more productive;
 reduces need for grass burning;
 some can be left ungrazed to provide for dry season/make silage/hay; [max 6]

[Total: 15]

- 11 (a) (i) root hairs;
 provide large surface area;
 concentration of cell sap greater than water/solution in soil;
 ref. to osmosis;
 water moves down a concentration gradient/from high to low water potential;
 from soil to (root hair) cell;
 through partially permeable membrane;
 passive process/does not require energy;
- (ii) minerals dissolved in soil water/only absorbed from solution;
 uptake usually against a concentration gradient;
 requires energy;
 active uptake; [min 2 marks for each of (i) and (ii) to max 9]

- (b) cultivation of the soil;
 suitable depth for root penetration;
 improve aeration;
 improve drainage;
 use of humus/organic matter to open soil texture;
 improves root respiration;
 use of fertiliser;
 importance of phosphates;
 crop rotation to avoid pests/disease which may attack root system;
 suitable spacing/avoid overcrowding; [max 6]

[Total: 15]

- 12 (a) (i) name of livestock [no mark]
- (ii) product appropriate to livestock named; [1]
- (iii) as appropriate to product – storage conditions (cool/dry etc.);
 other storage detail;
 processing (method + detail);
 grading;
 packaging; [max 4]

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- (b) identity of male and female used;
 date of mating;
 to estimate time of giving birth;
 date of birth;
 number of offspring;
 health/quality of offspring;
 mortality;
 other detail (e.g. birth difficulties, milk production);
 to decide on use breeding animals again;
 cull if poor;
 allow comparison with other breeding stock;
 date of weaning;
 rations during gestation;
 date of next mating;

[max 10]

[Total: 15]