

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

5038 AGRICULTURE

5038/11

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.

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abbreviations used:

OVP other valid point

AW alternative wording

Section A

- 1 (a) (i) A penis; [2]
B testis;
- (ii) produces sperm/male gametes (reject *semen*)/hormones [1]
- (b) (i) breeding livestock by depositing collected semen in female; [2]
using sperm collected from male selected for specific qualities;
- (ii) no need to keep bull/semen from overseas animals can be used/choice of specific quality [1]
not confined to one bull/allows herd improvement/OVP; (reject *cost unqualified*)

[Total: 6]

- 2 (a) digging – turn soil; [max 4]
bury weeds/trash;
incorporate manure/compost;
expose pests;
forking – break up large lumps/clods of soil;
raking – levelling;
produce fine tilth;
- 1 mark required for each part, plus one from any for max 4 [max 4]
- (b) prevents water running down the slope; [2]
carrying topsoil away/causing soil erosion;
- (c) waterlogged soil lacks air; [3]
(air/oxygen) required for root respiration;
root cells die;
unable to absorb nutrients;

[Total: 9]

- 3 (a) (substance is) toxic; (accept *poisonous*, reject *dangerous/hazardous*) [1]
- (b) $10/200 \times 100$; [2]
 $= 5 \text{ cm}^3$;
- (c) toxic spray harmful if consumed/AW; [2]
time interval allows breakdown/time required to become harmless/AW;

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(d) insects needed for pollination;
no/reduced pollination → no/reduced fertilisation;
no/reduced yield/fruit/seed formation; [3]

(e) spray blown onto spray operator/people/animals;
spray blown onto/may damage other crops;
spray blown into water courses/reservoirs/stores;
spray wasted/wastes money; [max 2]

[Total: 10]

4 (a) (i) 8 (mm); [1]

(ii) 8 (mm); [1]

(iii) highest food intake for lowest egg production;
feed cost per 100 eggs higher than other feeds;
illustrated with numbers from table; [max 2]

(b) crumbs;
because cheapest; [2]

(c) improves farming techniques;
improves choice of materials/named e.g. available;
informs choices of enterprise available;
increases productivity;
improves land use;
increases food self-sufficiency/may reduce imports;
OVP; [max 3]

[Total: 9]

5 (a) (i) stigma catches pollen grains;
anther produces/releases pollen grains;(reject *contains/stores*) [2]

(ii) stigma feathery;
to trap (wind blown) pollen;
accept ref. to exposed stigma; allowing wind currents to deposit pollen;
anther outside inflorescence;
exposed to wind/enables wind to carry pollen away from flower; [max 2]

accept ref. to central/versatile attachment to filament; allowing movement/shaking to
release pollen; [2]

(b) (fewer developed grains) means less pollination;
pollen blown from plants in row/plot **A** blown away from row;
no other plants to trap it;
pollen blown from plants in block/plot **B** trapped by surrounding plants; [max 3]

[Total: 9]

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- 6 (a) (i) 2; [1]
(ii) 4; [1]

- (b) concentration gradient of water vapour/water potential gradient between (air space) inside leaf and outside affects rate of transpiration;
steeper gradient → faster transpiration;
low humidity increases gradient (or converse);
high temperature increases rate of evaporation/increases gradient (or converse);
high wind strength removes water vapour faster/increases gradient (or converse);

(accept statement that *high wind strength/temperature or low humidity increases transpiration* or converse for one mark if no other mark) [max 4]

[Total: 6]

- 7 (a) (i) water from drip irrigation goes directly onto soil;
straight to roots;
which take up water;
some water from can may fall on leaves;
wasted/evaporates;
may cause scorch; [max 4]

- (ii) cost/availability of materials/OVP; [1]

- (b) watering can contains a measured amount of water; [1]

[Total: 6]

Section B

- 8 (a) breakdown of organic matter;
example;
releases ammonium compounds;
acted on by nitrifying bacteria;
produce nitrates;
used by plants/improves soil fertility;
(free-living) nitrogen fixing bacteria fix atmospheric nitrogen;
denitrifying bacteria release nitrogen from nitrates;
deplete soil nitrogen;
anaerobic/found in waterlogged soil;
ref. to bacteria in other nutrient cycles; [max 9]

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- (b) bacteria in rumen;
 break down cellulose;
 cellulose is a carbohydrate/broken down to sugar;
 ruminant/animals cannot/have no enzyme to break down cellulose;
 cellulose forms cell wall of plant cell/large part of plant material;
 would be wasted/lost/ pass through gut, without bacteria;
 also form proteins;
 and synthesise vitamins;

[max 6]

[Total: 15]

- 9 (a) lower costs;
 no/reduced housing and fencing;
 less labour intensive;
 animals find their own food;
 no/little protection from thieves/predators;
 unconfined animals may damage crops;
 harder to control diet/breeding;
 harder to check health;
 may not achieve optimum production;

[max 5]

- (b) use of fencing;
 detail (e.g. use/number of paddocks, use of electric fence);
 grazing one area for specified time;
 allows recovery of grazed area;
 reduces overgrazing;
 reduces selective grazing;
 reduces chance of erosion;
 reduces parasite/example infestation;
 enables provision of fodder for dry season/preservation of grass as hay/silage;
 (accept *zero grazing* and description to max 4)

[max 5]

- (c) clearing unwanted bush; (reject *weeding* unless qualified)
 ploughing and reseedling;
 using improved/more nutritious species;
 and legumes;
 use of fertilisers;
 irrigation;
 liming;
 controlled burning;
 controlling grazing;

[max 5]

[Total: 15]

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- 10 (a) (i) detail of cost/availability; (accept unqualified once in (i), (ii) or (iii))
 detail of durability/strength (e.g. rotting/insect action,
 size/strength of animal;
 fire risk;
 ease of cleaning;
- (ii) detail of cost/availability;
 fire risk;
 insulation qualities;
 weather damage;
 harbouring pests/vermin;
- (iii) detail of cost/availability;
 ease of cleaning;
 detail related to removal of dung;
 earth may harbour disease/allow vermin to enter;
 durability; [max 9]
- (b) orientation;
 reason;
 direction of prevailing wind;
 reason;
 distance from farm house;
 reason;
 proximity to water supply;
 accessibility;
 OVP; [max 6]
- [Total: 15]
- 11 (a) (i) name of appropriate example (e.g. sweet potato, cassava, sugar cane);
detail of material used (e.g. length of stem);
detail of planting (e.g. depth/amount buried/angle); [3]
- (ii) all offspring identical;
 uniform crop quality;
 quicker than from seed;
 may be more reliable than from seed;
 diseased material may be propagated/disease may affect all as no variation;
 particularly virus disease;
 stock deteriorates over time; [max 4]

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- (b) fruit/seed dispersal;
 by wind;
 detail;
 example;
 animals;
 detail;
 example/further detail;
 explosive mechanism;
 detail;
 example;
 other (e.g. water/run-off);
 by vegetative material;
 example;
 how spread (e.g. ploughing/cultivations);

[max 8]

[Total: 15]

- 12 (a) (i) steep slopes;
 limit machine use;
 with shallow soils;
 rocky/stony;
 (may lead to) erosion of soil;
 influences drainage;
 (aspect affects) light;

[max 3]

- (ii) rainfall amount;
 rainfall seasonality;
 frequency of drought;
 temperature range;
 length of growing seasons;
 humidity/wind/extreme conditions;
 effect on plants/crops;
 examples;
 OVP;

[max 5]

- (b) amount of land available;
 costs/returns/capital;
 availability of equipment;
 availability of necessary skills/labour;
 availability of market/processing/export opportunity;
 proximity of markets;
 access to roads/transport;
 local tastes;
 soil conditions (e.g. pH) for arable crop;
 local parasite/pest status (may refer to arable or livestock);

[max 7]

[Total: 15]