

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

MARK SCHEME for the May/June 2009 question paper
for the guidance of teachers

5038/01

5038 AGRICULTURE

Paper 1, maximum raw mark 100

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Section A

- 1 (a) (i) P/stomach labelled on stomach;
A/ileum labelled on ileum;
W/colon labelled on colon; [3]
- (ii) stomach has only one chamber/ruminant stomach has 4 chambers; (accept *has only one stomach*, reject *animal is a pig/pigs are not ruminants*) [1]
- (b) vitamins/named e.g.;
minerals/named e.g.;
fibre;
water; [max 2]
- (c) $(3 + (0.25 \times 12)) \div 2$;
= 3; (award two for correct answer if working not shown) [2]
- (d) to increase weight/for meat production/given to breeding/pregnant animals/to working (draught) animals/for egg production; [1]

[Total: 9]

- 2 (a) (i) particles blown against rock;
abrasive action/wears away more particles; [2]
- (ii) water expands on freezing;
pressure cracks/breaks down rock further; [2]
- (iii) forms carbonic acid;
dissolves (minerals in) rock; [2]
- (b) (i) organic/plant/animal remains;
decomposed by bacteria/fungi/micro-organisms; [2]
- (ii) releases minerals; (reject *adds/increases/improves fertility*)
improves drainage/water retention;
improves aeration;
improves root penetration/growth/development;
(accept *improves soil structure/reduces erosion risk*) [max 2]

[Total: 10]

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- 3 (a) *order is* gene, heterozygous, allele, dominant;;;
4 correct = 3, 2 or 3 correct = 2, 1 correct = 1
- (b) (i) 100(%) [1]
- (ii) asexual reproduction;
no gametes/no fusion of gametes;
all progeny are clones of single parent; [max 2]
- (c) heterozygous; [1]

[Total: 7]

- 4 (a) (i) plants of similar type take same nutrients from soil/soil becomes depleted in those nutrients;
may be prone to similar pests/diseases/build up of pests and diseases in the soil;
rooting depths similar/soil may become compacted/develop pan;
no legume included (to return nitrogen);
(*plants of only one group* = 1 mark if no other mark given) [max 2]
- (ii) bed 2: correct sequence; (accept other crops if of appropriate type)
bed 3: correct sequence; (accept other crops if of appropriate type) [2]
- (b) legume adds nitrogen;
nitrogen needed for leaf development/vegetative growth; [2]

[Total: 6]

- 5 (a) (i) D; [1]
- (ii) Reasons for unsuitability of all three other positions, such as:
A sprays soil so insects missed/insects are on leaves;
B spray only falls on top of plants so many insects missed/spray may be blown away so plants don't receive enough;
C spray likely to be blown away/wasted/little falls on plants;
(mark points as above in relation to D but without mention of A, B or C) [3]
- (b) read instructions/use correct chemical/OWTTE;
mix in correct proportion/dilution;
thorough mixing/method;
apply at correct time/interval;
avoid windy conditions;
don't eat/smoke when spraying;
care to avoid contaminating other crops/water sources/livestock;
OVP;
(reject points related to storage) [max 3]

[Total: 7]

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- 6 (a) (i) correct labels, either as letters or names of parts, on the diagram;;;
- (ii) one valve open;
piston is rising;
- (b) advantage – reduced labour/quicker/large area covered/timely cultivation/more power/variety of implements/uses of power take-off/OVP; [max 1]
disadvantage – costs/availability of parts/servicing/fuel/skilled labour/not practical for small areas/difficult terrain/may lead to soil compaction erosion/OVP; [max 1]

[Total: 7]

- 7 (a) (i) one mark for each feature:
locked door – gives security/prevents unauthorised entry/protects from thieves;
low wall – protects from wind/rain/wall is strong/durable;
wire mesh – allows ventilation/light;
overhanging roof – protects from rain/provides shade; [4]
- (ii) name of animal – no mark
any three features appropriate to animal named,
e.g. feeder/feed trough/mineral lick;
drinker/water trough;
provision of light/warmth;
provision of perch/nestbox/bedding materials/
sleeping area;
OVP; [max 3]
- (b) advantage – cost/availability/insulating properties; [1]
disadvantage – difficult to clean/harbours pests/not long-lasting/vulnerable in strong winds/fire risk; [1]

[Total: 9]

[Total for Section A: 55]

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Section B

- 8 (a) (i) no mark
- (ii) temperature requirement (detail needed);
rainfall requirement (detail needed);
soil texture specified;
soil pH specified;
detail of topography if relevant (e.g. for tea plantation);
available markets/export opportunities/local processing plants;
local tastes; [6]
- (b) (i) name of appropriate pest; [1]
- (ii) part of plant attacked;
how pest damages plant (e.g. method of feeding);
other detail (e.g. vector of disease, destruction of
photosynthetic material, crop made unusable/unpalatable); [3]
- (c) use of appropriate chemical;
method of application;
rotation of crops;
resistant cultivar;
weed control;
time of planting;
use of predators;
use of sterile males;
field hygiene such as burning/removal of trash; [max 5]
- [Total: 15]**
- 9 (a) transfer of pollen from anther/stamen;
to stigma; [2]
- (b) suitable example of wind-pollinated plant;
suitable example of insect-pollinated plant;
(If examples not given, mark general points below.)
presence/absence of scent;
presence/absence of colour;
insect 'guides';
presence/absence of nectaries;
position of nectaries;
shape/size in relation to landing platform for insects;
position of stamens;
comparison of attachment of filament to anther;
reasons (related to previous two points);;
structure/shape of stigma;
position of stigma;
reasons (related to previous two points);;
(accept point related to pollen quantity/stickiness etc.) [max 8]

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- (c) pollen grain absorbs nutrients from stigma;
pollen tube develops;
enters ovule; (reject *ovum*)
through micropyle;
a nucleus/nuclei from the pollen grain fuse(s) with a nucleus in the ovule;
the ovary forms the fruit;
containing the ovules; (reject *ovum/ova*)
which form seeds once fertilised/when nuclei fuse;

[max 5]

[Total: 15]

- 10 (a) water loss from leaves is transpiration;
water diffuses out of spongy mesophyll cells;
forms water vapour in air spaces;
diffusion gradient;
between air in leaf and air outside leaf;
water vapour moves out of air space via stomata/pores;
mainly on underside of leaf;
controlled by guard cells;
which can open and close the stomata;

[max 6]

- (b) (i) higher temperature increases rate of evaporation;
higher concentration of water vapour in air spaces;
increases diffusion gradient from air inside leaf to air outside;
increases rate of transpiration/water loss from leaf;
accept converse

[max 3]

- (ii) higher humidity increases concentration of water vapour outside leaf;
reduces diffusion gradient;
reduces rate of transpiration/water loss from leaf;
accept converse

[3]

- (iii) greater wind strength/air movement;
moves water vapour away from outside leaf;
increases diffusion gradient;
increases rate of transpiration/water loss from leaf;
accept converse

[max 3]

[Total: 15]

- 11 (a) no mark but only award mark for (b) *type of parasite* if livestock is specified.

- (b) parasite appropriate to type of livestock in (a);

[1]

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- (c) mark as appropriate to parasite named in (b)
 e.g. internal/external;
 eggs;
 where laid;
 stages of lifecycle;; (nymphs, secondary hosts, etc.)
 metamorphosis;
 feeding;
 how animal is infested;
 part of animal infested;

[max 6]

- (d) how damage is caused;; (by feeding, irritation causing scratching, introduction of disease etc.)
 part of body damaged;
 effects on animal;; (anaemia, loss of production, wounds providing entry for micro-organisms)

[max 4]

- (e) mark as appropriate for parasite named in (b)
 e.g. use of appropriate chemical on animal;
 method of application;
 frequency of application;
 hygiene/cleaning of housing;
 cleaning feeders/drinkers regularly;
 clean pasture/rotational grazing;
 removal of secondary host/clearing bush;

[max 4]

[Total: 15]

- 12 (a)** drought;
 irregular rainfall;
 insufficient rainfall;
 extend the growing season;
 improve yield;
 improve crop quality;

[max 4]

- (b) source of water; ('dip' tank, dam, river/stream etc) × 3
 method of taking it to crop;; (pipes, furrows, use of pump, means of control) to max 2 × 3
each method to include source and up to two other points to max 8 for section

[max 8]

- (c) use of mulch;
 use of shading;
 grow drought resistant crops;
 timing of sowing/planting to take best advantage of rains;
 reduce soil cultivation;

[max 3]

[Total: 15]