

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

5038/01

5038 AGRICULTURE

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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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 [3]

(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;;; [3]

(ii) one valve open;
piston is rising; [2]

(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]