

**MARK SCHEME for the October/November 2015 series**

**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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Mark schemes may use these abbreviations:

; = separates marking points

/ = alternative and acceptable answers for the same marking point

( ) = words which are not essential to gain credit

— = underlined words must be present in answer to score a mark

e.c.f. = error carried forward

o.r.a. = or reverse argument

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### Section A

- 1 (a)** aspect;  
altitude/height above sea level;  
sun/shade;  
temperature/too cold;  
depth of soil/rocks;  
water run-off;  
soil erosion;  
acidic soil;  
weeds/named invasive species; [2]
- (b) (i)** cutting described;  
stumping described;  
burning;  
removal of stones/rocks; [3]
- (ii)** contour ploughing;  
terracing;  
planting wind breaks/trees;  
drainage pipes;  
channels/bunds  
minimum tillage; [2]
- (iii)** burning;  
ash high in potassium; [2]
- [Total: 9]**
- 2 (a)** S anywhere in tube from entrance to base of ear;  
C on the downward pointing tube below join of small and large intestine;  
M either end of stomach or at end of tube at anus; [3]
- (b) (i)** fluke; P in liver;  
tape worm; P in small intestine/stomach;  
round worms; P in the stomach/intestine; etc. [2]
- (ii)** thin/lack of growth (despite being fed) losing weight/loss of appetite/blood/worms/in  
faeces/faeces runny/different colour;  
not thriving; [1]
- (iii)** good hygiene/animal husbandry with example stated, e.g. rotate pig grazing area;  
preventative medicine, e.g. wormers; vaccination; [1]
- [Total: 7]**
- 3 (a)** D; [1]
- (b)** it feels sticky when wet;  
it retains nutrients; [2]

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- (c) flocculates/breaks up clay structure/raises pH/reduces acidity; [1]
- (d) (i) 3(.0); [1]
- (ii) (pH) 5.5; [1]
- (iii) crops at pH 6 on a sandy loam soil; [1]
- (iv) crops require more lime applied than grass; [1]
- (e) animal dung deposited; dung is/breaks down to be acidic; OR  
removal of compounds by grazing of grass; no replacement on death; [2]

**[Total: 10]**

- 4 (a) less competition;  
gives the remaining plants more space;  
so better root growth;  
for nutrients/minerals;  
for water;  
light in soil;  
bigger plants or fruit/improved growth rate;  
less chance of disease/pest spread;  
easier to control pests; [2]
- (b) *lines between:*  
fertiliser = causes excessive...  
herbicide = kills some plants...  
pesticide = builds up in food... [2]
- (c) compost/use dung/kraal manure;  
use mechanical method, e.g. hoe/hand picking/mulching;  
use cultural methods, e.g. rotation of crops/biological control/removal of crop residue; [3]

**[Total: 7]**

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- 5 (a) C; [1]
- (b) (i) S; [1]
- (ii) Y; [1]
- (iii) U; V; W; S; or Z; [1]
- (c) (i) caterpillar / leaf cutter / locust / leaf miner / valid example; [1]
- (ii) less leaf for photosynthesis;  
excess water loss causing wilting;  
site for disease / infection; [2]
- [Total: 7]**
- 6 (a) (i) (tissue) growth / repair;  
carbohydrate / fat; [2]
- (ii) iron for blood;  
calcium for teeth / bones;  
*Accept requirement and relevant condition, e.g. calcium for milk fever.* [1]
- (b) (i) aid food movement in gut;  
reduce / prevent constipation; [1]
- (ii) grinding;  
in gizzard / proventriculus / eq.; [2]
- (c) (i) 30; [1]
- (ii) 46; [1]
- (iii) as stocking rate increases gain in body mass decreases;  
because less food is eaten by individuals; [2]
- (iv) no relationship / mortality appears random; [1]
- [Total: 11]**

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7 (a) B; [2]  
D;

(b) cross F<sub>1</sub> to produce green oval; [3]  
select green oval and (back)cross;  
as they are double recessive / all offspring have green, oval fruit;

(c) (i) use genetic engineering / modification; [2]  
detail, e.g. insert gene / length of chromosome for toxin into tomato;

(ii) toxin might get into the food chain; [1]  
humans who eat tomatoes have side effects;  
may kill beneficial insects;

**[Total: 8]**

8 (a) (i) C; [1]

(ii) rye grass / timothy grass; [1]  
*Accept any appropriate grass.*

(iii) B; [1]

(b) (i) animals might fall in; [2]  
ditches take up space for grazing;  
ditches get eroded / moving water causes soil erosion;  
water might contain diseases / cause water-related disease;  
cost of maintenance;

(ii) loose sand would enter holes and block pipe core in A; [1]  
larger pipe in sand takes water away more quickly;  
loam soil takes longer to drain so needs holes;  
smaller pipe is better for loam soil as it takes longer to drain;

**[Total: 6]**

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- 9 (a) (i) description of an insert/connector; [2]  
description of fixing hose clip/solder;
- (ii) tank; height increases pressure; [2]  
storage tank; for use in shortage; more/better pump(s); better pressure/constant supply;  
cistern in building;  
with tap/ball valve/trough for control of supply;  
collect water from roof; free; more water;  
purification; for clean water;  
bore-hole; to obtain underground water;  
bury pipes; to avoid damage;  
give each building its own pipe; if one breaks, the other works/security of supply;  
bigger pipe; more water;
- (b) B; [1]

**[Total: 5]**

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### Section B

- 10 (a)** movement of food / products of photosynthesis;  
sugars;  
in phloem;  
from where made to where need;  
to make starch / cellulose / tuber / for respiration / for storage;  
method: mass flow / active transport;  
detail: companion cells / energy requirement; [4]
- (b)** *named pest:* e.g. aphid;  
*method:* spray plant with systemic insecticide;  
absorbed into plant;  
to all parts of the plant;  
contact with pest; [4]
- (c)** *advantages:* effective / reliable;  
can be specific;  
do not need to cover the whole plant;  
quick;  
can be broad spectrum;
- disadvantages:* kill beneficial animals, e.g. slug bait killing vertebrates;  
environmental implications, e.g. persist in soil;  
enter waterways;  
enter food chain;  
bioaccumulation;  
require training to use;  
protective clothing needed;  
specialist equipment needed;  
require safe storage / disposal;
- either:* costs qualified, e.g. chemicals cheap, equipment expensive; [7]

**[Total: 15]**



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- 11 (a) *diagram to show:*  
vagina;  
vulva;  
cervix;  
oviduct funnel;

uterus / womb;  
oviduct;  
ovary; (max. 6)

*Max. of three marks for structures with correct position, shape and scale.* [9]

- (b) *advantages:*  
done at correct part of cycle / more likely to take;  
no need for male on farm;  
cost qualified;  
safer for female;  
allows use of other breeds / quality males;  
range of sires possible;  
farmer knows when birth likely;  
faster genetic improvement;  
increased production;  
many pregnancies possible from a single ejaculate;  
male can sire after death;  
reduced disease transfer;

[6]

**[Total: 15]**

- 12 (a) transfer of pollen;  
from stamens / anthers;  
to stigma / style;

*Allow from male to female for one mark only.* [3]

- (b) *insect flowers:* brightly coloured petals;  
scent;  
nectar;  
nectar guides;  
sticky pollen;  
large pollen; (max. 4)

*wind flowers:* large quantities of pollen;  
light pollen;  
anthers / stigmas outside flower / hanging anthers;  
feathery stigmas;  
small, dull green flowers;  
tall;  
flowers at top of canopy; o.r.a. (max. 4) [7]

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- (c) plant cutting;  
at node/bud;  
use of rooting hormone/powder;  
half in soil;  
cut stem (at angle);  
at least 30 cm apart;  
ridges of soil/compost;  
rows 75–100 cm apart;  
plant during rainy season/irrigate/water;  
drainage/free-draining/gritty compost;  
(organic) fertiliser;
- [5]

**[Total: 15]**

- 13 (a)** legumes have Rhizobium;  
bacteria;  
fix nitrogen;  
from the atmosphere;  
in root nodules;  
nitrogen released on decomposition;  
decay provides humus for structure;  
can use as green manure;  
reduce use of artificial fertiliser;  
crop rotations;
- [4]

- (b) plant decays;  
bacteria;  
plant used by decomposers;  
who decay in turn;  
protein to ammonium compounds;  
ammonification;  
to ammonium compounds;  
during nitrification;  
to nitrites; by nitrifying bacteria; named;  
to nitrates; by nitrifying bacteria; named;
- [7]

- (c) leached by rain/excess watering;  
as nitrates are soluble;  
especially in porous/sandy soils;  
prevent by mulching; description;  
planting cover crop;  
soil testing; not adding excess nitrogen compounds; detail, e.g. field mapping;
- [4]

**[Total: 15]**

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14 (a) *topography:* surroundings, e.g. flooding;  
 aspect;  
*exposure:* sheltered from wind;  
*soil:* hard for foundations;  
 wet or dry;  
*access:* to road / transport / communication;  
 markets;  
*proximity to other buildings:* e.g. smell / noise;

availability of water;  
 security;  
 proximity to existing farm for ease of management;  
 pollution risk (assessment);  
 likelihood of obtaining planning permission;  
 cost qualified, e.g. amount of ground preparation / need for (additional) foundations; [6]

(b) *size:* height;  
 area;  
*construction:* roof, overhanging / gutter;  
 material;  
*walls:* material appropriate to animal;  
*windows:* style, wire / glass ;  
 ventilation, wire or opening and closing;  
*floor:* material;  
*door:* appropriate for animal;  
*feeding:* trough / hay racks / zero grazing system;  
*water supply:* trough with ball valve / drinkers from pipes;

*Award marks if appropriate for selected animal.*  
*Award up to three marks for justification of choices.* [9]

[Total: 15]