CAMBRIDGE
International Education

Cambridge O Level

AGRICULTURE **5038/12**

Paper 1 Theory **October/November 2025**

MARK SCHEME

Maximum Mark: 100

Published

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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<u>'List rule' guidance</u> For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6	<u>Calculation specific guidance</u> Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'. For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values. For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme. Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.
7	<u>Guidance for chemical equations</u> Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme. State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standard isation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
✓	correct point or mark awarded
✗	incorrect point or mark not awarded
BOD	benefit of the doubt given
ECF	error carried forward applied
SEEN	point has been noted, but no credit has been given or blank page seen
TV	response is too vague or there is insufficient detail in response
●	incomplete answer
∿∿∿	linked consideration of points
⌇	linked consideration of points

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Annotation	Meaning
REP	repetition in response
^	information missing or insufficient for credit
CON	contradiction in response, mark not awarded

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Question	Answer	Marks
1(a)(i)	Three lines labelled correctly for two marks. Two lines labelled correctly for one mark. top unlabelled line is topsoil middle unlabelled line is subsoil bottom unlabelled line is underlying materials	**2**
1(a)(ii)	provides nutrients for crops; provides (nutrients for) soil flora and fauna / improves soil health; binds soil particles / aggregates soils; improves water holding; reduces erosion; improves crumb structure / soil structure; improves aeration;	**2**
1(a)(iii)	grow green manures / cover crops; apply manure; compost / organic fertilisers; (plough in) crop residues; leave fallow; include livestock as part of rotation; crop rotation / grow legumes;	**2**
1(b)	less organic matter (with increasing soil depth); soil density increases (with increasing soil depth); fewer organisms to feed on / less food (with increasing soil depth); colder temperature (with increasing soil depth); less oxygen (with increasing soil depth); Accept reverse arguments.	**2**
1(c)	clay compared to sandy has: higher water-holding capacity than sand; higher nutrient content than sand; slower rate of drainage; Accept reverse arguments.	**3**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>One mark for year 3 completed correctly:
<table>
<tr><td></td><td>(year 3)</td></tr>
<tr><td>(field 1)</td><td>sweet potato</td></tr>
<tr><td>(field 2)</td><td>bean</td></tr>
<tr><td>(field 3)</td><td>maize</td></tr>
</table></td><td>1</td></tr>
<tr><td>2(a)(ii)</td><td>One mark for a benefit. Maximum two marks for benefits alone.
Additional mark available for relevant explanation of benefit, for example:

(crop rotation) can increase soil fertility / fixing nitrogen;
so, increases crop yield / provides nutrients, e.g. legumes;

(crop rotation) breaks the life cycle of pests and diseases;
so, less pesticides used / fewer pests;

(crop rotation) can reduce the amount of weeds;
so, less competition for water and nutrients;

(crop rotation) improves soil structure;
so, increases crop’s root growth / accessibility of water or nutrients;

(crop rotation) avoids depletion of nutrient(s);
because different crops uptake different quantities of nutrients / different nutrients / nutrients from different depths;

(crop rotation) spreads risks;
not all fields susceptible to pest / disease;

Credit other relevant explanations.</td><td>4</td></tr>
</table>

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Question	Answer	Marks
2(b)	improves soil fertility through adding manure; reduces the need for purchased / inorganic fertilisers / can use manure produced on farm; economic productivity more diverse / income spread through year / improved cash flow; use own crop for animal feed / need to buy less feed; grazing animals can reduce levels of weeds;	**2**

Question	Answer	Marks
3(a)(i)	transpiration / evaporation / diffusion / evapotranspiration;	**1**
3(a)(ii)	for photosynthesis / carbohydrate synthesis; for cooling; to maintain turgidity / avoid wilting; to produce fruit; absorption of nutrients from the soil; to facilitate chemical reactions; translocation / transport of sugars / metabolites / minerals / nutrients;	**2**
3(b)(i)	movement of water molecules; from a higher water concentration to lower water concentration / from a less concentrated solution to a more concentrated solution; through a semi-permeable membrane;	**2**
3(b)(ii)	(the amount of water in the root) decreases;	**1**

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Question	Answer	Marks
4(a)(i)	dry; cool / cold / low temperature; well-ventilated; Accept other suitable suggestions.	2
4(a)(ii)	metal will last longer than thatch / metal is more durable; metal stronger so more resistant to damage; metal will not harbour pests / disease; metal is non-flammable / avoids fire risk of thatch; animals / birds / termites cause less damage to metal; metal is more resistant to (extreme) weather conditions;	3
4(b)(i)	to prolong storage of the crop / to reduce pest attack during storage / to preserve the quality of the crop;	1
4(b)(ii)	Two marks for fully correct answer to two decimal places. One mark for 47 (square metres) in working. total surface area = 47 square metres; (47 / 20 = 2.35, 2.35 × 1.5) = 3.53 (litres);	2

Question	Answer	Marks
5(a)	A: (petals are) brightly coloured to attract pollinators; B: (anthers) dust pollen onto pollinators; C: (stigma is) sticky to collect pollen grains; Accept other suitable descriptions.	3
5(b)	D: ovule; E: ovary;	2

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Question	Answer	Marks
6(a)(i)	mouth: intake of food; teeth: chews / grinds food; salivary gland: produces saliva to mix with food; oesophagus: contracts / peristalsis to push food to stomach; stomach: churns food / contains acid / mixes with enzymes / stores food; small intestine: food / nutrients absorbed; caecum: temporary store of material / may contain bacteria / releases fluids / absorbs fluids or salts; liver: produces bile; gall bladder: stores bile; pancreas: releases pancreatic juice / releases enzymes; large intestine: transports waste / absorbs water; rectum: storage of faeces / waste just before release; anus: egestion / removal of waste; Allow other appropriate roles for other parts. Credit animal specific points.	**4**
6(a)(ii)	Three correct for two marks. Two correct for one mark. A: small intestine; B: caecum; C: rectum;	**2**
6(b)(i)	Award 1 mark for each of these aspects: correct label on both axes; consistent scale; all bar heights correct given consistent scale;	**3**
6(b)(ii)	low light levels / chickens moulting / low seasonal temperatures; Allow other suitable suggestions.	**1**
6(b)(iii)	calcium / phosphorus / protein / energy / amino acids / named amino acids / carbohydrate;	**1**
6(b)(iv)	264 (eggs);	**1**

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Question	Answer	Marks
6(b)(v)	increased well-being of chickens / exercise; more similar to natural environment; varied diet / more nutrients; stronger eggs due to foraging;	**2**

Question	Answer	Marks
7(a)(i)	age of animal, e.g. young animals have a lower water intake than mature animals; size of animal, e.g. larger animals consume more water; health of animal, e.g. sick animals often consume more water than healthy animals; temperature / different environmental conditions, e.g. more water is consumed in warmer temperatures; different breeds may require more water; animals have different levels of activity, e.g. some doing farm work / ploughing; Accept other suitable suggestions.	**2**
7(a)(ii)	dairy cow is producing milk; dairy cow may be pregnant / dairy cow needs to support calf during pregnancy; the ration provided is different / requires differing water intake for digestion;	**2**
7(b)	reduced risk of disease transmission / reduce risk of parasites in water / clean water improves digestion / nutrient absorption;	**1**

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Question	Answer	Marks
8(a)	One mark for each correct label. penis: anywhere in line with or below muscle; epididymis: shape above / around part of the testis labelled anywhere before leaving the testis; scrotum: sac structure anywhere up to the narrowing point;	**3**
8(b)	staff need to be trained to conduct artificial insemination; need to observe when cow is in heat; need to catch / restrain the cow; need to inseminate at a fertile time; may need to inseminate more than once; risk of (internal) injury to the cow from equipment / badly used equipment; equipment must be sterilised; takes up farmer's time; cost, e.g. of quality semen / can be much more expensive; pregnancy rate can be lower than natural service;	**2**
8(c)	vaccination; (veterinary) inspections / testing (for STI); treatment (prophylactic or responsive); isolate infected stock / do not allow infected animals to breed; possible culling of infected animals; closed herd / use only one bull; ensure farm security / maintain fences well / keep males and females separate; use of virgin bull;	**2**

Question	Answer	Marks
9(a)(i)	the set of observable characteristics / visual appearance;	**1**
9(a)(ii)	identifies a desired trait; the phenotype allows visual selection of the desired characteristic / based on their appearance; farmer can then separate animals out / plant breeder can separate / dispose of plants lacking the desired observable characteristic;	**2**

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Question	Answer	Marks
9(b)	<table><tr><td></td><td>G</td><td>g</td></tr><tr><td>G</td><td>GG</td><td>Gg</td></tr><tr><td>g</td><td>Gg</td><td>gg</td></tr></table> (parents) Gg × Gg; punnet square / diagram workings; (ratio) 3:1;	**3**
9(c)	chickens quicker to market / quicker to size / more chickens able to be farmed / increased output / reduced production time;	**1**

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Question	Answer	Marks
10(a)	ground preparation / levelling / remove stones where fence is located; dig post hole; height of fence / posts suitable for large livestock; posts spaced appropriately for large animal; concrete around post base / compact earth around post base; use of straining posts at either end of fence; use of struts (with straining post); use of spacers between posts; use of post knocker; use of plumb line / spirit level / laser level to see line of fence; use of high tensile wire / string / mesh for livestock / barbed wire; use of multiple strands of wire; use of staples for mesh; use of straining tool; use of nails / rails / hammer / other tools; gate / hurdle; fence treatment, e.g. for termites;	**5**
10(b)	animals can be kept in one place; animals can be easily collected; (sick) animals can be isolated / disease control; specific (production) ration can be fed; different breeds / ages of animal can be kept separate; unplanned mating is avoided / improved breeding control; prevents theft; keeps livestock safe / away from predators; prevents animals becoming lost / running away; easier to manage pasture improvements, e.g. reseeding; prevents overgrazing; prevents soil erosion / soil degradation / allows vegetation to recover; fencing limits livestock movement reducing wasted energy;	**4**

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Question	Answer	Marks
10(c)	irrigation of pastures (to encourage new growth); sowing of mixed herbage / palatable species; reseeding; grow bushes (for browsing); application of fertilisers for increased herbage growth; add manure / compost / organic matter; mulching; weeding / herbicide use; pest control / pesticide use; disease control; liming to correct pH / neutralise soil / reduce acidity; introduction of nitrogen-fixing species / legumes; scarification of grassland (to encourage new growth); mole drainage (to aerate soil / to break soil pan); topping (to encourage growth of new grass); prevent soil erosion, e.g. planting windbreak, do not leave soil bare; zero grazing / cut and carry;	**6**

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Question	Answer	Marks
11(a)	One mark available for naming a weed. Five further marks are available for descriptions of harmful weed effects. named weed; compete with the crop plant for light; compete with the crop plant for minerals / nutrients; compete with the crop plant for water; compete with the crop plant for space; harbour diseases; reduce the efficiency of farm implements / harvesting process; harbour pests, e.g. birds / rodents; reduce overall fertility of the soil; can reduce land value; can cause health issues / poison farm animals; can injure workers / farmers, e.g. with thorns; reduce quality / contaminate (harvested) crop;	**6**

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Question	Answer	Marks
11(b)	One mark for a way in each area. A further mark for a relevant explanation, for example: cultural: crop rotation; breaks life cycle of weed; under sowing / interplanting of crops; reduces bare soil for weeds; crop spacing; increasing density of crop / reduces weeds germinating; use of black membranes / mulches; to smother weeds / stop them germinating; hand pulling / weeding; remove weeds (from the crop); remove weed roots / tap root / rhizome; so that the weed does not regrow / spread; mechanical: using weeder machines / ploughing / hoeing; cut / bury weeds / kill weeds; use of livestock; to eat / browse weeds; chemical: herbicide; poison / kill weeds; selective; target weeds / leave crop unaffected;	**6**

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Question	Answer	Marks
11(b)	broad spectrum; kill a wide range of weeds; spot treatment / weed wipe; kill particular weeds in small areas; pre-emergent; stop weeds emerging (in a crop);	
11(c)	select representative sample plots of land; count the weeds in the plots / use a transect; control weeds on one plot / plots by the usual / a selected method / selected methods; apply test weed control method to another plot; wait for a period of time; record how many weeds have died after the selected method; compare outcomes; most effective method is that which controls the highest percentage / number of weeds / equivalent; relevant reference to controlling variables;	**3**

Question	Answer	Marks
12(a)	production by splitting cells / mitosis; one parent / one plant required; cloning / clones produced; no genetic variation / all offspring identical; no (fusion of) gametes;	**3**
12(b)	creates disease entry points by cutting; cuttings need constant water to root; controlled environment / weed free; specific skill is required to propagate; clones / offspring all affected by the same disease; disease can spread through the crop quickly; (a lot of) labour is required in producing cuttings on a field scale;	**5**

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Question	Answer	Marks
12(c)	helps farmers to plan the planting of crops / crop rotations; ensures efficient use of land; to manage crop rotation / to know which crop to plant next; to be aware of pests / diseases (in fields); to provide optimum time of fertiliser / manure application; to manage pesticide application; to record yields; to work out / show profitability / identify most profitable crop; to demonstrate cash flow; to keep track of input costs;	**7**

Question	Answer	Marks
13(a)	(gradual) introduction of adult food / solid food; withdrawal / reduction in amount of mother's milk; no longer reliant on mother for feeding / stop suckling;	**2**
13(b)	a female animal introduced to a male; the oocyte / egg is released from ovary; the egg travels down oviduct; mating / intercourse occurs; sperm (from male) enters the vagina / cervix; sperm swims with motile tail; sperm moves to egg; takes place in the oviduct; (one) sperm enters the egg; egg becomes fertilised; forms zygote;	**6**

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Question	Answer	Marks
13(c)	Maximum of two marks for specific characteristics to improve alone. choose / select parents for (best) quality / quantity of meat; select for a specific characteristic, e.g. lean, low fat, slow growing, tender; observing animal phenotype to assess meat quality; condition scoring / feel the animal to assess fat content / depth of fat; breed parents with desired characteristics together; choose offspring with desired meat characteristics (to produce the next generation); separate these offspring out from herd; breeding these offspring together; select (again) from this cross; repeat the process / keep breeding these offspring over several generations; continue until all offspring show desired meat quality characteristics;	**7**

Question	Answer	Marks
14(a)	plants grown in water; in a nutrient solution; example of nutrients added, e.g. nitrate; no soil / solid growing medium;	**3**

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Question	Answer	Marks
14(b)	One mark for a suitable factor. A maximum of three marks for factors. An additional mark is for explaining the way the factor may limit the use of agricultural land, for example: topographical: sloping land; might be affected by rainfall and hence erosion / may not be suitable for some livestock buildings / slopes may limit what can be grown due to accessibility of machinery; aspect; light levels can affect growing crop / levels of photosynthesis; climatic: temperature; low temperatures / frost can kill / reduce growth rate of (young) crops / some breeds may not cope with temperature extremes / high temperature can slow plant growth / denature enzymes / make plant wilt / scorch plant; wind; causes damage to growing crops, e.g. drying out / stems breaking; rainfall; excessive rainfall can cause waterlogging; too little rain causes drought and low crop growth; hail; damages crop, e.g. leaves / stems; environmental: soil type; sandy soils require more fertiliser than silt / clay soils; clay soil is less aerated / drains not as well / is harder to work; soil water; some crops not very drought resistant;	**6**

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Question	Answer	Marks
14(b)	soil pH; affects availability of nutrients; pollution; e.g. acid rain or salt salination issues; Credit suitable reference to animal examples.	
14(c)	reduction in pesticide use; increased pollinators / wildlife; improved soil structure; reduced synthetic fertilisers use; reduced soil contamination; less energy used, e.g. in fertiliser production / reduced carbon footprint; organic soils store more carbon / contain more organic matter; less pollution of groundwater; increased biodiversity; less (not prophylactic) antibiotics used;	**6**

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