

**MARK SCHEME for the May/June 2010 question paper
for the guidance of teachers**

5038 AGRICULTURE

5038/01

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 must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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Section A

- 1 (a) no mark for stating the tool but required for marks to be given
A (hoe) – digging; breaking up clods; weeding;
B (spade) – digging; overturns soil; buries weeds; exposes insects/eggs/larvae;
C (fork) – digging hard ground; breaks up clods; improves aeration/drainage;
D (rake) – levelling soil; creating fine tilth; removing debris;
for tool chosen [max 2]
- (b) (i) clean after use; dry; exclude air/water (A rust caused by air and water); by applying oil;
appropriate storage; [max 3]
- (ii) rot/fungal attack/insect damage/specific example; [1]
- (iii) clean; store dry; insect-free storage; appropriate wood treatment; as appropriate to (b)(ii)
[max 2]
- [Total: 8]**
- 2 (a) (i) and (ii) any ruminant kept as livestock, any non ruminant kept as livestock; both correct
[1]
- (b) (i) no mark for animal stated but required for marks in (b)(i) and (ii)
appropriate main purpose; [1]
- (ii) appropriate by-product; [1]
- (c) iron – manufacture of haemoglobin; needed in r.b.c.; prevents anaemia; [max 2]
protein – for growth; repair of tissues; named production; [max 2]
water – needed in cells/main constituent of cells; makes up large part of blood; saliva/
digestive juices; excretion; temperature control; production of eggs/milk; [max 2]
- [Total: 9]**
- 3 (a) (i) amount of seed sown over a given area/kg per hectare; [1]
- (ii) too dry/trees take moisture/trees prevent rain reaching ground; [1]
- (iii) trees take/compete for nutrients; for light; for water; [max 2]
- (b) (i) wastes seed/wastes money/no, small return on cost of seed; [1]
- (ii) acts as windbreak/prevents erosion/visual impact; [1]
- [Total: 6]**

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- 4 (a) (i) polled – dominant; [1]
- (ii) suitable alleles e.g. P = polled, p = horned;
genotype of bull = PP (or as appropriate to alleles used);
genotype of cows = pp (or as appropriate to alleles used);
genotype of calves = Pp (or as appropriate to alleles used); [4]
- (b) (i) cross Pp × Pp (or as appropriate to alleles used); 25(%); [2]
- (ii) less chance of danger/injury to farmer/workers/less chance of injury/damage to hides of other cattle/OVP; [1]
- [Total: 8]**
- 5 (a) $(0.3 \times 10\,000) = 3000$ (kg per ha); [1]
- (b) increases/raises (pH); [1]
- (c) increases/improves, uptake/availability of minerals/allows greater range of crops to be grown; [1]
- (d) flocculation/clumping of clay particles; improves drainage/aeration; [2]
- [Total: 5]**
- 6 (a) feeding/egg-laying leaves hole in leaf surface; disease organisms can enter; adult may introduce/act as vector of disease to healthy plant; after feeding on diseased plant; [max 2]
- (b) reduces leaf area/green tissue; photosynthesis reduced; less food made; [3]
- (c) (i) feeds on the pest; [1]
- (ii) systemic enters sap; kills larvae and feeding adults; contact kills only insects it touches; doesn't affect larvae inside leaf; some adults escape if some leaf surfaces are missed; [max 3]
- (iii) insecticide may be toxic/can't be used within certain interval of harvest/can't be used in organic production;
(reject refs. to harm to beneficial insects – incorrect context) [1]
- (iv) crop rotation; fallow interval; digging/ploughing before next crop (to expose larvae); early planting; appropriate field hygiene (must be specified); weed control; [max 2]
- [Total: 12]**

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- 7 (a) (i) **B, C, D, A;** [1]
- (ii) outlet/exhaust valve; [1]
- (iii) produces spark/ignites (air-fuel) mixture; [1]
- (b) (i) large area cultivated more easily/quickly; lower labour costs; timely harvest easier; [max 2]
- (ii) small area of land; high capital cost/cost of fuel; availability of parts/fuel; availability of skilled labour; concerns re. soil damage; [max 2]

[Total: 7]

[Total for Section A = 55]

Section B

- 8 (a) pasture divided into camps/paddocks; use of fencing; animals graze first camp; specified time; repeated for other camps; area grazed recovers; one may be left ungrazed; used for dry season/winter forage; [max 5]
- (b) higher stocking rate possible; grasses can be improved; grasses have time to recover; reduces selective grazing; reduces overgrazing; reduces erosion; reduces weed invasion; easier to control stock/mating/separate stock; breaks parasite life cycles; allows conservation of forage; better pasture increases yields; [max 6]
- (c) named method; details of method;;
at least 2 methods to be named with max. 3 for any method or three methods named with detail mark for any [max 4]

[Total: 15]

- 9 (a) (i) same nutrient demands year on year; nutrients are exhausted; pests/diseases build up in soil; life cycle of pests not broken; plants more prone to disease as they become weaker; [max 3]
- (ii) different crops are grown in succession on the land; have different nutrient requirements; different rooting depths; use nutrients at different soil levels; hosts to different pests and diseases; rotation breaks life cycle/prevents build up; [max 5]
- (b) annotated diagram to show: nitrogen in atmosphere; living organisms; waste products; bacterial action in; decomposition; ammonification; nitrification; nitrites to nitrates; denitrification; nitrogen fixation; in legumes; in soil; lightning; [max 7]

[Total: 15]

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10 (a) loss of water vapour; from stomata/leaves/aerial parts of plant; to atmosphere; [3]

(b) (i) increased temperature increases rate of evaporation; into air spaces in leaf; increases water potential gradient/concentration gradient; between inside and outside of leaf; increases rate of transpiration;

(ii) high humidity means large amount of water vapour in atmosphere; decreases water potential gradient/concentration gradient; decreases rate of transpiration;

(iii) wind/air movement moves water vapour away from leaf surface; increases water potential gradient/concentration gradient; increases rate of transpiration; [max 8]

(c) allows flow of water through plant; from soil; through roots, stem, leaves; by xylem (vessels); carrying salts; cooling effect; [max 4]

[Total: 15]

11 (a) (i) protects from adverse weather; wind; extremes of temperature; animals less vulnerable to disease in good conditions; allows ventilation; discourages respiratory problems; OVP;

(ii) water needed for all body processes/animals cannot carry out body processes properly without sufficient water; examples;; may contain microorganisms; parasites; breeding ground for vectors of disease; example;

(iii) insects may be vectors of disease; example; may carry disease-causing organisms to food/water; irritation to stock; rubbing/scratching causes wounds; allows entry of disease; parasitic insects;

(iv) old stock may carry disease; young stock more vulnerable to disease; may be injured by larger animals; easier to ensure they receive correct rations;

1 mark for each of **(a)(i) – (a)(iv)** with max 4 for any section to [max 12]

(b) unproductive; lack of fertility; poor quality product(s); poor breeding quality; returns less than inputs; OVP; [max 3]

[Total: 15]

12 (a) (i) variety of a type of crop plant; [1]

(ii) yield quantity; yield quality; ('yield' = 1 mark)
appeal to customers/markets; length of growing season; resistance to weather; rain; wind; temperature; related to local conditions; resistance to pest/disease attack; [max 7]

(b) diary to record sowing date; harvesting date; inputs; named examples;; costs; yield; returns; OVP; [max 7]

[Total: 15]