

**MARK SCHEME for the October/November 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.

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Section A

- 1 (a) (i) photosynthesis; [1]
- (ii) water; chlorophyll; sunlight/light energy (*reject sun, reject CO₂ – given in question*) [max 2]
- (iii) respiration; [1]
- (b) (i) phloem labelled with P (or *phloem*); [1]
- (ii) for respiration/energy/to manufacture protein/oils/for storage in roots/vegetative organs/seeds/OVP; (*reject growth unqualified*) [1]
- [Total: 6]**
- 2 (a) (i) kills only certain types of weed; [1]
- (ii) weeds reduce quality of pasture; compete with grasses; may be poisonous; may taint products; [max 2]
- (iii) herbicide on grass passes through animal in faeces; [1]
- (b) (i) spray may run/soak down trousers and enter boots/contact feet/skin; [1]
- (ii) blown away from target crop/to other crops; which may be damaged; blown into water sources; blown onto operator; toxic; [max 3]
- (iii) run off; into water; pollution; washed off plants; [max 2]
- either (b)(ii) or (b)(iii) wastes spray; wastes money
- [Total: 10]**
- 3 (a) prevents attack by insects/example; prevents fungal attack/rotting; [2]
- (b) ensures post is vertical/upright/allows post to be set vertically; (*reject straight unqualified*) [1]
- (c) (i) line/string from corner/end to next corner/end; measure /mark position of posts along this line; [2]
- (ii) top wire first (*accept A or B*); holds posts in position; [2]
- [Total: 7]**

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- 4 (a) (i) 125 (cm³); [1]
(ii) 75%; [1]
- (b) (i) air/microorganisms/soil fauna/e.g.; (*accept* mineral salts/humus/dead organic material) [1]
(ii) oxygen/air absent/not available; needed for respiration; in roots; [max 2]
- [Total: 5]**
- 5 (a) (i) falls/decreases; [1]
(ii) insufficient food; poor quality food; [2]
- (b) weight gained faster; more weight gained; less weight loss/no weight loss in dry season; [max 2]
- (c) can keep more animals (so greater returns); higher/faster weight gain (so greater returns); [max 2]
- (d) overgrazing; damage to pasture grasses; so pasture deteriorates; soil left bare; weeds colonise; erosion risk; animals have insufficient food; [max 3]
- [Total: 10]**
- 6 (a) (60 000 ÷ 3 000) = 20kg; [1]
- (b) (i) (50 000 ÷ 60 000) × 100; = 83(%); [2]
(ii) seed not viable; eaten by birds/animals/insects; low temperature may affect germination rate; dry conditions may affect germination rate; may have germinated but not emerged (due to soil capping or other); [max 2]
- (c) (i) weeds suppressed/discourages erosion/maximises/increases land use/returns; (*accept* N₂ fixation **only** in relation to **future** crops) [1]
(ii) difficulties in harvesting/difficulties in cultivation/difficulties in applying treatments/difficulties in weeding/tall crop/maize may shade shorter crop; [1]
- [Total: 7]**

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- 7 (a) drain wet ground; destroy snails; avoid grazing on contaminated pasture; (accept refs. to use of anthelmintics) [max 2]
- (b) (i) medicines/vet. costs; vaccines; feed supplements; labour; OVP; (reject capital costs such as housing) [max 2]
- (ii) total returns – total costs; profit if positive/loss if negative OWTTE; [2]
- (c) (i) yield; fertility; health; OVP; [max 2]
- (ii) use semen from high quality male; no need to keep bull so cheaper; no need to keep bull so safer; reduces chances of sexually transmitted disease; OVP; [max 2]

[Total: 10]

[Total for Section A = 55]

Section B

- 8 (a) collection of rainwater; from roofs; use of guttering; barrels; dam across water course; creates reservoir (AW); drainage from land; into reservoir/pond; lining earth reservoirs with plastic/rubber sheet; other details;; [max 6]
- (b) (i) method of irrigation (sprinkler/drip/furrow etc.); source of water; details of delivery to crop;; [max 3]
- (ii) increases range of crops grown; crops grown during dry season; extends growing season; can increase income; crop growth maintained during drought; improves yield; improves quality; capital costs; water costs; salinisation; erosion; [max 6]

[Total: 15]

- 9 (a) 4 chambers correctly named; rumen receives swallowed food; largest chamber; storage; bacterial action/microorganisms; on cellulose; vitamin synthesis; reticulum – large and small particles separated; churning of food to soften; regurgitation (of cud) to mouth; omasum receives chewed cud; contains folds/layers; water removed; passes food to abomasum; enzyme digestion begins; [max 10]
- (b) as appropriate to livestock named – feeding immediately after birth; ref. to colostrum; food after weaning/specific stages;; quantities; frequency; supplements; water; [max 5]

[Total: 15]

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- 10 (a) (i) name of crop [no mark]
- (ii) pH of soil; texture; drainage; fertility/nutrient status; rainfall – seasonal/amount; temperature range; frosts; wind/cyclone resistance; other detail (e.g. altitude/topographical); [max 6]

- (b) (i) name of insect – if not named no mark for (b)(ii), mark general points in (b)(iii) [no mark]
- (ii) part of plant affected; how damage is caused (e.g. method of feeding of pest); effects; visible symptoms; [max 3]
- (iii) as appropriate to pest named – chemical (*reject* pesticide); details of application (timing, method); weed control; rotation; use of predators; field hygiene examples; early planting; [max 6]

[Total: 15]

- 11 (a) first/primary cultivation; of previously cultivated land/no tree roots/rocks; breaks up soil; turns soil; buries weeds/crop debris/manure; [max 3]

- (b) keep clean; dry storage; oil/grease; to prevent rust; tighten bolts/screws; lubricate moving parts; sharpen/straighten; replace worn parts; check for wear/damage; [max 6]

- (c) tractor much quicker over a large area; enables cultivations/harvest to be done in good time; tractor replaces many labourers; cost of labour; availability of labour; crops on commercial scale provide large return/justifies capital cost; difficult to manoeuvre tractor in small area; cost of machinery too great; crops on small scale give insufficient return/do not justify cost; [max 6]

[Total: 15]

- 12 (a) (i) named example of wind-pollinated flower; loose anthers; outside flower; very large amounts of pollen; very fine pollen; feathery style/stigma; outside flower;

- (ii) named example of insect-pollinated flower; large/conspicuous/colour; scent/nectar; arrangement/structure ensures transfer of pollen to insect; from insect to stigma; [max 5 for (a)(i) or (a)(ii) to max 8]

- (b) (i) named example; stem cutting/root cutting/offset/tuber/other; details of planting/use of fungicide/other;; [max 3]

- (ii) uniform; as all have same genotype; can be selected for specific trait; all grow to same height/AW; all mature at same time; quicker to establish; hardier than seedlings; can propagate non-fertile cultivars/some plants cannot be propagated by seed; material readily available from previous crop; may be cheaper than buying seed; [max 4]

[Total: 15]