



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2012

Marking Scheme

Agricultural Science

Ordinary Level

Introduction

General points

- The marking scheme is a guide to awarding marks.
- Examiners must conform to this scheme, and may not allow marks for answers outside the scheme.
- In many cases only key phrases are given in the marking scheme. These points contain the information and ideas that must appear in the candidate's answer in order to merit the assigned marks.
- The descriptions, methods and definitions given in the marking scheme are not exhaustive and alternative valid answers are acceptable.
- If the Examiner determines that a candidate has presented a valid answer, and where there is no provision in the scheme for accepting said answer, then the Examiner must first consult with his/her Advising Examiner before awarding marks.
In general, if the Examiner is any doubt if a particular answer is correct he/she should consult their Advising Examiner before awarding marks.
- The detail required in any answer is determined by the context, the phrasing of the question and by the number of marks assigned to the answer in the examination paper. This may vary from year to year.
- Words, expressions or statements separated by a solidus (/) are alternatives which are equally acceptable for a particular point.
A word or phrase given in brackets is an acceptable alternative to the preceding word or phrase. Note, however, that words, expressions or phrases must be correctly used in context and not contradicted and where there is evidence of incorrect use or contradiction, the marks may not be awarded.
- In general, names and formulas of elements are equally acceptable. However, in some cases where the name is asked for, the formula may be accepted as an alternative. This is clarified within the scheme.

Cancelled answers

- If the only answer offered is cancelled ignore the cancelling and mark as usual.
- If an answer is cancelled and a second version of the answer is given, you should accept the cancellation and award marks, where merited, for the un-cancelled version only.
- If two un-cancelled versions of an answer are given to the same question or part of a question, mark both and accept the answer that yields the greater number of marks. You may not, however, combine points from both versions to arrive at a manufactured total.

Surplus answers

- In Section One, a surplus wrong answer cancels the marks awarded for a correct answer.
e.g. Question: Choose two dairy breeds from the following list of cattle breeds:

Charolais Friesian Simmental Jersey Hereford

Marking scheme : Friesian/ Jersey/ Simmental Any two 2 x 1 marks

Sample answers :

Friesian, Jersey and Hereford - there is a surplus answer (Hereford), which is incorrect, therefore the candidate scores $2 - 1 = 1$ mark.

Conventions

- The mark awarded for an answer appears in the marking scheme next to the answer on the right hand side.
- Where there are several parts in the answer to a question, the mark awarded for each part appears as e.g. 3 x 4 marks. This means there are three parts to the answer, each part allocated 4 marks.
- Award unit marks separately, e.g. if an answer merits 3(3), write:
$$\begin{array}{r} 3 \\ 3 \\ 3 \end{array}$$
in the first column in the right-hand margin.
- The answers to subsections of a question may not necessarily be tied to a specific mark e.g. there may be three parts to a question - (i), (ii), (iii) and a total of 12 marks are allocated to the question. The marking scheme might be as follows:
6 marks + 3 marks + 3 marks. This means that any first correct answer is awarded 6 marks and each subsequent correct answer is awarded 3 marks.
- Square brackets/*italics* are used where the Examiner's attention is being drawn to an instruction relating to the answer or to some qualification of the answer.
- The total mark for each question should be written beside the question number, and circled.
- The cumulative total should be written in the bottom right-hand corner of each page on which a question total appears.
- All blank pages should be marked to indicate they have been inspected.

SECTION ONE

Question One. (5 x 4m)

- (a) Bacteria/ rhizobium **Any one 4m**
- (b) Decomposition of organic matter (O.M.)/ recycling of nutrients or named nutrient/
silage making/ food manufacturing or named example/ nitrogen fixation **Any one 4m**
- (c) Drawing of inoculating loop [*accept drawing of forceps or "tweezers" if named*] **4m**
Name : Inoculating loop [*accept forceps or "tweezers"*] **4m**
- (d) Nitrogen fixation/ rich in protein/ rich in minerals/ improves productivity of grassland/
weed control/ less N fertiliser required/ saves money/palatable/ digestible/ improved
silage if red clover stated **Any one 4m**

Question Two.

	Animal 1	Animal 2
(a) Name of animal	Leatherjacket/ cranefly/ daddy-long-legs 1m	Earthworm/ Lumbricus. 1m
(b) Phylum to which animal belongs	Arthropoda. 4m	Annelida. 4m
(c) One characteristic of a member of this phylum	Jointed limbs/ body divided into two or three parts/ exoskeleton/ metamorphosis 4m	Segmented body / cylindrical body or round (in cross –section) / coelomate/ hermaphrodite/ clitellum/ setae 4m
(d) Importance in agriculture	Crop pest/ eats or kills roots or stems or plants/ decreases yield/ leads to bare patches 1m	Improves drainage/ improves aeration/ improves soil structure/ mixes soil layers/ creates humus/ increases soil fertility or adds nutrients/ breaks down O.M. 1m

Question Three. (8 x 1m) + (2 x 6m)

- (a) F
- (b) T
- (c) T
- (d) F
- (e) F
- (f) F
- (g) T
- (h) F
- (i) T
- (j) T

Question Four. (5 x 4m)

- (a) Compacts soil/ covers seed/ improve germination/ prevent birds eating seed/ buries stones /brings up moisture/ improves seed-soil contact/ levels soil **Any one 4m**
- (b) Prevents unwanted breeding/ safer/ less aggressive/ less testosterone/ more easily managed **Any one 4m**
- (c) Easier management/ easier feeding/ prevents poaching/ more grass in following spring/ higher stocking rates/ environmental compliance/ reduce death or injury/better FCE/ warmer/ FYM or slurry available **Any one 4m**
- (d) Prevents maggots or blowfly/ increases mobility of sheep/ facilitates mating/ keeps sheep cooler/ sale of wool/ allows more space for housed sheep. **Any one 4m**
- (e) Reduces competition/ increases space/ poorer trees removed/ improves the trees that are left or named improvement/ thinned trees used to make (useful) products/ provides access/ source of income. **Any one 4m**

Question Five. [2(3m) + 2(4m) + 6m]

Body part	Location
Atrium	Heart
(a) Trachea	Above lungs/ in the neck/ in the throat.
(b) Humerus	(Upper) arm/ above elbow/ (upper part of) forelimb
(c) Ureter	Between kidney and bladder/ beside kidney
(d) Duodenum	Exit from stomach/ beside stomach/ (first part of) small intestine
(e) Cerebellum	Brain/ head/ skull

Question Six. [2(3m) + 2(4m) + 6m]

Plant structure	Description
Phloem	Carries products of photosynthesis
(a) Stamen	Male part of flowers.
(b) Xylem	Carries water from roots.
(c) Stomata	Allows gas exchange in leaves.
(d) Root hairs	Absorb water from the soil.
(e) Carpel	Female part of flowers.

Question Seven. [6m + 2 (4m) + 2 (3m)]

- (a) (i) 25 - 30° C
 (ii) 22 - 26° C
 (iii) 20 - 22° C
- (b) Prevents damage to sow's teats/ prevents biting other bonhams **Any one**
- (c) 80- 95 kg

SECTION TWO.

Question Eight

- (a) (i) Suffolk/ Texel/ Galway/ (Wicklow) Cheviot/ Blackface mountain/ Border Leicester/ Beltex. **Any three [5m + 2(2m)]**
- (ii) Blowfly or maggots or flystrike/ mange mites/ (stomach) worms/ (lung) worms/ liver fluke. **Any two (4m + 2m)**
- (b) (i) Easier supervision or easier management/ prevents poaching/ shelter/ easier feeding/ less predation/ earlier grazing/ lower rate of lamb mortality/ more grass in spring/ FYM or slurry available. **Any three [5m + 2(2m)]**
- (ii) Ewes on bare pasture/ moved to good pasture (one month) before mating/ flushing / ewes can be sponged/ PMSG/ sponge removed/ rams introduced/ 1 ram for 40 - 45 ewes or other suitable ratio/ raddle harness on ram(s)/ change colour every 14 days/ ewes kept on good grazing during mating/ mating season lasts six weeks/ dagging/ shearing **Any four [7m + 3(3m)]**
- (c) (i) Colostrum / ewe's milk/ hay / silage/ grass/ (creep) meal or nuts or rations or Concentrates feeding. **Any three [2(7m) + 2m]**
- (ii) 40-50 kg **(4m)**

Question Nine

(a) (i) Kerrs Pink/ Rooster/ Home Guard/ Golden Wonder/ British Queen **Any two(2 x 4m)**

(ii) (1) Plough/ rotavate or harrow/ ridger/ stone removal. **Any one (4m)**

(2) Potato blight Fungicide/ spray/rotation/ certified seed/ avoid ground keepers

Blackleg Certified seed/ good drainage

Scab Avoid liming/ certified seed/ rotation

Leaf roll Aphicide/ certified seed/ biological control or detail of

Leaf mosaic Aphicide/ certified seed/ biological control or detail of

Name of disease **(4m)**

[Control measure must match named disease] Control measure **(4m)**

(3) Spraying/ scuffling/ earthing up/ rotation/ hand-weeding/ hoeing/ spade/ hand pick **Any one (4m)**

(4) Haulms sprayed/ elevator digger/ complete harvester/ harvested in Sept – Nov. for maincrop **Any one (4m)**

[Accept May-June or June-August as harvest time for first earlies or second earlies respectively]

(b) (i) Reduced frost risk in south and east/ earlier growth in spring/ light soils/ free draining/ sandy soils/ south facing/ warmer weather or warmer soil/ soil heats up more quickly **Any two (6m + 2m)**

(ii) Prevents pests/ prevents diseases/ improves soil structure/ prevents nutrient depletion/ avoids ground keepers/ weed control/ prevents plough pan. **Any two (6m + 2m)**

(c) Weigh dish/ cut potatoes/ weigh dish and potatoes/ weight of potatoes/ oven/ dry to constant weight/ reweigh/ loss in weight/ calculate % water/ calculate % DM **Any four [7m + 3 (3m)]**

Question Ten

- (a) (i) Holstein/ Friesian/ Jersey/ Ayrshire/ Shorthorn/ Simmental **Any two (2 x 3m)**
(ii) Hereford/ Aberdeen Angus/ Charolais/ Simmental/ Limousin. **Any two (2x 3m)**
[Note: Simmental in either but not in both]

- (b) (1) A 21 days
(2) B 282 days
(3) C 4 days
(4) D 305 days
(5) E 37 days
(6) F 60 days

[2(6m) + 2(4m) + 2(2m)]

- (c) Calf rearing : Remove mucus/ iodine on navel/ colostrum/ good housing or two named examples/ hygienic conditions/ (whole) milk/ milk replacer/ meal/ hay/ silage/ disease control/ weaning/ “let- out” to grass (at 12 weeks)/ leader-follower system/ parasite control.

OR

Rearing replacement heifer : *[Accept any points from calf rearing above]*/ select calf with good dairy characteristics/ calf should reach 200 kg at housing/ silage/ meal/ 300kg at 15 months/mated/ easy calving bull/ 450 kg at housing second winter/ 500-525 kg at calving
Any four [7m + 3(3m)]

- (d) Clean housing/ clean parlour/ wash teats and udders/ check for mastitis/ fly control/ teat dips/ change filters/ wash bulk tank/ plate cooling/ bulk tank cooling
Any two (2 x 4m)

Question Eleven

(a) PRG / IRG/ Cocksfoot/ Meadow fescue/ Timothy/ Meadow foxtail
Any two (2 x 3m)

(b) (i) Tillering: Growth of side-shoot (from base of main stem) **(6m)**

(ii) Encouraged by : Damage to main stem/ close grazing/ sheep or calves/ topping/
rolling/ (Phosphorus) fertiliser **Any two (2 x 4m)**

(c) Diagrams **(2m +2m)**

Paddock: Land divided/ (21) equal sized paddocks/ permanent roadway/ permanent
fencing/water in each/ one paddock per day/ N fertiliser after grazing/ animals return to
1st paddock after 22 days/ efficient/ expensive. **Any two (2 x 5m)**

Set stocking : Access to all land/ no divisions/ no roadway/ not efficient/ patchy grazing
/cheaper/ topping **Any two (2 x 5m)**

[Full marks may be awarded for each point labelled in each diagram drawn]

(d) (i) Hay : Dehydration or drying or removal of water **Any one**
Silage : (Controlled) fermentation or anaerobic/ pickling or acid **Any one**
(ii) Hay : Less digestible/ more fibre/ stemmy/ low DMD **Any one**
Silage : More digestible/ less fibre/ leafy/ higher DMD **Any one**
[7m + 3(3m)]

Question Twelve (30m ; 30m)

- (a) (i) Well ventilated/ free from draughts/ clean water/ adequate feed space/ slats/ straw bed/ adequate floor space/ slurry holding capacity/ adequate (cubic) air capacity/ hygiene
Any three (6m + 4m + 2m)
- (ii) Weight at first winter 200-220 kg
Weight at slaughter 600-700 kg
(6m + 2m)
- (ii) Conformation: Muscle distribution/ on back and hindquarters/ graded EUROP/
Shape of an animal (around the bones) **Any two (4m + 1m)**
Fatness : Amount of fat on carcass/ tail area or hindquarters/ graded 1-5
Any two (4m + 1m)
- (b) (i) Soil Texture: Amount or percentage of sand, silt and clay in a soil. **(3m)**
Soil structure: (coming together of soil particles to form) aggregates or crumbs or peds. **(3m)**
- (ii) Sandy soil: Good drainage/ good aeration/light/ low inherent fertility/ warm/ early/ prone to drought/ prone to leaching/ easy to till/ low CEC
Any two (2 x 2m)
- Loam soil : Good drainage/ good aeration/ fertile/ light/ warm/ retains water/ not waterlogged/ easy to till. **Any two (2 x 2m)**
- Clay soil : Poor drainage/ poor aeration/ heavy/ plastic/ cold/ waterlogged/ late/ good inherent fertility/ difficult to till/ retains water.
Any two (2 x 2m)
- (iii) Sieve method : Oven dry sample/ crush sample/ weigh sample/ place in sieves/ cover/ shake / weigh each sieve contents/ calculation/ soil triangle

OR

Sedimentation method : Add sample to water/ stir/ add mixture to graduated cylinder/ stopper/ shake/ settle overnight/ note layers/ record amounts/ calculation/ soil triangle

OR

Feel method Handle dry soil/ note feel gritty or non-gritty/ moisten the soil/ note cohesiveness / plasticity/ grittiness/ knead into ball/ can it be rolled into threads/ can it be bent into threads

Any three (6m + 4m + 2m)

- (c) (i) An animal whose stomach consists of 4 compartments/ chews the cud. **Any one (6m)**
- (ii) A – Rumen or paunch (stomach)
 B – Reticulum or honeycomb (stomach)
 C - Abomasum or true stomach **(6m + 4m + 4m)**
- (iii) Breakdown of cellulose/ digestion of plant material/ protein synthesis. **Any one (6m)**
- (iv) C / abomasum/ true stomach. **Any one (4m)**
- (d) (i) Prevents crushing/ easy suckling/ access to creep area. **Any one (6m)**
- (ii) Calves access to meal only/ increased growth rates/ earlier weaning/ best grass/
 parasite control/ faster development of rumen/ gets used to solid food **Any one (6m)**
- (iii) Attractive/ biodiversity/ conifers give shelter in winter. **Any one (6m)**
- (iv) Powdery mildew/ fungus/ disease/ nutrient deficiency/ fertiliser scorch/ spray
 damage. **Any one (6m)**
- (v) Mud snail or secondary host lives in wet area
or
 Life cycle stages or named stages need water **Any one (6m)**

Question Thirteen

- (a) (i) Two sets of chromosomes/ two copies of each chromosome **Any one**
- (ii) Two alleles equally dominant/ co-dominance/ phenotype a blend
or any detailed example. **Any one**
- (iv) Testing of bull's offspring compared to other bull's offspring (under similar
feed and housing conditions) **(8m + 6m+ 2m)**
- (b) Gametes (R) x (r) **(2 x 4m)**
- F1 genotype (Rr) **(4m)**
- F1 phenotype round **(4m)**
- (c) Genotypes of parents (rr) x (Rr) **(2 x 2m)**
- Gametes (r) x (R) (r) **(3 x 2m)**
- F2 genotype (Rr) x (rr) **(2 x 1m)**
- F2 phenotypes round wrinkled **(2 x 1m)**
- (d) Easy to keep/ large no of offspring/ new generation quickly/
few chromosomes/ mutations well documented/ (larvae) have giant
chromosomes/ chromosomes easy to identify. **Any three (8m + 4m + 2m)**

