Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2013

Marking Scheme

Agricultural Science

Ordinary Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

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 a 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 an 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 an examiner is in any doubt whether 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 symbols/ formulae of elements/ compounds are equally acceptable. However in some cases where the name is asked for, the symbol/ 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. 3x 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: 3
  3
  3
  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 1. (5 x 4m)

A	*B*
Milk Fever	***Deficiency of calcium***
Sheep scab	*Caused by mange mite*
Mastitis	*Bacterial disease of udder*
Red water fever	*Caused by protozoan Babesia*
Twin-lamb disease	*Ewes lacking nutrition*
Joint-ill disease	*Bacteria enter the navel*

Question 2. (5 x (2m + 2m))

Machine	*(a) Letter*	*(b) Main use on farm*
Roller	E	Breaking large clods/ smoothing or levelling soil surface/ compacting soil/ burying seeds/ burying stones/ improving seed-soil contact/ rolling silage ground/ rolling grass/ encouraging tillering
Disc harrow	D	Preparation of seedbed/ breakdown of soil/ /cultivation of soil
Combine harvester	B	Harvesting (cereal) crops/ separating grain from straw
Subsoiler	C	Shatters soil/ loosens soil/ alleviates soil compaction / breaks up soil pan/ improves drainage
Hay tedder	A	Shakes grass (or hay)/ separates grass/ turns hay/ /gathers hay into rows (for baling)/ (helps) to dry hay

Question 3.

(a) Kerr Pink/ Rooster/ Golden Wonder/ Record/ Cara/ Maris Piper **4m**

(b) Free from aphids/ reduced spread of diseases **4m**

(c) Spraying/ fungicide or named fungicide/ earthing up/ resistant varieties/ burn off haulms/ certified seed/ avoid groundkeepers/ isolate potato dumps/ rotation/ remove infected plants

Any two **2 x 4m**

(d) Wireworms/ aphids/ leatherjackets **4m**

Question 4. (10 x 2m)

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

Question 5. (5 x 4m)

(a) Castration (of male animals)/ crushes spermatic cord/ cuts off blood supply to the testes/ prevents unwanted breeding
(b) Adoption or fostering of lambs
(c) Warms animal / heating of chilled animals/ prevention of water freezing in farm buildings.
(d) Storage of milk for collection/ cooling of milk/ prevents growth of bacteria/ prevents souring of milk
(e) Assists calving process/ for difficult births.

Question 6.

(a) (i) Produces both milk and beef **4m**
(ii) 6000 litres – 12,000 litres **4m**
(iii) 7 – 8 years **4m**

(b) Age/ disease/ infertility/ lameness/ high cell count/ grading up/calving difficulties/ low milk yield/ poor milk quality/ breeding policy/ hard to get in calf/ bad temperament
Any two **2 x 4m**

Question 7. (5 x 4m)

(a) Excludes air/ provides anaerobic conditions/ allows fermentation/ encourages lactic acid bacteria/ reduces pit size

(b) Prevents foot rot/ prevents foot scald/ reduces lameness/ kills bacteria/ prevents infection in feet

(c) Provides minerals or named mineral/ prevents grass tetany/ prevents milk fever/ /ensures cow reaches peak yield/ increases milk yield/ supplements silage or grass/ / increases BCS/ better quality colostrum/ stronger calf/ increases milk protein

(d) Faster development of rumen/ scratch factor/ introduces bacteria into rumen

(e) Prevents risk of harm or death/ build- up of poisonous gases or named gas indoors/ / legal requirement.

Section Two

Question 8.

(a) (i) Wheat/ Oats/ Maize Any two **2 x 3m**

(ii) Animal feed/ concentrates/ malting or brewing or distilling/ straw. Any two **2 x 3m**

(b) (i) (Sandy) loam/ good drainage/ good aeration/ brown earth or grey-brown podzolic/ / pH 6.5 – 7.0/ fertile Any one **4m**

(ii) <u>*Spring barley*</u>: February – April/ <u>*Winter barley*</u>: September – November/ corn drill combine drill/ seed sown 3-5cm deep/ seeding rate 200kg per ha./ lines 18cm apart Any one **4m**

(iii) Spraying/ herbicide/ rotation/ pulling/ certified seed/ stubble cleaning. Any one **4m**

(iv) Combine harvester/ one sign of ripeness/ harvest date - <u>*Spring barley*</u>: August – October/ / <u>*Winter barley*</u>: July - August.*[Harvest date must match sowing date in part (ii)]* Any one **4m**

(c) True to type/ (minimum) purity/ high germination rate/ free from wild oats/ seed treated/ higher yields Any three **3 x 4m**

(d) Seeds/ count/ soak (for 24 hours)/ seed tray or suitable container/ cotton wool or suitable growing medium/ warm place/ regular watering/ leave for suitable time/ count sprouted seeds/ repeat for average/ control/ calculate % germination.
[Award maximum of 16 marks if candidate omits (reference to) calculation of germination] Any five **5 x 4m**

Question 9.

(a) (i) Landrace/ Large White/ Duroc Any two **2 x 3m**

(ii) *Landrace*: Good conformation/ long body/ large hams/ small shoulders/ droopy ears **4m**

Large white: Prolific/ fast growth/ good meat quality/ good FCR/ good mothering ability/ / erect ears **4m**

(b)
Teeth clipping/ tail docking/ iron injection/ navel dip/ ear notching/ infrared lamp/ water supply/ / colostrum or ensure piglet sucks the sow/ introduce creep feed/ maintain good hygiene
Any two **2 x 4m**

(c)
(i) *Dry sow house*: Temp 20°C/ sows fed on (sow) ration or concentrates or meals/ thin sows fed extra ration/ oestrus detection/ mated or served/ second day of oestrus/ double served/ vaccinated/ washed/ deloused/ disinfected/ moved to farrowing house one week before farrowing date/ / (fresh) water supply/ maintain good hygiene Any three **3 x 3m**

(ii) *Fattener house*: grouped by size/ fattener ration/ fed ad lib/ 15% protein/ lysine/ temp. 22°C/ / restrict feeding in final two weeks/ disease control/ good hygiene/ target weight at slaughter of 80 – 82 kg/ slaughter before 6 months Any three **3 x 3m**

(d) (i) *FCR*: Amount of feed needed or eaten to produce (1 kg) LWG **5m**

(ii) *Gilt* : (Young) female pig that has not yet farrowed **5m**

(iii) *Farrowing crate*: Holds sow during farrowing/ prevents sow lying on bonhams/ / allows easy suckling **5m**

(iv) *Delousing*: Treatment to prevent lice infection *[Accept to prevent (external) parasites]* **5m**

Question 10.

(a) (i) *British*: Hereford/ Aberdeen Angus **4m**

Continental: Charolais/ Limousin/ Simmental/ Belgian Blue **4m**

(ii) *British:*

Advantage : Smaller/ hardier/ ease of calving/ beef suited to Irish market/ less feeding **3m**

Disadvantage: Early maturing/ slow growth rates/ fatter (carcasses) **3m**

Continental:

Advantage: Leaner/ heavier /faster growth/ late maturing/ suited to export/ better conformation **3m**

Disadvantage: Less hardy/ difficult calving/ too heavy/ high feeding level **3m**

(b) (i) Start of first winter: 200 - 230 kg **4m**

(ii) Start of second winter housing: 470 - 490 kg **4m**

(iii) Slaughter: 550-750 kg **4m**

(c) Housed in October-November/ slats or straw bedding or cubicles/ adequate floor space/ / good ventilation/ no draughts/ dry/ warm/ (fresh) water supply/ adequate trough space/ / good hygiene or cleanliness/ sufficient slurry holding capacity/ ease of access/ dosing/ / treatment for lice/ silage or hay/ concentrates or meals Any four **4 x 4m**

(d) *Store period*: Moderate feeding level in winter/ frame grows/ little extra muscle produced/ / decrease in rate of weight gain/ target LWG of 0.2 – 0.5 kg. Any two **2 x 3m**

Compensatory growth: Higher level of growth/ during following summer at grass/after Period of restricted feeding during winter/ higher LWG than that of animal fed well over winter/ average LWG of 0.8-1.2 kg

Any two **2 x 3m**

[Award 6m in each case if a graph is drawn, and where the terms "store period" and "compensatory growth" are labelled , and where the axes are labelled]

Question 11.

(a) (i) Segmented body/ triploblastic/ coelomate/ setae/ bilateral symmetr/ nephridia/ hermaphrodite
[Accept clitellum] Any two **2 x 2m**

(ii) Improve drainage/ improve aeration/ mix soil (layers)/ decompose organic matter/ / create humus/ deepen topsoil/ excretory products add nutrients to soil/ dead earthworms improve organic matter content of soil/ improve soil structure Any three **3 x 3m**

(iii) Mark out area/ quadrat/ random/ how random/ remove vegetation/ apply potassium permanganate solution or washing up liquid solution/ wait for suitable time/ count earthworms inside quadrat/ multiply no. earthworms by 10,000/ repeat/ calculate average number of earthworms Any five **5 x 3m**

(b) (i) Parent material/climate/ living organisms/ topography or slope/ time
[Accept (description of) named example in each case above] Any three **3 x 3m**

(ii) Deep O horizon/ pale or leached (A2) horizon or layer/ rusty coloured or dark (B2) horizon or layer/ iron pan/ poor drainage or wet/ acid parent material/ peat on top/ high rainfall
Any two **2 x 4m**

[Award 8m if diagram drawn with any <u>two</u> of the above included as labels]

(c) (i) Raises soil pH/ reduces soil acidity. Any one **3m**

(ii) Causes soil particles to clump together/ improves structure/ improves aeration/ / improves drainage/ provides calcium ions (or Ca^{2+}) Any two **2 x 2m**

(d) Increases organic matter content/ increases humus content/ provides soil nutrients or named soil nutrient or increases soil fertility/ increases earthworm population in soil/ improves soil structure/ improves soil aeration/ cheap (source of organic matter)/ handy way of disposal
Any two **2 x 4m**

Question 12.

(a) (i) Recording of the characteristics or named characteristic of the offspring of a bull/ comparing performance to other bulls/ kept in same conditions Any two **2 x 3m**

(ii) Increased performance/ increased growth rates/ increased milk yields/ increased prolificy in pigs or sheep/ select best breeding stock/ other EBI related factors e.g. health Any two **2 x 3m**

(b) (i) A Cytoplasm
B Nucleus
C Chloroplast
D Vacuole
E Cell Wall **5 x 2m**

(ii) Nucleus / B **3m**

(iii) Contain the genes/ contains hereditary information **3m**

(c)

(i) Gametes: (G) (g) **2 x 4m**

(ii) Genotype F1: (Gg) **4m**

(iii) Phenotype F1: Green **4m**

(d)

(i) Genotypes: (gg) x (Gg) **2 x 2m**

(ii) Gametes: (g) x (G) (g) **3 x 2m**

(iii) Genotype of offspring: (Gg) (gg) **2 x 2m**

(iv) Phenotypes of offspring: Green Albino **2 x 1m**

Question 13. Any two parts from (a), (b), (c), (d) (30m + 30m)

(a) (i) (Sitka) spruce/ (Lodgepole) pine/ (Japanese) larch / fir Any two **2 x 4m**

(ii) Select healthy plants/ fence off land/ drain land/ create mounds/ 2m x 2m spacing/ each tree has 4 m²/ 2500 trees per ha. Any two **2 x 3m**

(iii) *Why?* Reduces competition/ improves growth of trees/ weeds smother young trees. Any one **4m**

How? Spraying/ herbicides/ cutting/ trampling Any one **4m**

(iv) Removes poorer trees/ increased space/ less competition/ remaining trees grow better/ / useful products from thinnings or source of income/ improves access/ / thinnings can be used to create "roadway". Any two **2 x 4m**

(b) (i) A: Perennial ryegrass.
B: Meadow foxtail.
C: Italian ryegrass.
D: Cocksfoot. **4 x 4m**

(ii) Perennial ryegrass or PRG/ Italian ryegrass or IRG/ (red or white) clover. Any two **2 x 3m**

(iii) *PRG*: Persistent/ high productivity or high yield/ palatable/ tillers vigorously/ digestible/ aggressive

Or

IRG: High productivity or high yield/ palatable/ digestible/ large amounts of herbage/ long growing season/ early bite for cows

Or

Clover: Palatable/ digestible/ fixes nitrogen/ protein source/ good ground cover/ rich in minerals

Any two **2 x 4m**

(c) (i) *Flushing*: Ewes on bare pasture/ high stocking rate/ placed on very good pasture 3-4 weeks before mating/ kept on good pasture for 3 weeks after mating/ reduced stocking rate/ increased number of eggs released / more twins/ higher conception rates/ more regular heat periods/ fewer barren ewes/ safer implantation of embryo(s) Any three **3 x 3m**

Sponging: Sponge containing hormone or named hormone/ ewe's vagina/ removed after 12-14 days / PMSG injection/ ewes come into heat at same time/ compact lambing/ early lamb production/ easier management on mixed farm/ reduced labour costs/ reduced ram:ewe ratio or 1 ram:10 ewes. Any three **3 x 3m**

(ii) Blow fly or green bottle or blue bottle. **3m**

(iii) Dipping/ pour-on/ spray (insecticides)/ tail docking/ dagging or clipping wool/ shearing/ /dosing (to prevent diarrhoea) Any three **3 x 3m**

(d) (i) Diagram **6m, 3m, 0m**

[Award full marks if diagram shows trachea, bronchus, lung and bronchiole.]

[Award three marks for diagram if any one of the above structures is not shown]

Any three labels. **3 x 3m**

(ii) Good ventilation/ vaccination/ house only when dry/ isolate bought-in stock/ good hygiene/ / avoid stress/ colostrum/ avoid draughts Any one **3m**

(iii) Adult worm in lungs/ eggs coughed up/ swallowed/ pass out with dung/ larvae on grass/ / picked up by grazing animals/ larvae burrow through intestine/ enter lungs/ larvae mature in lungs Any three **3 x 3m**

(iv) Dosing/ leader- follower system/ vaccination **3m**

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