Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2009

MARKING SCHEME

AGRICULTURAL SCIENCE

ORDINARY LEVEL

Leaving Certificate 2009
Ordinary Level Agricultural Science
Marking Scheme

Question 1

(a) Cow / sheep / goat / deer / any farm mammal (**2 x 4m**)
(b) Anaemia or anaemia symptom described / poor weight gain / lower milk yield / swelling under lower jaw / loss of hair **or** loss of wool / death (if acute) (**2 x 4m**)
(c) Dose animal **or** inject animal. (**4m**)

Question 2

P: Organic matter **or** humus **or** peat **or** O (horizon) **(4m)**
Q: Topsoil **or** A (horizon) **(4m)**
R: Subsoil **or** B (horizon) **(4m)**
S: Parent material **or** (parent) rock **or** C (horizon) **(4m)**

(Deep) ploughing **or** sub-soiling **or** drainage (**4m**)

Question 3

(a) A: (Sweep) Net **(4m)**
B: Pooter **(4m**)
(b) To collect small organisms **or** named small organisms (**4m**)
(c) Leaf / flower head / ligule / awns / spikelets / growth pattern / parallel venation / wind pollination / long anthers / feathery stigmas (**2 x 4m**)

Question 4

(a) Resazurin **or** methylene blue (**5m**)
(b) Microorganisms **or** named microorganism **or** poor hygiene **or** poor hygiene described **or** improper cooling (**5m**)
(c) Check for mastitis **or** wash udders before milking **or** teat dip **or** iodine **or** exclude infected milk **or** cool milk in bulk tank **or** wash out bulk tank **or** wash milk line and/or clusters **or** filter **or** plate cooler **or** operator hygiene **or** fly screens **or** parlour hygiene **(5m**)
(d) 3 **or** White **(5m)**

Question 5

Swayback	-	Copper
Anaemia	-	Iron
Grass Tetany	-	Magnesium
Milk Fever	-	Calcium
Pine	-	Cobalt **(5 x 4m)**

Question 6

(a) To ensure they are representative of the area **or** more accurate **or** to give a composite sample or described **(4m)**
(b) Gateways **or** entrances **or** exits (to field) /around feeding area **or** around water trough / headlands / wet marshy areas / shaded areas / fertiliser transfer area **(2 x 4m)**
(c) Phosphorus (P) **or** potassium (K) **or** nitrogen (N) **or** calcium (Ca) **or** named trace element **(4m)**
(d) Acidity **or** alkalinity **(4m)**

Question 7

(a) Cheaper than using purebred sows **or** gilts / hybrid vigour **or** any one advantage of hybrid vigour e.g. approx. half of genes from each breed **or** associated desirable characteristics / reduces inbreeding **(2 x 4m)**
(b) (To promote) genetic improvement **or** to prevent inbreeding **(4m)**
(c) Self-contained or explained **or** reduces risk of diseases **or** eliminates travel stress **(4m)**
(d) 1.0 – 1.6 kg inclusive **(4m)**

Question 8

(a) (i) Friesian /Ayrshire / Holstein / Jersey / Shorthorn / any dairy breed **(2 x 4m)**

(ii) Record of mating (time) / steaming up / isolate cow before calving / suitable housing / good hygiene **or** example / bedding / calving jack or other relevant equipment / have experienced person present / regular inspection / veterinary assistance if needed / clear mucus / iodine navel dip / colostrum / infra-red lamp **(2 x 4m)**

(iii) Steaming up **or** drying off period **or** feed at a high level after birth **or** feed concentrate rations **or** prevent disease **(4m)**

(b) (i) Grazing calves (one paddock) ahead of the older animals **(4m)**

(ii) Less chance of parasites / young leafy grass available / better grassland management / higher weight gain **(2 x 4m)**

(iii) 180 – 220 kg inclusive **(4m)**

(iv) House underweight calves in separate pen / feed good quality silage / feed (extra) concentrates / disease control **or** parasite control **(2 x 4m)**

(c) (i) Infection or disease / of the udder **(2 x 4m)**

(ii) Swelling and pain in udder ("in udder" not required if mentioned in (i)) **or** reduced milk yield **or** clots in milk / discoloured milk **(4m)**

(iii) Hygienic housing condition / wash udders before milking / wash teat cups between milking cows / test milking machine / clean milking machine / avoid over-milking / teat dipping / dry cow therapy **(2 x 4m)**

Question 9

(a) (i) Control of (soil-borne) pests / control of (soil-borne) diseases / control of weeds / maintenance of soil structure / improvement of (soil) organic matter / maintenance of (soil) nutrient balance / prevents a plough pan / rest **or** recovery **(2 x 4m)**

(ii) Crop rotation / growth encouragement / stubble cleaning / certified seed / early ploughing / correct ploughing depth / herbicides / hand pulling / mechanical control **or** named example **(3 x 4m)**

(iii) Leatherjacket **or** wireworm **or** aphid **or** any other correct insect pest of cereals **(4m)**

(iv) **Damage must match pest named in (iii) (4m)**

(v) *Selective:* kills weeds only **(4m)**
Total herbicide: kills all vegetation **(4m)**

(b) (i) Any correct fungal disease and matching plant e.g. blight and potatoes **(4m + 4m)**

(ii) **Symptoms must match disease named in (i)** (**2 x 4m**)

(iii) *E.g. for blight:* crop rotation **or** harvest all tubers **or** certified seed **or** resistant variety **or** earthing up **or** spray (with fungicide) **or** apply desiccant one month prior to harvest (**4m**)

(iv) Decomposition **or** breakdown of organic matter **or** formation of humus **or** recycling of nutrients **or** N-fixation **or** addition of organic matter on death **(4m)**

Question 10

(a)

(i) Blackface Mountain / Wicklow Cheviot / any other mountain breed(s) (**2 x 3m**)

(ii) Suffolk / Texel / Galway / Oxford Down / Ile de France / Border Leicester / Blue-faced Leicester / any other lowland breed(s) **(2 x 3m)**

(iii) *Mountain:* Mountain ewe bred with mountain ram / ewe lambs used for flock replacement / some ewe lambs sold for breeding / ram lambs fattened for Italian market / some sold as stores in autumn for fattening on lowlands / mountain ewes removed / sold off to lowland farmers after 4-5 years / other **relevant** point(s)

OR

Lowland: Weaning / at 12-14 weeks / lambs sold as target weights reached / ewe selection and/or ewe selection reason / culling and/or culling reason / suitable ram / flushing / other **relevant** point(s) **(3+3+2m)**

(b)

(i) To come into heat more than once (a year) (**3m+2m**)

(ii) 15-19 days inclusive (**3m**)

(iii) Sponge / progesterone (accept "hormone") / in ewe's vagina / left 12-16 days / remove sponge / injection of PMSG / mated 1-2 days later (**3 x 3m**)

(iv) 1:10 **(3m**)

(c)

(i) A: Rumen **or** paunch
C: Omasum **or** book (stomach)
D: Abomasum or true (stomach) (**3 x 4m**)

(ii) To digest **or** to break down cellulose **or** fibre **or** protein source (**4m**)

(iii) Omasum: To reabsorb water (**4m**)

Question 11

(a) Name of cereal crop **(1m)**

(i) Good drainage / good aeration / good crumb structure / loam / grey-brown podzolics **or** brown earth / pH 6.0 – 7.0 / south-facing / fertile / not too stony **(2 x 4m)**

(ii) Sow 1 year in 3 / 2-3 cm deep / rows 18 cm apart / combine drill / sowing date / sowing rate **(2 x 4m)**

(iii) Soil test / (apply) P **or** K / applied when sowing / timing of N application / how applied / single or split application / lime **(2 x 4m)**

(iv) Ear lies parallel to stem / straw colour / grain goes hard / moisture content 14-20% / combine harvester / date of harvesting / yield per hectare stated (**2 x 4m**)

(b)
Free from wild oats / free from diseases / treated (with fungicide **or** insecticide) / (minimum) 98% purity / (minimum) 85% germination rate / true to type (**3 x 4m**)

(c)
Soak seeds in water / place on seed tray / cotton wool **or** suitable medium / first suitable condition / second suitable condition / repeat / average **(3 x 4m)**
Result stated including reference to time **(3m)**

OR

Stated number of seeds / soak seeds in water / place on seed tray / cotton wool **or** suitable medium / **one** suitable condition / allow to germinate **or** leave for time / count germinated seeds / repeat / average **(3 x 4m)**
Reference to percentage calculation or result stated **(3m)**

Question 12
Any TWO of (a) (b) (c) (d) (30m, 30m)

(a) (i) Perennial ryegrass **or** Italian ryegrass **or** RVP **or** any suitable grass **(4m)**

(ii) Cut grass / wilting / harvest with forage harvester / transport grass to pit / additive **or** named additive / shake out grass / roll (to remove air) / seal with black polythene / weigh down polythene **(5+4+4m)**

(iii) Cheaper than building silage pit / can be made on wet land / small fields / can be sold / easy to transport / useful where farm is spread over large area / less pollution / less wastage / **(5+4+4m)**

(b) (i) Straw bedding **or** slatted floor **or** cubicles / well ventilated / draught free / adequate floor space / adequate air space / water / feeding space / hygiene / waste storage **(3 x 4m)**

(ii) Increased rate of growth / when an animal is well fed / after restricted feeding **or** after store period **(2 x 3m)**

(iii) Blocklike (in 2 dimensions) / shoulderblades well fleshed / wide hindquarters and/or shoulders / deep barrel / straight topline / good feet **(2 x 4m)**

(iv) Have reached target weight **or** start putting on fat instead of muscle after 2 years **or** meat quality **or** older carcasses grade poorly **or** frees up grass **(4m)**

(c) (i) *Xylem:* transport of water **or** transport of minerals **or** support **(4m)**
Phloem: movement of food **or** translocation **or** movement of growth regulators **(4m)**

(ii) *Transpiration:* loss of water (vapour) from a plant
Translocation: transport of food in a plant **(2 x 4m)**
[max. 4m if "plant" not mentioned at least once]

(iii) Plant **or** named plant / in water / add coloured dye (to water) / leave for time / cut stem / cross section / observe / stained cells / conclusion
OR
Plant **or** named plant / cut stem at angle / cut stem underwater / potometer /fill (potometer) with water / movement of air bubble / conclusion **(4+4+4+ 2m)**

(d) (i) Aerobic / respiration **or** breakdown of glucose / waste (product)

(ii) To reduce competition / for any **one** named resource / straighter **or** bigger trees

(iii) To prevent tubers being exposed to sunlight **or** to prevent greening / to prevent production of poisonous alkaloids / reduces likelihood of blight / weed control / increased yield

(iv) Increased palatability / nitrogen fixation **or** increased nitrogen levels **or** reduced N fertiliser requirement / ground cover or weed control / source of protein / source of minerals / provides grazing during lag phase **2 (4+4m) + 2(4+3m)**

Question 13

(a)

(i) Nucleus (**4m**)
(ii) Meiosis **(4m)**
(iii) Haploid **or** n **(4m)**

(b)

Easily cultured in bottles in a lab / have a 2-week life cycle / documented mutant varieties / small number (four) of chromosomes / produce large numbers of offspring / large chromosomes **(3 x 4m)**

(c)

Dominant: The allele which is expressed in the heterozygous condition.
Alleles: Different forms of a gene **(2 x 3m)**

Parental genotypes	(FF)	x	(Ff)	
Gametes	**(F)**	**x**	**(F)(f)**	**(3 x 2m)**
Offspring genotypes	**(FF)**	**x**	**(Ff)**	**(2 x 2m)**
Offspring phenotype	**Feathered**			**(2m)**

(d)

(i) *Performance testing:* comparing records of an animal's performance (with animals kept under similar conditions)
Progeny testing: comparing records of an animal's offspring performance (with the offspring performance of another animal)
(2 x 3m)

(ii) Artificial insemination **(3m)**
(iii) No need to keep a bull/ safety / wider choice of bull / cheaper / service more cows / easier to transport / reduces inbreeding / reduces incidence of disease **(3 x 3m)**