

**Leaving Certificate 2006**  
**Agricultural Science- Higher level**  
**Marking Scheme**

**1.** Answer any six parts

- (a) Derived from glacial drift (glacier, ice age)/ final glaciation ended 1,000s of years ago (recently) **2(5)**
- (b) Influences drainage/ influences fertility (balanced soil)/ ease of cultivation/ fixed property/affects soil temperature/ affects aeration / affects living organisms (or plant roots or animals) any three **4 + 3 + 3**
- (c) Weed killer/ dwarfing agent/ rooting hormone/ fruit ripening/ seedless fruit/ micro-propagation/ control of apical dominance/ tropism/ growth inhibitor/ etc. any two **2(5)**
- (d) **3 + 3 + 2 + 2**
- (i) Strawberry/ Buttercup/ etc.
- (ii) Scotch grass/ Iris (flag)/ *Gunnera*/etc.
- (iii) Potato/ Dahlia/ Lesser celandine/ etc.
- (iv) Onion/ etc.
- (e) Name of parasite (e.g. eelworm, roundworm, hairworm, lungworm, stomach worm, *Trichina*) **4**  
 Life cycle (name of host/ location in or on host/ eggs laid/ larval stage/ entry into host/ effect on host/ etc.) any two **2 (3)**
- (f) **4 + 3 + 3**
- (i) Liver
- (ii) Gall bladder
- (iii) Emulsifies (digests, breaks down) fats/ neutralises content of gut
- (g) **4 + 3 + 3**
- (i) Silage/ carbohydrate source/ binding agent/ ration/ concentrate/ sweetener (flavour or palatability)
- (ii) Silage/ grazing
- (iii) Winter grazing/ fodder crop/ catch crop
- (h) **3 + 3 + 2 + 2**
- (i) Cabbage/ Turnip/ Cress/ Mustard/ Charlock/ Shepherd's Purse/ Lady's Smock/ Rape/ etc.
- (ii) Clover/ Pea/ Bean/ Vetch/ Lupin/ Gorse (Furze, Whin)/ etc.
- (iii) Daisy/ Dandelion/ Thistle/ Ragwort/ Groundsel/ Sunflower/ Lettuce/ etc.
- (iv) Carrot/ Parsnip/ Parsley/ Dill/ Hemlock/ Angelica/ Ragweed/ etc.
- (i) **4 + 3 + 3**
- (i) 3 – 5
- (ii) 15 - 19
- (iii) 5
- (j) Breeding and rearing unit and fattening unit on one farm **4**  
 Lessens risk of disease entry/ eliminates transport stress/ can select own breeding stock any two **3 + 3**

2. (a) Rainfall causes leaching of bases/ liming replenishes calcium ions/ many soils acidic/ liming increases pH/ most crops need neutral soil/ improves structure (flocculation)/ prevents root rot/ increases earthworm activity/ improves drainage/ improves aeration/ helps release (or make available)N, P, K/ increases bacterial activity/ overliming/ resulting negative effect explained any three 6 + 3 + 3
- (b) Acidic parent material/ high rainfall/ leaching (loss of minerals)/ accumulation of iron or aluminium/ formation of iron pan/ water logging/ anaerobic conditions/ accumulation of organic matter (peat) any three 6 + 3 + 3
- (c) Lime (CaCO<sub>3</sub> or MgCO<sub>3</sub>) causes Mg or Ca ions / to replace H or Al ions on soil colloid/ this leads to reduction of H ion concentration in soil solution/ hence raises soil pH any three 6 + 3 + 3
- (d) Recycle organic matter (adds humus)/ add soil biomass/ improve fertility/ mix soil layers/ improve aeration/ improve drainage/ neutralises soil any three 6 + 3 + 3

### Option One

3. (a) (i) Arthropoda 3  
(ii) Eliminate dung pats/ decompose organic matter/ recycle nutrients/ improve grazing any two 3 + 3  
(iii) Increases organic matter/ improves fertility/ adds N or P or K/ improves soil structure/ increases earthworm activity or numbers any two 3 + 3
- (b) (i) Protein (or amino acid)/ leaf growth/ chlorophyll 3  
(ii) Any two steps 2 ( 3 + 3)  
[e.g. name of process, what happens during process]
- (c) (i) Name of soil type/ affects drainage/ aeration/ fertility/ temperature/ pH 3  
How soil type influences sward 3  
(ii) Grazing system/ fertilising/ weed control/ drainage/ pest control/ liming/ topping/ re-seeding 3  
How management practice influences sward 3  
(iii) Day length/ light intensity/ temperature/ amount of rainfall 3  
How seasonal factor influences sward 3

### Option Two

3. (a) (i) leaf roll/ mosaic/ etc. (virus X/ virus Y) any two 2(3)  
(ii) aphids/ contact 3  
(iii) control aphids/ certified seed/ location 3  
(iv) silage making/ decomposition/ fix nitrogen/ recycle nitrogen/ digestion of cellulose / supply of vitamin in intestine/ dairy products/ probiotic bacteria in milk replacers any two 2 (3)
- (b) named fungus or disease (e.g. potato blight/ blackleg/ violet root rot/ downy mildew) 3  
(i) spores 3  
(ii) hyphae (or haustoria)/ penetrate wall/ digest organic matter in host/ absorb digested material through hypha any two 3 + 3  
(iii) damp weather 3

- (c) Accept any disease associated with farm animal production
- (i) milk fever/ grass tetany/ twin lamb/ bloat/ etc. any two **3 + 3**
- (ii) cause/ main symptom/ prevention or cure **3 (3)**  
milk fever – calcium deficiency/collapse/ feed supplement  
grass tetany – Mg uptake low/ staggers / diet supplement  
bloat – gas in rumen produced by bacteria/ swelling of abdomen/ puncture of abdomen or use of surfactants or careful introduction to grazing high clover swards or high non-protein nitrogen grass  
twin lamb - inadequate feeding/ collapse/ scan ewes and separate or feed supplement
- 4.** (a) named mineral **4**  
how sample obtained/ named apparatus / add distilled water to soil sample / add reagent /shake and filter/ dry in oven/ add dilute nitric acid to crystals/ add ammonium molybdate/ leave/ yellow indicates phosphate/ add diphenylamine / blue indicates nitrate/ describe control/ use colour chart/ to indicate mineral  
any five related points **5 (4)**
- (b) named apparatus/ grind grass leaves / boil grass leaves / in alcohol/ place drop of extract on chromatography (filter) paper/ concentrate drop/ solvent in covered gas jar/ place end of paper in solvent (acetone + petroleum ether) / pigments separated/ name of one pigment  
any six **6 (4)**
- (c) biuret test/ crush peas/ in distilled water/ filter/ sample in container/ add biuret solution/ add dilute NaOH/ shake/ add copper sulphate solution/ shake/ violet colour is positive/ blue is negative  
any six **6 (4)**
- (d) named seeds/ soaked/ control/ disinfectant/ place in insulated container/ cover/ thermometer/ record temperature/ leave / observe temperature change  
any six **6 (4)**
- 5.** (a) more aggressive varieties in temporary ley/ more weeds in permanent ley/ one more fertilised than the other/ seeds sown in temporary ley/ name of plant in correct context  
any three **6 + 2 (3)**
- (b) provides a break in tillage crops (rotation)/ disease control/ improves soil structure/ increases soil organic matter/ provides grazing/ cheap food source  
any two **6 + 3**
- (c) supplements poor quality fodder crops/ control of dietary intake (balanced diet)/ provides fibre / ensures production targets are met/ high in dry matter (concentrate)/ high energy food  
any three **6 + 2 (3)**
- (d) (i) high yields/ winter feed/ feeding in absence of grass/ early bite for sheep/ rotations/ catch crop/same cultivation machinery as tillage crop/ less expensive feeding  
any three **3 (3)**
- (ii) grazing in situ/ harvested and fed outdoors/ harvested, pulped and fed indoors/ strip grazing  
any two **2 (3)**

6. (a) (i) palatability/ digestibility/ productivity/ aggressiveness/ persistence/  
heading out date/ nutrient level/ purpose – silage or hay or grass  
any three 3 (3)
- (ii) description of experiment  
any four relevant points 4 (3)
- (b) (i) 300 - 310 days (10 months) [allow “length of time milking”] 3  
(ii) change in milk yield (or graph of) throughout lactation period 3  
(iii) lactation peak X (200 to 220) = total lactation yield  
[allow reference to direct proportion between peak and yield] 3  
(iv) concentrates/ hay or silage or grazing 2(3)
- (c) (i) amount of food that allows cows maintain constant body weight (or condition) 3  
(ii) good condition at mating/ development of calf/ milk production/ prevention of  
disease/ development of udder any three 3 (3)
7. (a) (i) incomplete (lack of or co-) dominance 3  
(ii) asexual reproduction (mitosis)/ genotype identical to parent plant 3  
(iii) many genes or many alleles control or affect a characteristic 3  
(iv) recessive gene/ linked to sex (X) chromosome (no corresponding allele on Y  
chromosome) 2 (3)
- (b) (i) SsPp or PpSs 6  
(ii) Straight stamen + plain petal 6  
(iii) Straight + plain : straight + striped : incurved + plain: incurved + striped  
6  
1: 1: 1: 1 6
- (c) reduces (halves) the chromosome number/ haploid (n)/ produces gametes/ diploid (2n)  
state/ restored at fertilisation/ crossing over produces variation/ independent assortment  
allows variation any three 3 (3)

8. Any two of (a), (b), (c).

- (a) (i) antibodies/ disease resistance/ nutrients/ laxative any three 4 + 3 + 2  
(ii) adequate space/ ventilation/ heat/ waste disposal/ water/ slats or straw/ hygienic  
conditions/etc. any two 4 + 2  
(iii) big enough for mating/ good enough for calving/ to meet calving deadline/  
potential for high milk yield/ development of reproductive organs/financial  
any three 4 + 3 + 2
- (b) (i) ewes on bare pasture after weaning or high stocking rate/ on good pasture a  
month before mating or low stocking rate 4 + 2  
more eggs released/ better conception rate/ more regular heat/ greater chance of  
twins 3  
(ii) 1. shorter mating period/ shorter lambing period/ reduced labour/ lambs  
same size 3  
2. earlier lambing (for Easter market)/ higher price/ spreads labour 3  
(iii) gradual increase in feeding of concentrates (up to 0.5 kg/day or 0.7 kg/day for  
twins)/ steaming up 3  
most foetal growth occurs during final 6-8 weeks of pregnancy / grass growth is  
poor/ avoidance of twin lamb disease/ milk production any two 4 + 2

- (c) (i) support for plant/ aeration of soil for respiration / water for plant/ good soil-seed contact/ nutrients for growth / germination any two 4 + 2
- (ii) intake of water into roots (osmosis)/ water needed for transport/ for support or turgidity / nutrients in solution/ photosynthesis any two 4 + 2
- (iii) Name 3
1. breaking large clods/ smoothing and firming soil/ burying stones any two 4 + 2
2. compacting soil around seed/ improves water intake/ improves capillarity 3

9. any four three points in each 4[7 + 3 + 2]

- (a) weathering during winter/ frost breakdown of soil/ good seed bed with less traffic/ deep ploughing for root crops/ earlier sowing/ better germination/ less cultivation in spring/ pest control/ disease control/ better organic matter breakdown
- (b) shelter for wildlife/ food source for wildlife/ protection for crops/ shelter for farm animals/ absorb carbon dioxide/ replenish oxygen/ biodiversity/ wildlife corridors/ REPS
- (c) reduction in prolificacy (litter size)/ reduction in milk yield/ health problems/ etc.
- (d) poultry have no teeth/ gizzard part of alimentary canal/ muscular/ grit or sand/ food ground up
- (e) water taken in through root/ by osmosis/ diffuses across into centre of root/ carried upwards in xylem/ by root pressure/ cohesion-adhesion/ capillarity/ evaporation through leaves/ stomata/ transpiration stream