



Coimisiún na Scrúduithe Stáit State Examinations Commission

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Eolaíocht Talmhaíochta

Ardleibhéal

Marking Scheme

Leaving Certificate Examination, 2005

Agricultural Science

Higher Level

**Leaving Certificate Agricultural Science
Higher Level Marking Scheme**

SIX QUESTIONS TO BE ANSWERED

- 1.** any six parts (6 X 10)
- (a) respiration of seed / energy required (for germination) **4 + 6**
- (b) long (hanging) stamens/ reduced petals/feathery stigmas/ light pollen grains/
large amount of pollen any three (3 + 3 + 4)
- (c) air (house) temperature (or correct temperature)/
at (or above) which animal can maintain body temperature without weight
loss (or need for extra food) OR good FCR **4 + 6**
- (d) (i) potato
(ii) Solanaceae
(iii) 30 - 40 tonnes (12 – 16 tonnes per acre)
5 – 10 tonnes (2 – 4 tonnes per acre) - must specify early crop **(3 + 3 + 4)**
- (e) (i) limestone
(ii) carbonation – carbon dioxide dissolves in rainwater to produce
hydrogen carbonate (carbonic acid or acid rain)/ carbonic acid reacts
with calcium carbonate to produce calcium hydrogen carbonate any one
(iii) alkaline or fertile or its effects or good drainage **(3 + 3 + 4)**
- (f) (i) 200 - 220 kg
(ii) 280 – 320 kg
(iii) 550 - 700 kg **(3 + 3 + 4)**
- (g) (i) manganese
(ii) boron/ heart rot or crown rot **(3+ 3 + 4)**
- (h) (i) inhalation or breathing
(ii) produces thyroxine/ controls metabolism/ prevents goitre
(iii) carries blood (or food) from intestine to liver **(3 + 3 + 4)**
- (i) bulls dangerous/ difficult to manage (more costly to fence in) / may serve
heifers any two **4 + 6**
- (j) fights disease (white blood cells engulf pathogens or produce antibodies)/
blood forms clots /RBCs carry oxygen/ transport of food or waste or
hormones/ temperature regulation any three (3 + 3 + 4)

2. (a) (i) eases burrowing (reduces compaction)/direct killing/exposure to predation/ reduced number of transport channels/ reduces soil biomass or organic matter/ other justified effect
any two 6 + 3
- (ii) adds worms/ food (organic matter)for worms/ benefit from improved soil structure/ other justified effect any two 6 + 3
- (b) forest soil has more leaching/ is more acidic/ has less organic matter/ less humification/ less water retention/ less nutrient-holding capacity/ has more horizons (opposite effects for grassland) any three 6 + 2(3)
- (c) (i) cations continually leaving surface of colloids to replace ions withdrawn from the soil water OR being replaced by other cations that are temporarily more abundant in soil OR calcium replacing other ions 6
- (ii) small sample of soil/ in filter paper in a funnel/ add reagent slowly/ potassium chloride/ test for calcium/ continue exchange/ repeat Ca test until test is negative/ test for K/ result/ conclusion
any four 4(3)

3. Option One

- (a) (i) sunshine/ rainfall/ topography (aspect)/ soil type/ proximity to market
any two 3 + 3
- (ii) strawberries/ maize/ etc. any one 3
- (iii) protects against frost/ retains heat (warmer root temperature)/ biodegradable/earlier crop/ weed control/ higher yield/ encourages germination any two 6 + 3
- (b) (i) crop rotations/ inter-row cultivation/ mulches/ flame weeding/ autumn ploughing/ shading/ stubble cleaning/ roguing/ growth encouragement / earthing up any two 6 + 3
- (ii) crop rotations / resistant varieties /harvesting without delay/ scarecrows/ guns/ bangers/ biological control/ stubble cleaning/ liming/ netting/ fleece/ autumn ploughing any two 6 + 3
- (c) increased percentage germination/ better establishment rate/ true to type/ minimum weed infestation/ marketing/ disease control/ hybrid vigour/ better yield/ pest control any four 4(3)

3. Option Two

- (a) (i) A = omasum B = abomasum C = rumen 3(3)
- (ii) food compressed/ water removed 2(3)
- (iii) cellulose digested/ bacteria (microbes)/ protozoans/ fatty acids absorbed/ amino acids synthesised/ protein produced/ B-vitamins synthesised/ storage any three 3(3)
- (b) early grass (or leguminous crops) fed to animal/ large quantities of gas produced/ normal elimination of gas reduced/ rumen becomes inflated/ pressure on lungs and heart/ may result in death/ correct treatment
any three 6 + 2(3)
- (c) species/ age/ milk or beef (production targets)/ male or female/ pregnancy/ lactation/ health any three 6 +2(3)

4. Any **two** of the following [2 X 6(4)]
- (a) empty can/ measure volume/ bore small hole in bottom/ insert in ground/
remove soil sample/ add water to graduated cylinder/ finger on base of tin/
pour water into soil sample until full/ measure amount of water used/
calculate percentage of volume of can/ this is percentage of air
OR alternative experiment
any six points
- (b) Resazurin or Methylene Blue test/ sterile tube/ milk in tube/ add solution and
stopper/ incubate / examine colour/ blue is good quality/ pink or white poor
quality
OR
sterile/ agar plates/ inoculating loop/ smear with milk/ control/ seal/ incubate/
24-48 hours/ observe bacteria any six
- (c) **named enzyme (compulsory)**
named substrate/ experimental procedure (any valid points) /named
product/test for product
any five
- (d) potted plant or seedlings/ named stimulus (e.g. gravity or light)/ control/
clinostat/ leave for a period to grow/ inspect regularly/ results
any six
5. (a) (i) longer growing period/ increased photosynthesis/ increased
day length/ increasing temperature any two 2(3)
- (ii) grass develops flower/ lower leaf to stem ratio/ higher percentage of
cellulose/ reduction in starch any two 2(3)
- (iii) lower intake/ less digestible food/ protein content reduced
any two 2(3)
- (b) 6 + 3(3)
- (i) substrate for bacteria/ converted to lactic acid any one
- (ii) for anaerobic bacteria/ prevents rotting any one
- (iii) inoculants add bacteria/ acids keep pH low and help preservation/
sugars as food for bacteria/ enzymes catalyse fermentation
any one
- (iv) dispenses with need for additives/ less effluent/ less waste/ raises dry
matter content/ raises sugar levels any one
- (c) sample of fresh dry grass/ place in plastic bag and roll (remove air)/ place in
freezer (to burst cells)/ squeeze drop of cell sap / on a refractometer/ read/ get
readings for two further drops/ get average reading any four 6 + 3(3)

6. (a) calves and weanlings first into each paddock/ yearlings follow/ two year olds follow/ calves are selective grazers on young grass/ better use of grass/ level of parasitic worm infestation reduced
[may be described diagrammatically]

any four 2(3) +2(6)

- (b) bonhams – suckling of sow/ colostrums/ creep feeding/ water available/ iron injection/ correct ambient temperature/ breaking teeth/ infra-red lamp/ castration/ cutting tails

OR

lambs – colostrum/ suckling of ewe/ grass/ creep feeding/ dipping of navel/feed (hay)for development of rumen/ vaccination

any four 2(3) +2(6)

- (c) cow uses energy carrying foetus/ uses energy giving birth/ milk yield increases after calving/ uses body reserves to make up deficit/ milking off back

any three 2(3) +6

7. (a) (i) individual plants with certain characteristics chosen/ breeding from these plants takes place/over a number of generations (inbreeding)/ to produce homozygous inbred lines/ two inbred lines crossed for F1 seeds

any three 3(3)

- (ii) hybrid vigour/ higher yield/ known traits/ uniform offspring

any one 6

- (b) due to incomplete dominance

Parents RR X rr (RR X WW) 2(3)

Gametes R r (R W) 2(3)

F1 Rr (RW) 3

Phenotype Pink Pink 3

- (c) small pieces of plant cut/ grown on sterile medium/ form clump (callus)/ container/ plant hormones/ plant name/ develop into plants

any three 3(3)

large number of plants in a short time/genetically identical plants/ relatively inexpensive/ disease free

any one 3

8. Answer any two of (a), (b) or (c)

[2 X 24]

- (a) (i) 15 months/ 300 - 320 kg 2(3)

- (ii) A = Fallopian tube (oviduct) B = uterus (womb)
C = vagina (birth canal) D = ovary 4(2)

- (iii) production of lambs for slaughter/ rams chosen to give fast growth rate and good carcass quality/ Suffolk ram / with crossbred or named ewe / prolificacy: target is 200 lambs sold per 100 ewes mated/ achieved by using Belclare Improver rams/ Texel ram for mid-season lamb of high carcass quality

any four 3(3) + 1

- (b) 6(4)

	Sandy soil	Clay soil
capillarity	lower	higher
fertility	lower	higher
texture	grittier	smoother

- (c) (i) time of fertilising /named fertiliser / applied for each cut/ 100 – 200 kg per hectare for first cut /at reduced rate for 2nd cut (80 – 100 kg for second cut)/ to maintain perennial ryegrass/ keep weed free/ P & K built up slowly over 2-5 years/ 26 kg of P / 110 kg of K/ etc.
[halve kg for unit] any three **3(3)**
- (ii) bacteria in root nodules/ fix nitrogen (makes nitrogen available for plants) **3**
raises protein content of feed **3**
- (iii) soil type/ fertility status (soil test)/ pH of soil/ type of crop/ place in rotation/ climate/ cost/ REPS any three **3(3)**

9. Answer any four (any two points in each)

4 (4 + 8)

- (a) snail is intermediate host (or carries larval stage)/ thrives in poorly drained land/ larval stage (or named stage) needs water to swim
- (b) teat dipped in antiseptic/ protection against mastitis or other disease
- (c) moist warm conditions (Beaumont period)/ favour reproduction by zoospores/ of potato blight fungus
- (d) adult crane fly lays eggs on grass/ larva of the crane fly/ feeds on grasses/ cereals and grasses similar plants
- (e) spores / of (powdery) mildew (fungus)