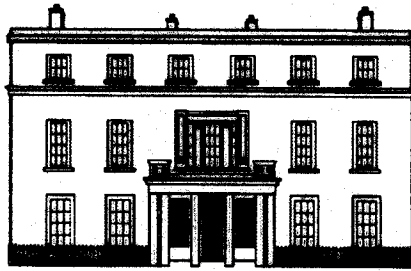


Leaving Certificate Agricultural Science Ordinary Level Marking Scheme 2002



**AN ROINN OIDEACHAIS
AGUS EOLAÍOCHTA** | **DEPARTMENT OF
EDUCATION
AND SCIENCE**

Marking Scheme

Leaving Certificate Examination, 2002

Agricultural Science

Ordinary Level

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Section One

Question 1

4 X 5 MARKS

- (a) B
- (b) Amount of water in the beaker / water flows through soil B faster or soil A slower
- (c) Sand / less clay / sub-soiling / earthworms / good soil type / other valid answer
- (d) Any named sedimentary rock

Question 2

4 X 5 MARKS

(Marks awarded for any 4 parts correct)

	Any valid function
Abomasum	true stomach for food digestion in ruminants
Enamel	outer tooth layer for protection / hard for protection
Ureter	tube which carries urine from the kidneys to the bladder / excreting waste
Vena Cava	blood vessel that carries blood from body to heart / back to heart / carry blood
Bronchiole	tube in lungs that carries air to and from the alveoli to the bronchi

Question 3

10 X 2 MARKS

- (a) True
- (b) True
- (c) True
- (d) True
- (e) True
- (f) False
- (g) True
- (h) False
- (i) True
- (j) False

Question 4

- (a) X = inoculating loop **3 MARKS**
Y = Petri-dish / agar plate **3 MARKS**
- (b) X = transfer/spread material/sample/bacteria/micro-organisms onto agar in petri-dish **3 MARKS**
Y = to provide an environment for the growth of the organisms in the sample / medium for bacterial growth **3 MARKS**
- (c) Round/dome shaped colonies on the surface of the agar **4 MARKS**
- (d) Flamed / dipped in alcohol and flamed **4 MARKS**

Question 5

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- (a) **Any two** Wool / milk / cheese **3 + 1 MARKS**
- (b) **Any two** breeds of sheep **3 + 1 MARKS**
 e.g. Blackface mountain / Wicklow Cheviot / Galway / Border Leicester /
 Texel / Down breeds - Suffolk / Oxford / Crossbreeds - Halfbreed /
 Greyface / Brownface / other valid example
- (c) **Any two characteristics**
 e.g.
- | Breed | Characteristics |
|--|----------------------------------|
| Blackface Mountain | Mountain / white wool / horned |
| Wicklow Cheviot | Mountain / white wool / polled |
| Galway | Long wool / white wool / polled |
| Border Leicester | Long wool / white wool / polled |
| Texel | Long wool / white wool / polled |
| Down breeds - Suffolk, Oxford | Short wool / white wool / polled |
| Crossbreeds - Halfbreed, Greyface, Brownface / | Mixed features / |
| Other valid characteristic | |
- 4 + 2 MARKS**
- (d) When a mountain ewe is sold to hill farmers / moved from flock / moved to better conditions / and lamb for several more years than they would if left on the mountain. **6 MARKS**

Question 6

- (a) Name any **two** grasses **4 + 2 MARKS**
- (b) **Any two** characteristics **4 + 2 MARKS**
 Ligule / Leaf blades / Growth form / Spikelets / Flowers / colour
- (c) **Any two** methods **6 + 2 MARKS**
 Direct / Undersowing / Direct-drilling / "Stitching-in" / machinery /
 broadcast / description of method

Question 7

5 x 4 MARKS

(All candidates that attempt this question awarded 4 marks for part (c) whether the answer given is correct)

- (a) Peat / bog
- (b) Water / liquid
- (c) Chicken / poultry
- (d) Friesian / dairy shorthorn / other valid example
- (e) Fungus / mould

Section Two

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Question 8

Named cereal crop - Barley / Oats / Wheat / Rye

2 MARKS

- (a) Any **two** varieties of cereal crop **1 + 1 MARKS**
- (b) Too much water / too little water - drought / hale storms /
late frost / lack of sunshine / strong wind / other valid condition
2 X 4 MARKS
- (c) **Two** soil characteristics under any of the following headings
E.G. Feeding Barley / Barley / Wheat
Soil type-deep sandy loam / brown earths & grey brown podzolics
Drainage - good drainage
pH - pH greater than 6 is essential / pH 6.5 ideal / lime
Soil aeration
Humus / organic matter
Soil fertility - NPK
6 + 2 MARKS
- (d) Soil Preparation for sowing the crop
Autumn ploughing using a plough/ fine seed bed preparation with harrows/
shallow seed bed / fertiliser use **2 X 6 MARKS**
- (e) Named disease **2 MARKS**
Cause of disease **2 MARKS**
Symptoms of disease **2 MARKS**
Treatment of disease **2 MARKS**
- (f) When is crop harvested - time / fully ripe
How is crop harvested - Combine Harvester **6 + 4 MARKS**
- (g) **Three** conditions necessary for proper crop storage
Store in dry location / grain is dry / rodent or pest free / cool / ventilated
6 + 2 + 2 MARKS

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Question 9

(a) (i) *Explain Leader-Follower*

Diagram =

(0, 3, 5 MARKS)

Points can be on diagram or written

Calves graze pasture first / calves get best grass / followed by older animals / which can graze down the grass left by the calves / method will minimise the levels of infestation of parasitic stomach and lung-worms / infection free
2 X 3 MARKS

(ii) *Bloat - any two reasons*

Too much fresh grass / too much clover suddenly **3 + 1 MARKS**

(iii) *EUROP- Animals graded at slaughter on the basis of conformation and fatness / conformation grades from E (Best)-P (worst) / fatness grades from 1 (Leanest)-5 (Fattest) / grading system*

FATNESS	E	U	R	O	P
1					
2					
3					
4 ^L					
4 ^H					
5					

4 MARKS

(iv) **Diagram = (0, 3, 5 MARKS)**

Points can be on diagram or written

	Beef Breed
General Appearance	Block-like in two dimensions / topline and underline parallel / shoulder and hindquarters wide and well fleshed
Head	Short and wide head / neck short and thick
Shoulders	Shoulderblades well apart / shoulder well fleshed
Back	Level / broad at all points
Chest & Abdomen	Deep from front legs to loin
Hindquarters and legs	Long / wide / deep / evenly fleshed to hocks / good feet

	Dairy Breed
General Appearance	Wedge shaped in two dimensions / topline and underline converge at a point beyond the head / hindquarters wide / shoulders narrow
Head	Long and narrow / neck long and thin
Shoulders	shoulder blades close together / shoulders strong but not well fleshed
Back	Level
Chest & Abdomen	Depth unimportant / should have good lung capacity
Hindquarters and legs	Long / wide / strong / not fleshed / good feet

Any valid 4 points stated

4 X 4 MARKS

(b) (i) **Advantage = Any one of the following**

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heavy yields / highly digestible nutrients / can be fed in-situ / cost **3 MARKS**

Disadvantage = Any one of the following bulky / labour intensive / need to be protected from frost during winter storage / cost **3 MARKS**

(idea of cost can be given as an advantage or disadvantage not both)

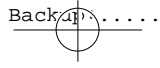
- (ii) Concentrated Ration = cereal grains / cereal grain by-products-bran, pollard, oat husks / dried sunflower oil / molasses, beet pulp / oilseed by-products / legume seeds / dried skimmed milk / feed supplements-vitamins and minerals / protein / carbohydrate / fat / roughage

3 x 2 MARKS

- (iii) Importance balanced ration = **maintenance** - amount of nutrients which allow the animal to maintain body weight and keep composition constant

and the nutrients required for some kind of **production** in the animal e.g. milk, wool, eggs or other valid example

6 + 2 MARKS



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Question 10

- (a) (i) Dicotyledon **3 MARKS**
- (ii) Cotyledon = food store **2 MARKS**
- Plumule = forms the young shoot **2 MARKS**
- Radicle = forms the young root **2 MARKS**
- (b) (i) Germination - the growth of a plant from a seed **6 MARKS**
- (ii) **Diagram = (0, 3, 5 MARKS)**
Points can be on diagram or written

Named Factor = oxygen, moisture, heat **2 MARKS**

Control tube = moist cotton wool / seeds / warm place

One of the following

Oxygen = test-tube containing cotton wool, seeds / filled with water / layer of oil / warm place

Moisture = dry cotton wool / seeds / warm place

Heat = moist cotton wool / seeds / fridge

Leave for a few days

Results = No germination in experiment / growth in control

Conclusion = Oxygen / heat / moisture is needed for germination.

4 X 2 MARKS

- (c) (i) Pollination = transfer of pollen (male part) from the anther of one flower to the stigma (female part) of another flower

3 MARKS

- (ii) Insect / wind / water / other valid method **6 + 3 MARKS**

- (iii) **Any three of the following**

silage effluent = collect and store in underground pits / dilute with water / spread on land / spread where low risk of run-off / allow grass wilt which will minimise the volume of effluent / do not cut after rainfall / check tanks / proper shores for the collection of material

milk = avoid contamination of streams by whole milk / maintain tanks

slurry = collected in underground tanks / diluted with water before being spread on land / maintain tanks / proper shores for the collection of material

Artificial fertilizers = apply at the proper rate / apply correct fertilizer / apply during periods of rapid plant growth / not applied during a drought period / do not apply close to water

Pesticides / oil spillages / yard run off / dairy washings can be other possible sources - treat as above

Stating cause = 3 X 4 MARKS

Explain cause = 3 X 2 MARKS

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Question 11 Answer any two parts

- (a) (i) Water, Fat, Protein (casein), non-protein nitrogen, lactose, minerals or one named mineral, vitamins or one named vitamin
5 X 2 MARKS

Any one of the following

- (ii) **Fat**

Sample of milk / rub onto brown paper or filter paper / control rub water instead of milk / allow dry / translucent grease spot if fat is present / non if not present

Protein

Sample of milk / Place in a test tube / Add sodium hydroxide- NaOH / Add copper sulphate - CuSO_4 / Shake / control, add water instead of milk / Colour change - purple = protein in food / no colour change = no protein

Lactose

Sample of milk / Place in a test tube / add benedict's solution or Fehlings 1 and 2 / heat in a water bath / control, add water instead of milk / colour change - red/orange = sugar present / no change = no sugar

Sample of milk / pocket refractometer / calibrate refractometer / drop of sample on stage of refractometer / close the refractometer / look through eyepiece / read the % sugar present / control, add water instead of milk

Vitamin C

Sample of dilute milk / Place in a test tube / add DCPIP to the milk / colour change from blue to pink to colourless = Vitamin C present / control, add water instead of milk / no colour change = no Vitamin C

Method = 4 X 2 MARKS

Result or conclusion = 4 MARKS

- (iii) wash cows udders and teats before milking / regular washing of the clusters, milk line and cooler / using a filter to remove any dirt particles which get into milk / washing the bulk tank regularly
4 X 2 MARKS

- (b) (i) insulated / ventilation / temperature / integrated slurry system / draft free / low roof / other valid condition **3 X 2 MARKS**

- (ii) housed in dry sow house / fed once daily / given 2.5kg meals / if sow is over thin fed extra rations / final 3-4 weeks fed 0.5kg a day more / ensures healthy Bonham's and milk production / a week before farrowing sow moved into farrowing house / sow is

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washed etc and placed into a farrowing unit / temperature is 20°C
3 X 5 MARKS

- (iii) sow to farrow without risk to Bonham's / allows her stand and lie down without crushing Bonham's / allows Bonham's easy access to sow for suckling / and infra red lamp
6 + 3 MARKS

- (c) (i) Any three minerals - N, P, K, Mg or other valid example.
3 X 3 MARKS

- (ii) **Diagram = (0, 3, 5 MARKS)**
Points can be on diagram or written

Aim: Test plant for the effect of named element X

Method: 2 flasks / sterilise / 2 plant seedlings of equal size / nutrient tablets - one with all (control), one minus one element / aeration tube / tinfoil cover / measure and take plant description at the start / run for weeks / measure at weekly intervals / top up nutrient medium during experiment
6 X 2 MARKS

Result: control grows well / others either stunted, yellowing leaves (chlorosis) / other valid example
2 MARKS

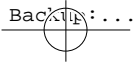
Conclusion: Relate element X to the deficiencies observed (e.g. Nitrogen = stunted growth, due to a lack of protein, Magnesium = chlorosis, due to the inability to make chlorophyll) **2 MARKS**

- (d) (i) Lactobacillus / Streptococcus species / Clostridium / other valid example
1 MARK

- (ii) crop not cut during or immediately after rain / allow crop to wilt for 1-2 days after cutting / delay harvesting to concentrate sugars
4 + 2 + 2 MARKS

- (iii) *Harvest and storage of good silage*

- Cut at correct stage of growth (high digestibility)
 - Cut in dry weather
 - Harvest with a forage harvester which cut's macerates, blows grass into silage trailer
 - Transported to silage pit / surface levelled to remove air pockets
 - Compacted with tractors / roll
 - Seal pit with polythene sheeting
 - Addition of an additive if needed
 - Avoid soil contamination
 - Effluent collection / storage
 - Closing off
- 7 X 3 MARKS**



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Question 12

- (a) (i) Abdomen **3 MARKS**
- (ii) Glycogen / vitamins A, D, B12 / minerals iron, copper, potassium **1 + 1 MARKS**
- (iii) Skin (adipose tissue) / muscles / rectum / bladder **3 + 1 MARKS**
- (b) (i) Ventral Sucker - attach onto host tissue / absorb nutrients **2 MARKS**
 Cuticle - protection from host enzyme (chemical) attack **2 MARKS**
- (ii) cow / sheep **4 + 4 MARKS**
- (iii) any **two** valid symptoms-weight loss / emaciated host / liver damage / lump under chin **5 + 2 MARKS**
- (iv) isolate and dose the infected animal (with anti-helminth chemicals) **6 MARKS**
- (v) *Any three valid reasons with reason*
 Drainage of land - less snails and miracidium die
 Biological control - introduce duck and geese which will eat the snail
 Filling in ponds and using elevated drinking troughs
 Fencing off wet pasture-prevents cercaria from reaching host
 Spraying land with a molluscicides - kill the snail / miracidium
 Liming the land - eggs will die at pH above 7.5
3 X 3 MARKS for stating
3 X 1 MARKS for explanation
- (c) (i) General Appearance - animal is alert and active
 Head - clear, bright eyes / mouth and nose free from discharges
 Coat / skin - clean and sleek
 Hindquarters - clean
 Eating - normal appetite and eating habits
 Walking - normal
 Breathing - normal
 Sexual / Reproductive activity - normal oestrus / pregnancy
 Production - normal levels of production **4 + 3 + 3 MARKS**
- (ii) Schemes that have been devised for cows, ewes and sows / Based on the examination of the animal by hand / to assess the amount of fat cover on various parts of the body e.g. backbone, loin, tailend / Condition scores range from between 0-5 in cows / and ewes and 0-9 for sows / 0 represents thinness / with the highest score representing excessive fatness / mid range scores most desirable e.g. of a score (0-5/9) **2 + 2 MARKS**

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Question 13

(a)

	Non-identical	Haploid
	Identical	Diploid

4 X 2 MARKS

(b) (i) Artificial Insemination

2 MARKS

(ii) Advantage = superior bull to fertilize a large number of cows / less risk of disease / better chance of fertilisation / longer time for inserting sperm / refrigeration of sperm - longer life

3 MARKS

Disadvantage = heat detection crucial as bull is not running with cows / time delay (management of oestrus to get A.I. at crucial time) / need to watch animals

3 MARKS

(iii) Performance Testing = keeping records of the animals individual performance-growth rate, efficiency at converting feed / comparing them with records of other animals kept under similar conditions

4 MARKS

Progeny Testing = comparing records of animals offspring / with the offspring of other animals kept under similar conditions

4 MARKS

(c) (i) Rr

3 MARKS

(ii) Incomplete dominance / R was not dominant over r / compromise reached

6 MARKS

(iii) Parents	RR	X	Rr
Gametes	R	X	R r
F2 Genotypes	RR		Rr
F2 Phenotypes	Red		Roan

9 X 3 MARKS