

Leaving Certificate 2006
Agricultural Science - Ordinary Level
Marking Scheme

SECTION ONE

Answer six questions

6 (20)

Question 1

- (a) Period of milking **4**
- (b) (i) Two months (55 -65 days) **4**
(ii) Recovery (time for body to build up) /concentrate on calf in system **4**
- (c) Antibodies/disease resistance/ laxative (clears tract) / high in protein/ high in nutrients or named nutrient **4**
- (d) Injury/ milk yield declines/ age/ disease/ grading up/ hard to manage **4**

Question 2

B=1, C=5, D=6, E=3, F=2 **5(4)**

Question 3

- (a) Prevent fall in body temperature (warmth) / ease of feeding / absence of grass protection against weather extremes/ prevent poaching /disease prevention/ ease of prevention
any two **4 + 2**
- (b) No draughts/ ventilation/ slatted housing or straw/ sloped floors/ cubicles/ dung passage/ insulation/ barns/ space/ water/ hygienic (disease prevention)/ cow mats
any two **4 + 2**
- (c) Hay/ silage / concentrates/ roots/ mineral lick/ fodder crop (or named)
any three **3 (2)**
- (d) Animal fed on low quantity or quality feed or for maintenance **2**

Question 4

- (a) 1 Barley 2 Ryegrass **4 +2**
- (b) Gramineae (or grass family) **4**
- (c) Leafy/ longer growing season/ high productivity/ can be cut 4 /5 times a season/ palatable/ nutritious/ high in protein
any two **4 +2**
- (d) Bleached in colour/ grain dry and hard/ ear bends over and lies parallel to stem/ high DM **4**

Question 5

- Foot and mouth/Orf – a viral disease that affects sheep **4**
- Anaemia – lack of iron in the blood **4**
- Food and mouth – notifiable viral disease **4**
- Bloat – build up of gas in the rumen **4**
- Grass tetany – disorder caused by low level of blood magnesium. **4**

Question 6

- (i) Excretion/ osmoregulation 4
- (ii) Production of eggs (ova)/ production of hormones / reproduction (mating) 4
- (iii) Production of sperm/ production of hormones/ reproduction 4
- (iv) Exchange of gases/ respiration/ breathing (taking in air or oxygen)/ excretion of CO₂ + H₂O 4
- (v) Breakdown (digestion) of roughage (fibre, cellulose)/ storage of grass/ reference to bacteria 4

Question 7

- (a) (i) Rotational grazing (paddock)/ strip grazing/ block grazing/ zero grazing/ leader-follower 4
- (ii) Weed control/ adequate recovery time/ grass grazed at nutritious stage/ better daily care / more output / better control of diseases / better use of grass / leafy grass/ more tillering / more dung and urine 4
[no need for (i) and (ii) to match]
- (b) Nitrogen fixation/ symbiotic bacteria in nodules / high in protein/ saves on use of N fertiliser/ less cost/ organic farming/ palatability 4
- (c) Nitrogen (N)/ Phosphorus (P)/ Potassium (K)/ Calcium (Ca)/ Magnesium(Mg)/ Sulphur (S)/Iron (Fe)/ Manganese (Mn)/ etc. any two 2(4)

SECTION TWO

Answer any **three** questions

3(60)

Question 8

- (a) (i) Eats (kills, attacks)plant (seedling or root) 6
- (ii) Pesticide (chemical control) / rolling / use of baits/ rotation/ tillage operation/ described biological control (except natural control) any two 2(3)
- (iii) Using living organism (predators) to control pests 6
- (iv) Named predator and named prey (pest) 6 + 3
Parasitic eelworms (of flies that carry bacterial spores in mushroom tunnels)/ Ladybirds on aphids on roses/ *Trichoderma* (fungus) against root fungus/ nematodes for vine weevils/etc. [accept natural predator] 3
- (b) (i) Damp (humid, foggy, wet) / warm (+10 degrees C) 6 + 3
- (ii) Fungus (*Phytophthora infestans*) [allow micro-organism] 6
- (iii) Kills plant/ dark brown (necrotic) patches with whitish beard on leaves/ rusty brown patches in tubers when cut / brown or purplish area on the skin / rot / reduces yield any two 6 + 3
- (iv) Selection of seed/ spraying with fungicides/ 10 - 14 day intervals/ spray when risk is high/ burn off haulms before harvest/ earthing up/ clearing out pits/ dig or remove all potatoes (no groundkeepers) any two 6 + 3

Question 9

- (a) (i) Landrace/ Large white/ Duroc/ Vietnamese pot-bellied/ etc. any two 2(3)
- (ii) Galway/ Blackface (Scottish) Mountain/ Cheviot/ Texel/ Île de France/ Border Leicester/ Bluefaced Leicester/Suffolk Down/ Dorset Horn/etc. any two 2(3)
- (iii) Hereford/ Angus/ Charolais/ Simmental/ Limousin/ Shorthorn/ Blonde d' Aquitaine/ Belgian Blue/ Shorthorn/ Friesian/ etc. any two 2(3)
- (iv) Friesian/ Holstein/ Holstein-Friesian/ Jersey/ Kerry/etc. any two 2(3)

- (b) Two bodily characteristics any two **2(3)**
- (c) Dosing /grazing system/ supervision/ vaccination/ good housing/ treating soils with trace elements / elimination of poisonous weeds/ mineral & vitamin supplements / veterinary treatment / diet/etc. any four **4(3)**
- (d) Assessment of lean & fat/ feeling by hand along back/ reason for scoring **3**
Scale or indication of scale **3**
- (e) Know producer or history / observe conformation/ observe eyes, ears, nose, mouth, navel, anus, legs, shoulders, hindquarters, barrel (udder if relevant), teeth (any three)/ close supervision / observation / dosing/ health/ tagged any four **4(3)**

Question 10

- Answer any two parts **2(30)**
- (a) (i) Growth of a seed **3**
(ii) Suitable temperature (warmth)/ oxygen (air)/ water **3(3)**
(iii) Diagram **3**
Apparatus/ seeds/ water/ incubate/ leave for time/ count number of germinated seeds or seedlings/ calculate percentage any five **5(3)**
- (b) (i) Loss of water (vapour)/ from plant or leaf or stem or stomata **2(3)**
(ii) Movement of water /through semi-permeable (selectively permeable) membrane (from dilute to concentrated solution) **2(3)**
(iv) Diagram **3**
Apparatus/ membrane (e.g. potato, Visking tubing, etc.)/ water or dilute solution/ concentrated solution (or potato)/ control/ result – swelling of tubing or potato or colour change due to movement of dilute solution/ conclusion any five **5(3)**
- (c) (i) Carbon dioxide **6**
(ii) (a) or (b) or (c) **6**
(iii) Diagram **3**
Seeds/ apparatus (e.g. vacuum flask)/ control (e.g. dead seeds)/ disinfect dead seeds/ thermometer/ result – rise in temperature any five **5(3)**
- (d) (i) Oxygen **6**
(ii) Chlorophyll **6**
(iii) Diagram **3**
Apparatus/ plant(s)/ control (e.g. cover part of leaf or second plant)/ leave in light/ test for photosynthesis or starch (e.g. iodine) or test for bubbles/ result – turns blue-black or releases bubbles/ negative result brown or no bubbles released any five **5(3)**

Question 11

- (a) 23 **6**
- (b) Mitosis **6**
- (c) Mendel **6**
- (d) Large numbers/ breeds often/ new generation every two weeks / easy to culture / only four pair of chromosomes / large chromosomes / have well documented genetic varieties / mutants/ etc. **6**
- (e) (i) T and t **2(4)**
Tt **4**
Tall **4**
- (ii) Tt and tt **2(2)**
(T)(t) (t)(t) **4(2)**
(Tt) (tt) **2(2)**
Tall dwarf **2(2)**

Question 12

- (a) One statement implying comparison for each of (i) to (iv) gains **6 marks**. If soils are not specified the characteristics must appear in the same order as the question (sandy first, clay second) to gain 6 marks, otherwise a simple comparison not linking characteristic to soil type gains 3 marks
- | | | |
|-------|--|----------|
| (i) | Sandy 2mm – 0.5mm | 3 |
| | Clay less than .002mm | 3 |
| (ii) | Sandy – free draining/ quick draining/ well aerated | 3 |
| | Clay – water retentive/ slower drainage/ poor (limited) aeration | 3 |
| (iii) | Sandy – poor in minerals | 3 |
| | Clay – naturally fertile (e.g. P/ K/ minor elements) | 3 |
| (iv) | Sandy – low in organic matter | 3 |
| | Clay – has more organic matter | 3 |
- (b) Autumn ploughing/ liming/ tilling/ rotation/ harrowing/ organic matter introduction (FYM) / earthworm activity /sowing grass/ removal of animals in winter **any three 6 + 2(3)**
- (c) Affects drainage/ affects aeration/ affects soil temperature/ causes mineral retention/ ease of tillering/ poaching **any one 3**
How plant growth or yield is affected **3**
- (d) Supply nutrients/ increase organic matter/ maintenance of soil structure/ improvement of soil structure/ disposal of animal waste/ better growth/ cheap/ better water retention/ slurry seeding **any two 2(3)**
- (e) Can N
Ammonium Nitrate N
Urea N
Superphosphate P
Muriate / Sulphate of potash K
Any compound one one nutrient **any two 2 (3 + 3)**
[compound and two nutrients = 9 marks]

Question 13

- | | | |
|--|------|----------|
| | Name | 3 |
|--|------|----------|
- (i) Rotation: disease control/ weed control/ pest control/ soil management/example of rotation **any two 4 + 3**
- (ii) Soil suitability: pH/ structure/ soil type **any two 4 + 3**
- (iii) Pre sowing cultivations: ploughing/ harrowing/ fine seed bed **any two 4 + 3**
- (iv) Nutrition: Nitrogen/ Phosphorus/ Potassium **any two 4 + 3**
Accept correct rate
Barley 20-25 kg/ha of P, 40-50 kg/ha of K & 100-130 kg/ha
Barley Wheat 10.10.20 150 kg/ acre or 475 kg/ha NPK.
Potatoes 7.6.17 10 bags (50 kg) / acre
25 bags / hectare sulphate of potash (or N 140 kg/ha, P 140 kg/ha, K 280 kg/ha
Sugar Beet N.P & K & Boron
- (v) Choice of variety: Disease resistance/ yield/ winter or spring/ early or late/ name of variety **any two 4 + 3**
- (vi) Time, rate & method of seed sowing: **4 + 3 + 3**
Early spring Barley 125-155 kg / ha combine drill or broadcast
Sugar Beet 100,000 – 110,000 seed / ha precision drill
Potatoes 40,000 – 60,000 ha or 2 t / ha planter or by hand or drills
[for rate accept spacing or sowing width]
- (vii) Weed control: chemical (spray or contact or residual)/ mechanical/ rotation/ stubble clearing/ certified seed **any two 4 + 3**
- (viii) Target yield: **5**
Barley 5 – 9 t/ha, Wheat 6 – 11 t/ha, Potato 30 – 40 t/ha (main crop), Sugar Beet 40 – 50 t/ha