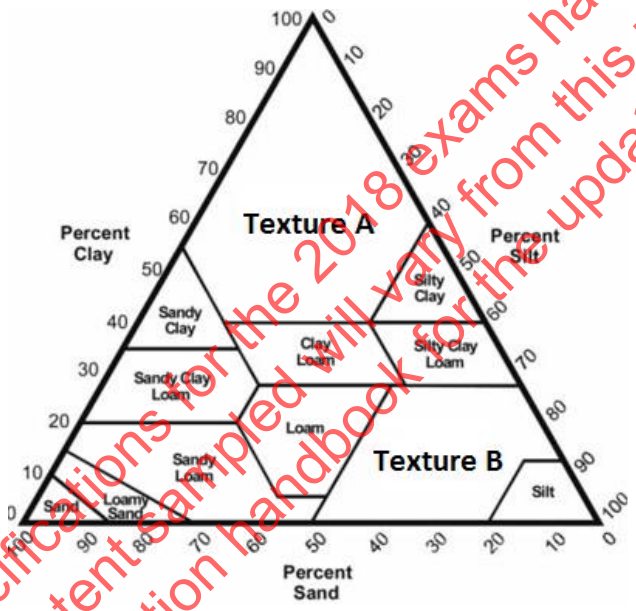
Qualification title: Level 2 Technical Award in Land Based Studies (0170-20)

Exam title: Externally set, externally marked

Version: Sample

Base mark: 80

1.	
What are the textures A and B in the soil texture diagram? (2 marks)  **Answer:** • A: Clay **(1)** • B: Silt loam **(1)**	
Test spec reference: 201 – 1.2	**Total marks:** 2 marks

2
What are the main responsibilities of DEFRA? (6 marks) **Answer:** One mark for any one of the following; to a maximum of 6 marks • Maintaining the natural environment, biodiversity, plants and animals **(1)** • Ensuring the sustainable development and the green economy **(1)**

- Maintaining and developing food, farming and fisheries **(1)**
- Maintaining animal health and welfare **(1)**
- Environmental protection and pollution control **(1)**
- Maintaining and protecting rural communities and issues **(1)**

Test spec reference: 201 – 1.1	**Total marks:** 6 marks

3

Using land for leisure, field and adventure sports can provide challenges that need to be managed to avoid them having a detrimental effect.

a. Describe the cause of three challenges. (6 marks)

Answer:

One mark for identifying challenge; one mark for description of cause; to a maximum of 2 marks for each challenge.

- Erosion **(1)** – caused by increased footfall/off-roading causes erosion **(1)**
- Noise **(1)** – caused by vehicles, people, pets, equipment on local communities **(1)**
- Light pollution **(1)** – caused by vehicle lights/car parking lights impacts on wildlife/natural environments/local communities **(1)**
- Effect on biodiversity **(1)** – caused by destruction of habitats; introduction of new plant and/or animal species **(1)**
- Effect on biosecurity **(1)** – caused by increase people traffic introducing potential diseases **(1)**
- Increase in traffic **(1)** – caused by increase leisure time; transport to leisure venues impacts wildlife/natural environments/local communities **(1)**
- Increase in population **(1)** – caused by increased concentration of population within an area **(1)**

b. Explain how each challenge identified in part a) can be managed. (3 marks)

Answer:

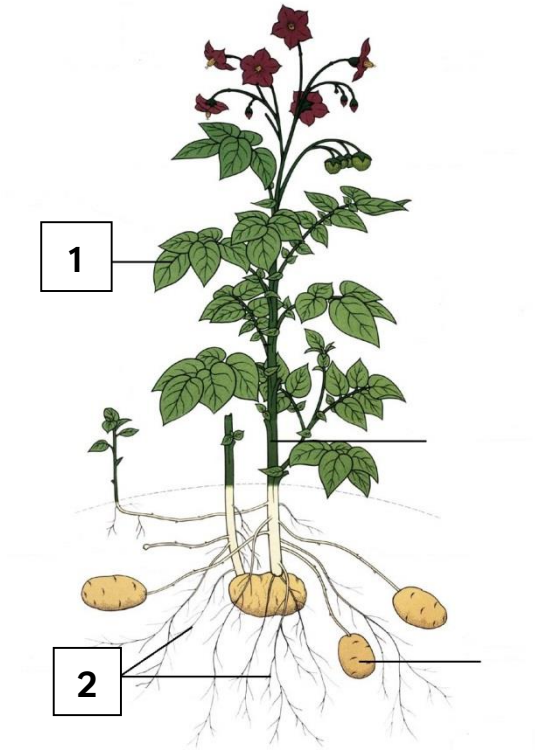
One mark for any one of the following; to a maximum of 3 marks

- Erosion - manage through designated footpaths/access **(1)**
- Noise - manage through signage, designated areas for activity / meeting / access / curfew times **(1)**
- Light pollution - manage through directional light/screening/times for lighting **(1)**
- Effect on biodiversity - careful management of habitats; enforcement agencies eg DEFRA **(1)**
- Effect on biosecurity - manage through encouragement of foot baths and disinfecting of sports equipment **(1)**
- Increase in traffic - manage through introduction of locality initiatives eg park and ride; public transport; car-share **(1)**
- Increase in population - manage through careful town planning and infrastructure eg roads; housing; offices; industrial properties **(1)**

Test spec reference: 201, 1.1; 1.3, 2.2	**Total marks:** 9 marks

4

4a. State the function of each structure identified. (2 marks)



1: … … … … … … … … … …

2: … … … … … … … … … …

Answer:

1: Leaf – photosynthesis **(1)**

2: Roots – absorbs water and nutrients from the soil **(1)**

4b Name the cause of each disease visible in the following images. (2 marks)

1.

2.

Answer:

1. Rust Damage **(1)**
2. Wine Weevil Damage (Adult) **(1)**

4c. State four signs of nitrogen deficiency within crops. (4 marks)

Answer:

One mark awarded for reference to the following; maximum four marks

- Stunted growth
- Yellow leaves
- Pink/purple stems
- Reduced yield

Test spec reference: 202 1.1, 1.2, 2.2	**Total marks:** 8 marks

5

Identify four pieces of equipment used by an arable farmer to establish, maintain and harvest cereal crops. (4 marks)

Answer:

One mark each for any four of the following; maximum four marks

- Tractor
- Seed drill (precision / broadcast)
- Fertiliser spreading equipment
- Sprayer
- Combine harvester
- Trailers (collecting harvest)

Test spec reference: Unit 203 2.1	**Total marks:** 4 marks

6

Discuss how technology could be used to optimise strawberry production in a growing horticultural business. (9 marks)

Answer

Indicative content:

- **Light intensity:** the more intense the light the faster the speed of heat and crop growth; technology: greenhouses; artificial lighting
- **Temperature:** there is an optimum temperature for photosynthesis and plant growth. If too cold or too hot the rate will decrease crop yield; technology used: greenhouses; heated benches; space heaters; frost protection
- **Use of fertiliser:** increases rate of plant growth and crop yield. Technology: chemical; broadcast spreaders; precision farming
- **Irrigation:** controlled application of water, internal or external. Technology: irrigation systems (greenhouse or hydroponics)
- **Biological pest control:** natural predators used to control pests

Band 1: 1 – 3 marks
Basic discussion with minimal range of technology use and limited relevance to impact on rate of strawberry production. To access the higher marks in the band, the response will make relevant points and attempt to make recommendations or conclusions.

Band 2: 4 – 6 marks
Range of technology discussed with clear links made to impact on rate of strawberry production; justified balanced argument. To access the higher marks in the band, the response will be balanced with recommendations or conclusions that are mostly supported.

Band 3: 7 – 9 marks
Detailed description of a wide range of appropriate technology use with clear relevant links to rate of photosynthesis and crop yield; sound recommendations made across technology types, which are justified. To access the higher marks in the band, the response will be well balanced with recommendations made that are fully justified and conclusions that are fully supported.

Test spec reference: 202 1.1 and 1.2; 2.2; Unit 203: 1.1 + 2.1 + 3.2	**Total marks:** 9 marks

7

Using **three** examples, explain how geography and climate affects plant growth rates and agricultural practices across the United Kingdom. (6 marks)

Answer:
One mark awarded for each relevant cause or effect; maximum 2 marks for each example.

- Southern areas receive longer daylight hours and a higher intensity of light through much of the year **(1)** therefore increased rate of photosynthesis than areas at the north of the UK **(1)**
- The average temperature is higher in the south of the UK compared to the north **(1)**, therefore increasing rate of photosynthesis in the warmer south compared to the cooler north **(1).**
- Rainfall is higher in the west of the country **(1),** often leaching nutrient from the soil and reducing plant growth in comparison to higher crop yields and growth to the East of the country where rainfall is lower **(1)**
- As a result agriculture in the west of the UK is largely grassland and livestock based **(1)** while the East is arable crop production **(1)**
- Highland areas are cooler with higher rainfall **(1),** which makes them less suitable for arable production and more suited to livestock farming/extensive farming **(1)**

Test spec reference: 201 1.2 and 202 1.1	**Total marks:** 6 marks

8

An arboriculture business owner is considering purchasing battery operated chainsaws over petrol powered equipment.

Describe advantages and disadvantages of using battery operated equipment compared with petrol powered equipment. (6 marks)

Answer:

One mark awarded for each relevant point; maximum of 4 from either advantages or disadvantages.

Advantages

- quiet operation reducing noise pollution and hazard **(1)**
- less pollution and cleaner operation **(1)**
- compact and easier to use **(1)**
- lighter equipment therefore less operator fatigue, minimising hazard risk **(1)**

Disadvantages:

- Needs back-up generator or spare batteries therefore additional costs **(1)**
- Quieter operation means less public/operator awareness hence greater safety/operational risks **(1)**
- Cost implication due to higher initial cost **(1)**
- Retraining for operators may be necessary, time implication for delivering; loss of production **(1)**

Test spec reference: 203 1.2	**Total marks**: 6 marks

9

The nutritional requirements of animals change through different life stages. Using an example, evaluate the change in nutritional needs and impacts of deficiencies for your chosen species in the following life stages:

- Young – adult
- Pregnant and nursing
- Geriatric (9 marks)

Answer:

Indicative content

- **Young - adult:** higher need of protein for growth and carbs and fat for energy while growing; small but regular meals due to stomach size decreasing as animal grows; minerals – main requirement for calcium for bone growth.
  Impact of nutrient deficiency: poor growth rates/stunting; rickets
- **Pregnant and nursing:** during pregnancy need for increase quantity of food in last trimester; smaller more frequent meals due to pressure on stomach in later pregnancy; good quality diet throughout containing required vitamins and minerals; nursing need for access to water at all times; good quality diet throughout containing required vitamins and minerals; maintain higher feed volumes whilst still nursing.

Impact of nutrient deficiency: termination of pregnancy; milk deficiency; milk fever; weight loss; failure to conceive

- **Geriatric:** palatable feed; easy to digest; monitoring of food intake and weight due to lack of exercise/activity; consideration of medication alongside diet; additional supplements may be required.
  Impact of nutrient deficiency: dental and bone weakness; weight gain and/or loss.

Band 1: 1 – 3 marks
Limited response with minimal links made to nutritional requirements needed for species. Candidate provided limited detail for the three life stages. Limited evidence of conclusions drawn from evaluation.

To access the higher marks in the band, the response will make relevant links for at least one of the stages.

Band 2: 4 – 6 marks
Good response with links made to nutritional requirements needed for species. Candidate provided some detail for the three life stages. Some conclusions drawn from evaluation.

To access the higher marks in the band, the response will have been detailed and appropriate for at least two of the stages and the evaluation will contain mostly relevant conclusions.

Band 3: 7 – 9 marks
Detailed and thorough response with relevant links made to nutritional requirements needed for species. Candidate provided a clear and relevant detailed response for the three life stages. Relevant conclusions drawn from evaluation.

To access the higher marks in the band the evaluation will be comprehensive and contain fully relevant conclusions for all three life stages.

Test spec reference: Unit 202: 3.1, 3.2, 3.3	**Total marks:** 9 marks

10

A local zoo recently purchased two new rabbits from a local resident to help increase the number of rabbits on display to the public in their farm and small mammal area. On the day the rabbits arrived they were introduced to the other rabbits in the petting area and seemed to integrate well, without any disturbances. The keeper observed them for 30 minutes and was happy that they were eating, drinking and not fighting with the other rabbits.

Two days after arriving one of the new rabbits became unwell and the other a day later with what is thought to be a viral infection. Some of the other rabbits are now showing similar signs of poor health.

a) State three visible signs that would indicate poor health of the rabbits. (3 marks)

Answer:

One mark awarded to any of the following; maximum three marks

- Swelling and discharge from the eye
- Not alert
- Pitched/dull coat
- Drooping tail
- Underweight
- Hunched posture

b) Explain three processes that would have prevented this outbreak from occurring. (6 marks)

Answer:

- Vaccination **(1):** Prevention of viral infections caused by contamination of sharing food and accommodation **(1)**
- Quarantine and segregation of rabbits **(1):** quarantined to allow any diseases that might be incubating to show their signs **(1).**
- Improvements to sourcing **(1):** Knowing the history of rabbit's health and care conditions **(1)**
- Introduction process **(1):** new rabbits should be separated to avoid fighting and sharing of food and water equipment **(1)**

Test spec reference: Unit 202 4.2, 4.3	**Total marks:** 9 marks

11

Modern dairy production has seen an increase in the use of robotic milking parlours. Evaluate the impact of this technology on animal welfare, production and competitiveness. (12 marks)

Answer

Indicative content:

- Animal welfare:
  - Reduce mastitis

    - Reduce time between milking - more natural being milked several times a day
    - Consistency of milking – always the same method
    - Reduce stress – not waiting in farm yard to be milked.
    - Monitors and controls nutrition
    - Less time spent grazing – impact on natural behaviours
    - Where cattle are housed inside – public perception could be poor.
    - Less contact between farmer and herd resulting in health issues being missed
- Production:
    - Increase in milk production efficiency
    - Lower feed : milk production (10 – 15% increase in milk production)
    - Difficulty finding skilled staff to operate robotic equipment
    - Works best in zero grazing systems/hard to use in grazing systems
    - Increase management of welfare and production for the cattle, highlighting cost issues earlier
- Competitiveness:
    - High initial cost/investment
    - Increased electricity costs
    - Higher complexity of equipment can increase cost of repairs
    - Less reliance on human labour, less employment opportunities
    - Lower running/labour costs
    - Increase in milk production per cow
    - Decrease in veterinary expenses

Band 1: 1 – 4 marks
Basic understanding of robotic milking parlours and the positive impact on animal welfare, with limited examples. Simple descriptions of production benefits and link to new technology. Minimal understanding of markets and competitiveness linking cost of production to milk yield.

To access the higher marks in the band, the response will contain relevant links between technology and impact with an attempt made to draw conclusions from the evaluation.

Band 2: 5 – 8 marks
Good understanding of robotic milking parlours and positive and negative impacts on animal welfare; clear explanations of how robotic parlours can result in increased/decreased production; good understanding of markets and competition making reference to costs and some comparisons to different milk production methods.

To access the higher marks in the band, the response will contain clear and accurate impacts with mostly relevant conclusions made.

Band 3: 9 – 12 marks
Thorough understanding of robotic milking parlours giving reasoned explanations on the impact of animal welfare including positive and negative outcomes; a thorough description of the potential impacts on production and constraints, which may affect production; a sound understanding of how new technology increases competitiveness with relevant comparisons of different milk production methods.

To access the higher marks in the band, the response will be clear, coherent and comprehensive with all relevant impacts considered and conclusions drawn from the evaluation which are relevant, accurate and fully supported.	
Test spec reference: Unit 201, Unit 202, Unit 203	**Total marks:** 12 marks