HM Government

T-LEVELS

T Level Technical Qualification in Agriculture, Land Management and Production (Level 3)

Theory Exam Paper 2: Livestock Core Pathway

Sample mark scheme

September 2023 v2.1

City & Guilds

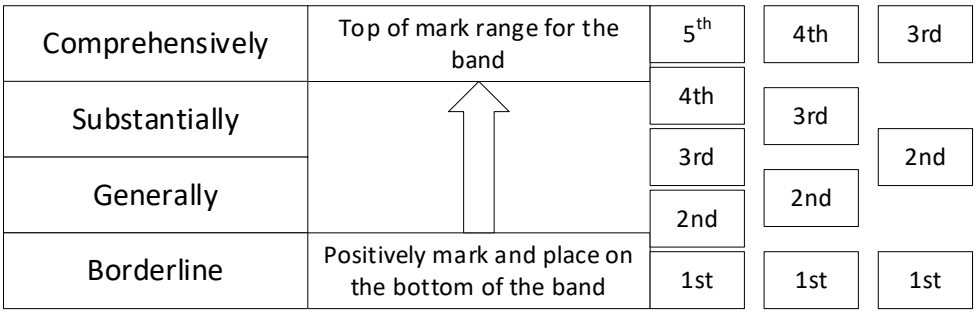
Marker guidance

Unless otherwise stated in the marker guidance for a specific question, the following conventions apply:

- All marking, from start to finish must be consistent and in line with the mark scheme guidance. Continue to refer to the mark scheme throughout marking.
- For questions that ask for a specific number of points, accept the first answers given up to the number requested eg State three… only accept the first three answers listed, and disregard any additional answers provided.
- For questions requiring continuous prose answers, mark positively – all correct answers should receive the appropriate mark according to the mark scheme. Any wrong (**but neutral**) answers should be ignored, and no marks should be lost.
- In some circumstances, it is appropriate to disallow a candidate answer that initially appears to give the correct answer as given in the mark scheme, if it is undermined by the fact that it goes on to actively **contradict** its intention. Sometimes the minimal wording used in the mark scheme allows a match that in reality is trivial and it is clear the candidate is referring to the wrong knowledge/understanding. Only the part of the response to which the contradiction applies should be disallowed, not the whole response. Material that is irrelevant/neutral but not contradictory should be ignored and positive marking applied as above.
- Use the full range of marks for a question as described by the mark scheme – eg for a 2-mark question, 0, 1 or 2 marks will always be available to award (never just 0 or 2). For levels marking, the full range of marks should be used freely as described by the mark scheme including 0 and full marks.
- Always award whole marks; half marks cannot be awarded.
- Allow phonetic misspellings as long as the meaning is clear, ie not so similar to another relevant but wrong term that you have to guess which was intended.
- Only allow 'it' as reference to the question topic if it is clear what 'it' refers to.
- Mark crossed out work **unless** it has been replaced by another response.
- Where judgement is required, apply the guidance. Where the guidance does not sufficiently support for a particular candidate response/interpretation, contact your Team Lead.
- Accept alternative wording that reflects what is given in the mark scheme.
- Contact your Team Lead if any additional correct answers arise which need to be added to the mark scheme.
- For level of response mark schemes:

  Note: indicative content has been provided to help orient the marking, providing a sense of the intentions of the question and expected parameters of the response. It is not exhaustive, and candidates do not need to cover all points referenced. Candidates may provide good quality responses while taking an approach which legitimately focuses either on breadth or depth given the time constraints. While the best responses are more likely to go to some depth across a broader range, there will be acceptable variation. Any pointers in the question towards coverage eg '…a range of…' should be kept in mind and balanced, through professional judgement, as to how much this affects the overall quality of the response when applying the marking instructions.

- First, read the full candidate response and decide which band descriptor best fits the overall level of quality of the response, in the context of the indicative content.
- Then, to decide on a mark within the band, consider the ***degree to which*** **the response fits the criteria**, as indicated by the diagram below:



The table below provides further detail on the descriptors used within each of the mark bands and what is expected at each level. Use the descriptors below alongside the mark scheme to support accurate and consistent judgment of candidate's response and allocation of marks.

AO2	**AO3**
Basic	
Limited application of understanding that is relevant to the context or question. Application of understanding is undeveloped, with limited accuracy in interpretation through lack of application of relevant knowledge and understanding.	Limited accuracy in analysis through lack of application of relevant knowledge and understanding. Unsupported evaluation through lack of application of knowledge and understanding. Unsupported judgement through lack of application of knowledge and understanding.
Good	
Some application of understanding that is relevant to the context or question. Some accuracy in interpretation through the application of some relevant knowledge and understanding.	Some accuracy in analysis through the application of some relevant knowledge and understanding. Partially supported evaluation through the application of some relevant knowledge and understanding. Partially supported judgement through the application of some relevant knowledge and understanding.
Thorough	
A range of accurate application of understanding that is relevant to the context or question. Accurate interpretation through the application of relevant knowledge and understanding.	Accurate analysis through the application of relevant knowledge and understanding. Supported evaluation through the application of relevant knowledge and understanding. Supported judgement through the application of relevant knowledge and understanding.
Comprehensive	
A range of detailed and accurate application of understanding that is fully relevant to the context or question. Detailed and accurate interpretation through the application of relevant knowledge and understanding.	Detailed and accurate analysis through the application of relevant knowledge and understanding. Detailed and substantiated evaluation through the application of relevant knowledge and understanding. Detailed and substantiated judgement through the application of relevant knowledge and understanding.

This exam has been split into **two** sections.

Below details the types of questions and marks available for each section. Please allow time for each section accordingly.

Section A is made up of **44** marks and includes **12** short answer and medium answer questions.

Section B is made up of **36** marks and includes **3** extended response questions.

Assessment Objectives	**Mark allocation**
AO1a Demonstrate knowledge The ability to demonstrate recall of relevant knowledge in response to straightforward questioning.	**10%**
AO1b Demonstrate understanding The ability to explain principles and concepts beyond recall of definitions, but in a general way – ie out of a particular context in response to straight forward questioning.	**15%**
AO2 Apply knowledge and understanding to different situations and contexts Using and applying knowledge and understanding, taking the understanding of generalities and applying them to specific situations. Questions are likely to ask for application in relation to a straightforward situation.	**45%**
AO3a Analyse information and issues Complex thinking that distinguishes patterns and relationships, breaking material into constituent parts, and determining how the parts are related to one another and holistically, inferring underlying assumptions/conditions/relevance/causation.	**30%**
AO3b Evaluation information and issues The ability to make judgements about the value, for some purpose, of own or others' work/ideas/solutions/methods using internal or external criteria or standards relevant for the occupational area. These criteria may include eg quality, accuracy, effectiveness, efficiency, coherence, consistency, and may be quantitative or qualitative.	

Section A

Q1	State **two** ways that the associated hazards of lone working can be controlled when working in the livestock industry. (2 marks)	
Mark Scheme	• Carry out a risk assessment for lone working (1) • Always carry a mobile phone/radio (1) • Always make sure someone knows the location of work (1) • Always make sure someone knows an approximate time of return (1)	**Marking guidance** Award **1 mark** for each correct answer up to a maximum of **2 marks.** Credit any other appropriate response.
Total marks	2	
AO	AO1a	
Qual spec reference	1.1 Hazards, risks and control measures associated with working in the livestock industry.	

Q2	Identify **one** feed ingredient which is high in protein and **one** feed ingredient which is high in energy. (2 marks)	
Mark Scheme	High protein: • Soya bean (1) • Clover (1) • Oil seed rape (1) High energy: • Barley (1) • Wheat (1) • Maize (1)	**Marking guidance** Award **1 mark** for a correct feed ingredient high in protein. Award **1 mark** for a correct feed ingredient high in energy. Credit any other appropriate response.
Total marks	2	
AO	AO1a	
Qual spec reference	7.1 Nutrients, feed sources and food safety and hygiene requirements of livestock species.	

<table>
<tr><td>Q3</td><td colspan="2">a) State two notifiable diseases of livestock.
(2 marks)
b) In addition to notifying the relevant authorities, identify two other actions to take on discovery of any notifiable disease.
(2 marks)</td></tr>
<tr><td>Mark Scheme</td><td>Part a) Diseases:
• Tuberculosis/(TB) (1)
• Sheep scab (1)
• Swine fever (1)
• Avian Influenza (1)
• Bluetongue (1)
• Foot & Mouth Disease (1)

Part b) Actions:
• Confirm outbreak (1)
• Isolate livestock (1)
• Implement biosecurity (1)</td><td>Marking guidance
a) Award 1 mark for each correct notifiable disease up to a maximum of 2 marks.

Credit any other appropriate response.

b) Award 1 mark for each correct action up to a maximum of 2 marks.

Credit any other appropriate response.</td></tr>
<tr><td>Total marks</td><td colspan="2">4</td></tr>
<tr><td>AO</td><td colspan="2">AO1a</td></tr>
<tr><td>Qual spec reference</td><td colspan="2">6.1 Diseases, disorders, parasites, ailments and notifiable diseases that can affect livestock in all stages of production.</td></tr>
</table>

Q4	Explain **one** benefit of applying farmyard manure onto grassland. (2 marks)	
Mark Scheme	• An additional nutrient source meaning the use of artificial fertiliser can be reduced (1) resulting in increased cost efficiency/cost-saving (1) • The addition of organic matter improves soil structure (1) which improves growing conditions (1)	**Marking guidance** Award **1 mark** for a basic explanation, and award **1 further mark** for a developed explanation, up to a maximum of **2 marks**. Award a maximum of **2 marks** for one benefit fully explained. Credit any other appropriate response.
Total marks	2	
AO	AO1b	
Qual spec reference	2.1 Waste management principles in the livestock sector.	

Q5	Explain **one** benefit of colostrum for a new-born animal. (2 marks)	
Mark Scheme	• Colostrum contains protective antibodies to boost immunity (1) and therefore ensures that the newborn animal is less likely to transmit disease and therefore more likely to survive (1) • It kickstarts the newborn animal's digestive system as it is a laxative (1) and therefore promotes the passing of meconium to prevent toxin build-up in the gut of the newborn (1) • It helps maintain the newborn animal's body temperature as it has a warming effect (1) ensuring the newborn is less likely to become chilled and more likely to survive (1)	**Marking guidance** Award **1 mark** for a basic explanation, and award **1 further mark** for a developed explanation, up to a maximum of **2 marks**. Award a maximum of **2 marks** for one benefit fully explained. Credit any other appropriate response.
Total marks	2	
AO	AO1b	
Qual spec reference	7.1 Nutrients, feed sources and food safety and hygiene requirements of livestock species.	

Q6	Explain **two** reasons why it is important to prevent the spread of zoonotic diseases in livestock production environments. (4 marks)	
Mark Scheme	• To reduce the chance of farm staff being contaminated with zoonotic disease transferred from livestock (1) to prevent the spread of zoonotic diseases from the livestock production environment to the wider community (1) • To prevent reduced livestock performance due to physical effects of zoonotic disease (1) leading to reduction of overall productivity for the unit (1) • Contagious zoonotic disease may require staff absences from work due to ill health (1) resulting in increased workload for remaining staff impacting on work performance/wellbeing (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1 further mark** for each developed explanation, to a maximum of **2 marks**. Award a maximum of **4 marks** for two reasons fully explained. Credit any other appropriate response.
Total marks	4	
AO	AO1b	
Qual spec reference	3.1 Security and biosecurity measures in the livestock sector to prevent the spread of disease.	

Q7	Explain **two** ways the condition of an eggshell can impact on the suitability of eggs for incubation. (4 marks)	
Mark Scheme	• A cracked shell/damaged membrane would mean the chick will not be developing in the appropriate environment (1) which would result in chick death before hatching (1) • Hygiene/cleanliness of eggs can affect suitability as eggshells are porous which would let bacteria enter (1) which would result in disease passing through the shell to the unhatched chick (1) • A weak/thin eggshell would mean that the egg is more prone to water vapour loss during incubation (1) resulting in a higher chance of a deformed chick being born (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1 further mark** for each developed explanation, to a maximum of **2 marks**. Award a maximum of **4 marks** for two ways fully explained. Credit any other appropriate response.
Total marks	4	
AO	AO1b	
Qual spec reference	9.1 How technology and equipment is used effectively in supporting the management of livestock at different stages of production.	

Q8	A farming business accumulates a large number of used veterinary needles. Explain **two** consequences of incorrectly managing this hazardous waste. (4 marks)	
Mark Scheme	• The used veterinary needles could be accidentally reused to administer veterinary medicines to other livestock (1) resulting in possible transmission of infection between livestock/physical injury by use of a blunt needle (1) • Farm staff could be physically injured by contact with the used veterinary needles (1) causing potential infection through transmission of disease/contamination by veterinary medicine (1) • Incorrect storage of the used veterinary needles prior to disposal is non-compliant with controlled inorganic waste management regulations (1) leading to farm assurance requirements not being met (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1 further mark** for each developed explanation, to a maximum of **2 marks**. Award a maximum of **4 marks** for two consequences fully explained. Credit any other appropriate response.
Total marks	4	
AO	AO2	
Qual spec reference	2.1 Waste management principles in the livestock sector.	

Q9	A farmer has accidentally administered an excessive dose of an antibiotic treatment to a milking cow. Explain **two** implications of this incorrect administration. (4 marks)	
Mark Scheme	• The antibiotic treatment will lead to adverse health implications for the cow (1) and further treatment being required leading to increased time/money spent (1) • The milk may be contaminated with excessive residues of the antibiotic treatment (1) leading to issues with selling milk due to a potential increased withdrawal period of the milk (1) • Correct procedures for the administration of veterinary medicines have not been followed (1) leading to non-compliance with farm assurance requirements (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1 further mark** for each developed explanation, to a maximum of **2 marks**. Award a maximum of **4 marks** for two implications fully explained. Credit any other appropriate response.
Total marks	4	
AO	AO2	
Qual spec reference	8.1 Veterinary medicine and health supplements and their uses in supporting livestock during all stages of production.	

Q10	A local farm produces and sells pigs. There is currently an oversupply of pigs onto the market which is expected to last for a three-month period. Explain **two** impacts of this oversupply in the market on the farm business. (4 marks)	
Mark Scheme	• The pigs cannot be sold at the optimal weight so they will not meet required market weight at the point of sale (1) meaning a reduction in sales price and profit (1) • Profitability will be lower for the overall farm business (1) as feed and bedding/husbandry costs will continue as the pigs will have to remain on the farm for the three-month period (1) • Additional pigs on the farm could mean that stocking levels could be too high for the available space (1) which may lead to welfare breaches with potential impacts on farm assurance status (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1 further mark** for each developed explanation, to a maximum of **2 marks**. Award a maximum of **4 marks** for two impacts fully explained. Credit any other appropriate response.
Total marks	4	
AO	AO2	
Qual spec reference	4.1 Principles of supply chains in the livestock production industry.	

Q11	Describe **two** requirements of an emergency plan to deal with fire in a building containing livestock. (6 marks)	
Mark Scheme	• Take into consideration the flammable nature of livestock feed and bedding materials (1). Locations of firefighting equipment appropriate for the type of flammable materials should be recorded on the plan (1) and these should be near to the fire hazards as these are at greater risk of fire/are easily ignited (1) • Specify suitable evacuation procedures to correctly prioritise the safety of people (1). If safe to do so, the livestock can be evacuated in order to preserve life/protect livestock welfare (1) and to ensure emergency services are able to safely deal with the fire so that it does not spread (1) • Specify a safe outside area(s) for livestock following evacuation so they can safely be contained/controlled (1). Escape routes for livestock should be marked on the plan to prevent loss of livestock/harm to farm staff handling the evacuation (1) and these routes must be kept free from stored materials/equipment to ensure safe and timely exit by livestock (1)	**Marking guidance** Award **1 mark** for each basic explanation, and award **1-2 further marks** for each developed explanation, to a maximum of **3 marks**. Award a maximum of **6 marks** for two requirements fully explained. Credit any other appropriate response.
Total marks	6	
AO	AO2	
Qual spec reference	1.3 Procedures and plans for emergency situations in the livestock sector.	

<table>
<tr><td>Q12</td><td>A sheep farmer needs to conduct pregnancy scanning of their ewes, which will be lambing indoors.

Explain how pregnancy scanning information can be used to enhance the management of the flock.

(6 marks)</td></tr>
<tr><td>Mark Scheme</td><td>
<table>
<tr><th>Band</th><th>Marks</th><th>Descriptor</th></tr>
<tr><td>3</td><td>5-6</td><td>Demonstrates thorough application of knowledge and understanding of how flock breeding data can be used.
Reasoning for how data can enhance the management of the flock is highly detailed and relevant.</td></tr>
<tr><td>2</td><td>3-4</td><td>Demonstrates good application of knowledge and understanding of how flock breeding data can be used.
Reasoning for how data can enhance the management of the flock is mostly detailed and relevant.</td></tr>
<tr><td>1</td><td>1-2</td><td>Demonstrates basic application of knowledge and understanding of how flock breeding data can be used.
Reasoning for how data can enhance the management of the flock has limited detail and relevance.</td></tr>
<tr><td></td><td>0</td><td>No relevant material</td></tr>
</table>

Indicative content:
• The information obtained from scanning allows accurate identification of the number of lambs being carried by each ewe, as well as the approximate due dates, to allow for effective planning/time management during the peak period of lambing.
• Barren ewes can be identified and sold at a more profitable time of year once scanning has identified them, and feed costs saved for these animals, ensuring overall profitability is increased for the livestock unit.
• Singles and multiple lamb bearing ewes can be fed accordingly thus making efficient use of feed required for the flock, saving on resources and costs.
• Ewes can be housed in groups to make lamb fostering from triplets onto singles easier and outcome of survival greater, improving the productivity of the flock.
• Ewes can be housed according to lambing date thus making efficient use of building resources.
• If ewes are tupped in groups and if rams can be identified, this enables a farmer to identify the most productive rams and to make informed decisions about which rams and ewes to breed from in the following year in order to improve efficiency of management of the flock and overall profits.
</td></tr>
<tr><td>Total marks</td><td>6</td></tr>
<tr><td>AO</td><td>AO2</td></tr>
<tr><td>Qual spec reference</td><td>10.1 How data and information is used in the process of managing livestock breeding and production.</td></tr>
</table>

Section B

Q13

A farmer has volunteered to support a neighbouring farm start a new calf enterprise. The calves will be reared in batches together after leaving the mothers. In setting up the new enterprise, the neighbouring farm has also requested advice on how to ensure the new calf enterprise is run efficiently.

Explain the procedures of stock management that would be recommended for an efficiently run calf enterprise, with justifications for your recommendations. Analyse how the business will be impacted if the principles of stock management are not followed effectively in the running of the calf enterprise.

(12 marks)

Mark Scheme

Band	Marks	Descriptor
4	**10-12**	Demonstrates comprehensive application of knowledge and understanding of procedures of stock management in relation to an efficiently run enterprise and business impacts if procedures are not followed effectively. Demonstrates a comprehensive use of analysis of the impacts on the business, in relation to the principles of stock management not being followed effectively. Demonstrates comprehensive evaluative skills by justifying an excellent range of procedures required for an efficiently run enterprise. Justifications are supported with highly detailed and relevant reasoning.
3	**7-9**	Demonstrates thorough application of knowledge and understanding of procedures of stock management in relation to an efficiently run enterprise and business impacts if procedures are not followed effectively. Demonstrates a thorough use of analysis of the impacts on the business, in relation to the principles of stock management not being followed effectively. Demonstrates thorough evaluative skills by justifying a good range of procedures required for an efficiently run enterprise. Justifications are supported with mostly detailed and relevant reasoning.
2	**4-6**	Demonstrates good application of knowledge and understanding of procedures of stock management in relation to an efficiently run enterprise and business impacts if procedures are not followed effectively. Demonstrates a good use of analysis of the impacts on the business, in relation to the principles of stock management not being followed effectively. Demonstrates good evaluative skills by justifying a moderate range of procedures required for an efficiently run enterprise. Justifications are supported with some detail and relevant reasoning.
1	**1-3**	Demonstrates basic application of knowledge and understanding of procedures of stock management in relation to an efficiently run enterprise and business impacts if procedures are not followed effectively. Demonstrates a basic use of analysis of the impacts on the business, in relation to the principles of stock management not being followed effectively.

		Demonstrates basic evaluative skills by justifying a limited range of procedures required for an efficiently run enterprise. Justifications are supported with minimal detail and relevant reasoning.
	0	**No relevant material**

Indicative content

Justifications

Recommended Stock Management Procedures

- Ensure that effective stock rotation procedures are in place in order to ensure the required feed is used within date so that feed does not deteriorate and can still be used.
- This is particularly important when supporting calf development to ensure growth rates are on-track, ensuring efficiency of the calf enterprise.
- Calves are more susceptible to illness/require regular inoculation to support their development, therefore effective rotation (using oldest stock first) of veterinary medicines is important to avoid wasting resources/incurring unnecessary costs. Complying with product expiry dates also ensures safety of medicine products being used.
- Ensure that effective and regular stock rotation is in place for calf bedding materials to prevent deterioration of old bedding and to prevent wastage or further resources spent on removal of old bedding after new bedding is introduced.
- Vermin control procedures in place to prevent contamination of bedding with diseases that are spread by vermin to the calves through contact with the bedding.
- Vermin control procedures are important in reducing any wastage of bedding if vermin control was left unchecked. This improves longevity of resources purchased preventing loss of money for the calf enterprise and increasing financial efficiency.
- Medicines should be stored in locked cabinets or fridges so that they can be easily sourced when they are required. This ensures time efficiency and prevents stock wastage as medicines are stored safely and stock levels can be easily monitored.
- Locked medicine storage is required as a stock management procedure in order to comply with legislation on the storage of medicines, ensuring the calf enterprise and farm business is not in breach leading to potential prosecution/financial implications eg fines, reducing overall efficiency/profits.
- Ensuring that effective records of purchase of medicines, equipment and feed are documented and maintained will support:
    - efficiency of future purchases
    - monitoring of actual stock vs. required stock
    - compliance with legislation and assurance schemes, preventing financial losses incurred from breaches with legislation/assurance schemes, which may also damage business reputation.
- Documented feeding charts should be produced and regularly updated in order to enable the successful monitoring of progress of calves and to aid purchasing of stock, ensuring efficiency in the running of the calf enterprise.

	• Ensuring that tags for calves are ordered in readiness for the first batch of calves on the enterprise to comply with legislation and ensure that all livestock is formally documented/accounted for increasing awareness of stock levels and in order to assess the financial viability of the enterprise. • The completion and maintenance of calf ID records, and health and growth records to comply with legislation and allow analysis of livestock/measurements in order to identify patterns and issues early on, increasing the efficiency of running the calf enterprise. • The completion and maintenance of medicine treatment records in order to effectively keep accurate track of medicine administered and to comply with legislation. Having this information readily available if required, will save time and resources. • Importance of being equipped ahead of schedule for the husbandry requirements in order to ensure smooth and efficient running of the calf enterprise. This will reduce any time lost whilst waiting for delivery of stock required and to increase efficiency of running during busy periods. • Compliance with legislation and assurance requirements relating to appropriate storage of identification, passports, records, veterinary medicines and feed in order to ensure no breaches have occurred which could lead to financial losses. **Analysis of impacts** • Lack of key husbandry materials (feed, bedding, water, medicine) for the calves leading to health and welfare issues potentially leading to prosecution and/or loss of assurance status. This may negatively impact business financials by the incurrence of fines and damage the overall reputation of the farming business running without assurance status. • Lack of available key husbandry materials (feed, bedding, water, medicine) leads to inefficient time management during busy periods leading to loss of time and money. • Not having adequate feed available will lead to reduced performance of calves as their dietary requirements will not be met. This may mean business performance targets are not met, decreasing efficiency of the calf enterprise. • Poor husbandry practices may lead to a lack of profits available due to not meeting performance targets for the calves. • Stock wastage which may result from over-ordering, poor storage, contamination, poor stock rotation procedures, ineffective vermin control leading to potential wastage of feed and bedding and a reduction in efficiency due to wasted money spent on stock which has to be discarded. • Lack of compliance with veterinary medicine legislation, and livestock identification legislation may lead to prosecution/loss of assurance status which may negatively impact business financials and overall reputation of the farming business. • Not having suitable storage areas for the key materials for the calves may mean stock is contaminated leading to increased wastage and potential impact on calf health, effecting overall performance of the enterprise. • Unsuitable medicine storage of veterinary medicine products required to support the calves' development could lead to potential wastage of medicines. For example, certain veterinary medicine products stored at the incorrect temperature will no longer be viable. This leads to loss of money reducing financial efficiency with new veterinary medicine products needing to be ordered/purchased.

	• Not having updated calf veterinary medicine purchase, storage and treatment records may impact business assurance status as calf health status and any administration of veterinary medicine products must be recorded as the calf develops as part of ensuring calf welfare. This may impact business financials if it results in prosecution and any fines. There is also a risk to the reputation of the enterprise and farming business leading to further financial loss. • Lack of ID records and health records which may lead to reduced efficiency of management of the calf enterprise as problems affecting some or all of the calves may not be identified promptly leading to reduced livestock performance of the entire calf enterprise. • Not complying with legislation and assurance requirements overall will impact the business. The time taken to provide evidence of compliance with the legislation and assurance schemes when inspected means that less time can be used on the running and management of the calf enterprise, reducing efficiency and impacting negatively on the success of the new enterprise.
Total marks	12
AO	AO2 – 4 AO3a – 4 AO3b – 4
Qual spec reference	4.2 Principles of stock management in the livestock production industries.

Q14

A local farm manager is responsible for running a large mixed farm with a range of livestock enterprises. There has just been a confirmed outbreak of a non-zoonotic disease in the farm's sheep. Recently, the sheep enterprise has been expanded with a number of sheep purchased from the local livestock market. The farm has employed additional staff that also work on the neighbouring livestock farm to manage the increased workload.

Analyse the impact of this outbreak across the business and justify actions to improve biosecurity on the farm.

(12 marks)

Mark Scheme

Band	Marks	Descriptor
4	10-12	Demonstrates comprehensive application of knowledge and understanding of biosecurity in relation to the impacts of a disease outbreak and required actions to improve biosecurity. Demonstrates a comprehensive use of analysis of the outbreak, in relation to how the outbreak will impact the business. Demonstrates comprehensive evaluative skills by justifying an excellent range of actions to improve biosecurity. Justifications are supported with highly detailed and relevant reasoning.
3	7-9	Demonstrates thorough application of knowledge and understanding of biosecurity in relation to the impacts of a disease outbreak and required actions to improve biosecurity. Demonstrates a thorough use of analysis of the outbreak, in relation to how the outbreak will impact the business. Demonstrates thorough evaluative skills by justifying a good range of actions to improve biosecurity. Justifications are supported with mostly detailed and relevant reasoning.
2	4-6	Demonstrates good application of knowledge and understanding of biosecurity in relation to the impacts of a disease outbreak and required actions to improve biosecurity. Demonstrates a good use of analysis of the outbreak, in relation to how the outbreak will impact the business. Demonstrates good evaluative skills by justifying a moderate range of actions to improve biosecurity. Justifications are supported with some detail and relevant reasoning.
1	1-3	Demonstrates basic application of knowledge and understanding of biosecurity in relation to the impacts of a disease outbreak and required actions to improve biosecurity. Demonstrates a basic use of analysis of the outbreak, in relation to how the outbreak will impact the business. Demonstrates basic evaluative skills by justifying a limited range of actions to improve biosecurity. Justifications are supported with minimal detail and relevant reasoning.
	0	**No relevant material**

Indicative content

Analysis of impacts

	• Poor livestock health and performance, leading to reduced overall enterprise income, as well as increased costs such as feed due to livestock remaining on holding for extended periods and possible effects on growth rates eg decreased. There may also be an increased use of veterinary medicines to control and treat livestock health issues caused by the non-zoonotic disease. • Introduction of the non-zoonotic disease into the other livestock enterprises on the mixed farm will affect the health of other livestock. This may effect livestock performance and have an increased impact on the financial viability of the whole business if the non-zoonotic disease spreads including wide loss of livestock, increased veterinary medicine costs and a reduction of produce to sell. • Welfare issues for both staff and livestock on the mixed farm. Livestock: ill health, lack of performance and increased mortality for sheep as well as potential wider effects on other livestock on the farm. Staff: mental health/wellbeing, ill health due to increased work pressure caused by the disease outbreak eg longer hours, additional work tasks caused by disease, working with animals that are deteriorating in health status and potential loss of animals. This may have an impact on staff absence caused by work related stress and therefore impacting on remaining staff with increased workload across all enterprises on the mixed farm leading to increased stress levels. This can lead to inefficiencies and increased costs for the whole business across both livestock and people, as well as potential reduced quality of husbandry ie lack of detail in work carried out which may make issues worse with ill livestock. • Could lead to potential non-compliances which might cause loss of farm assurance status, potentially leading to loss of value at point of sale if livestock is required to be farm assured when sold as produce. This could also restrict the variety of outlets for sale of livestock / livestock products. May also lead to impacts on customer bases due to public perception ie people purchasing livestock and livestock products from the farm. **Justified Actions** • Protocols for each enterprise on the farm, to include training and awareness for staff for identifying biosecurity breaches, issues and complaints. • Aim to purchase stock direct from source with known health status rather than via livestock market, reducing the mixing of stock from multiple sources. • Put in place hygiene controls for livestock transport to the farm after purchase to prevent contamination. • Suitable quarantining/isolation facilities for livestock in order to prevent transmission to existing livestock on the farm and so that checks can be conducted. • Review visitor and staff policy to keep unnecessary transmission to a minimum, preventing the spread of disease, and implement biosecurity measures for staff shared across multiple enterprises and with the neighbouring farm during the period of increased workload. • Review personal hygiene policy and facilities, to include hand washing to reduce transmission within the farm, clothing washing. • Review PPE policy, to include use of waterproof clothing that can be scrubbed down at regular intervals to reduce disease transmission. • Ensure suitability of wheel wash and foot dip facilities, to stop contamination between farms via machinery, and to prevent transmission from one enterprise to another as well as within each enterprise on the mixed farm.

	• Ensure appropriate disinfectant use using DEFRA approved disinfectants, and plan for regular updating/replacement of disinfectant. • Review health plan with vet to prevent further outbreaks and to ensure vaccination is complete and effective against disease. • Review access to feed and feeding equipment/goods handling and storage to deter contamination from pests as well as people eg keeping doors shut, use of netting, good vermin control, hand hygiene upon handling feed and feeding equipment. • Avoidance of contact with neighbouring livestock ie need for double fencing to avoid physical contact to prevent the transmission of disease between the neighbouring farms. • Review biosecurity protocols and measures across shared staff of neighbouring farm to prevent cross-contamination and outbreaks between the two neighbouring farms.
Total marks	12
AO	AO2 – 4 AO3a – 4 AO3b – 4
Qual spec reference	3.1 Security and biosecurity measures in the livestock sector to prevent the spread of disease.

Q15

A farmer has been asked to advise on the feeding requirements for calves, from birth up to six months old.

Analyse how diet stimulates the physiological changes within the digestive system of the calves and justify the dietary requirements for the first six months of life.

(12 marks)

Mark Scheme

Band	Marks	Descriptor
4	**10-12**	Demonstrates comprehensive application of knowledge and understanding of how diet stimulates physiological changes within the digestive system. Demonstrates a comprehensive use of analysis of the physiological changes in the calves' digestive system, in relation to how diet stimulates the changes. Demonstrates comprehensive evaluative skills by justifying an excellent range of dietary requirements. Justifications are supported with highly detailed and relevant reasoning.
3	**7-9**	Demonstrates thorough application of knowledge and understanding of how diet stimulates physiological changes within the digestive system. Demonstrates a thorough use of analysis of the physiological changes in the calves' digestive system, in relation to how diet stimulates the changes. Demonstrates thorough evaluative skills by justifying a good range of dietary requirements. Justifications are supported with mostly detailed and relevant reasoning.
2	**4-6**	Demonstrates good application of knowledge and understanding of how diet stimulates physiological changes within the digestive system. Demonstrates a good use of analysis of the physiological changes in the calves' digestive system, in relation to how diet stimulates the changes. Demonstrates good evaluative skills by justifying a moderate range of dietary requirements. Justifications are supported with some detail and relevant reasoning.
1	**1-3**	Demonstrates basic application of knowledge and understanding of how diet stimulates physiological changes within the digestive system. Demonstrates a basic use of analysis of the physiological changes in the calves' digestive system, in relation to how diet stimulates the changes. Demonstrates basic evaluative skills by justifying a limited range of dietary requirements. Justifications are supported with minimal detail and relevant reasoning.
	0	**No relevant material**

	Indicative content **Analysis of how diet stimulates physiological changes** • At the early stage of life, calves cannot digest the fibrous feeds that mature cows can digest. This is due to the rumen not yet functioning and the fibre not being successfully broken down. • Roughage is a source of fibre which is used to stimulate rumen/reticulum development in the calf. This is because the presence of roughage in the rumen stimulates rumen contraction to help empty it, building up the muscular layer. • Roughage eg hay and straw, is introduced slowly into the diet early in life to aid with rumen/reticulum development by promoting growth of the rumen's muscular layer as it begins the process of breaking down roughage introduced into the diet as well as helping to maintain the health of the rumen lining. • During the calves' rumen/reticulum development, palatable concentrates are required to be fed to the developing rumen/reticulum. Calves need palatable concentrates in early life which, along with fresh clean drinking water, provide the rumen microbes with the nutrients they need to grow and multiply so all food can be digested and successfully broken down/fermented when the rumen/reticulum is fully developed, providing the calf with the required energy. • Fresh clean drinking water and palatable concentrates initiate the process of bacterial fermentation, which produces volatile fatty acids encouraging the development of the rumen as well as increasing absorption in the developing rumen. **Justification of dietary requirements** • Milk/milk replacer does not directly cause physiological changes to the digestive system, but it is an important first stage of the calves' diet because it contains the required amount of protein to meet the calves' nutritional requirements in order to help with growth rates. • Milk/milk replacer is suitable for the calves' diet from birth to weaning. for the following reasons: - Calves are born with a fully developed abomasum for colostrum/milk/milk replacer digestion. - Oesophageal groove reflex in the new-born calf takes colostrum/milk/milk replacer straight to the abomasum and prevents it entering the rumen which is not yet functioning at this stage. - Calves are well adapted to drinking milk/milk replacer in early life, so they are able to get required nutrients/adequate nutrition before the rumen/reticulum develops. • Roughage eg hay and straw, is introduced slowly into the diet early in life. The roughage must be high-quality and palatable in order to encourage intake by the calf to promote this physiological change in the digestive system. The rumen/reticulum develops as the animal gets older and this enables the digestion of bulky feeds as the animal gets older and physically larger and requires more energy within their diet obtained from these bulky feeds. • Concentrates provide energy and protein are fed alongside milk/milk replacer and roughage which is an important factor in the development of the rumen/reticulum. Concentrates are very important as a dietary requirement as the calf develops and gets closer to weaning for adequate nutrition. The intake of concentrates is important in ensuring a smooth transition from milk feeding to an adult diet at weaning without setbacks to growth.

	• Clean drinking water is important in order to aid successful digestion of concentrates and in order to ensure the rumen develops fully. As soon as the rumen is developed the calf is better adapted to obtaining its nutritional requirements from more fibrous feeds.
Total marks	12
AO	AO2 – 4 AO3a – 4 AO3b – 4
Qual spec reference	5.1 Anatomy and physiology systems of livestock.

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