Assessment Schedule – 2016

Agricultural and Horticultural Science: Demonstrate understanding of how NZ commercial management practices influence livestock growth and development (91294)

Assessment Criteria

Question ONE: Calving beef heifers

Achievement	Achievement with Merit	Achievement with Excellence
Describes how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out.	**Explains** how low calf birthweight and calving ease in heifers improves overall calf growth and development.	**Evaluates** the effectiveness of low birthweight and calving-ease sires by explaining how they would improve calf numbers and their effect on the economics of production.

N1	Some writing, but does not describe how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out.
N2	Partial or insufficient description of how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out.
A3	Describes how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out.
A4	Fully describes how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out, with reference to growth rates.
M5	Explains how low calf birthweight and calving ease in heifers improves overall calf growth and development, linking to growth rates.
M6	Fully explains how low calf birthweight and calving ease in heifers improves overall calf growth and development, linking food utilisation and energy intake to growth rates.
E7	Evaluates the effectiveness of low birthweight and calving-ease sires by explaining how they would improve calf numbers and their effect on the economics of production. Comprehensive evidence for superiority in ONE aspect, with the other aspect well supported.
E8	Evaluates the effectiveness of low birthweight and calving-ease sires by explaining how they would improve calf numbers and their effect on the economics of production. Comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Q1	Sample Evidence
(a)	**Describes** how selecting bulls with a genetic tendency for low birthweight and calving ease is carried out. Birthweight is a more heritable trait than calving ease, meaning it is less influenced by management practices and other environmental influences and more by genetics. Direct calving ease is the genetic contribution of the calf to its own ability to be born unassisted, primarily because of its size, shape, and length of gestation. Bulls are selected by the farmer on the basis of these targeted attributes. Using a bull's genetic attributes for calving ease and birthweight is an accurate predictor of calf birthweight and calving ease. The resulting calf will inherit the characteristics of low birthweight and calving ease from the bull, resulting in the calf having a lower birthweight and being calved easier than normal by the heifer.
(b)	**Explains** how low calf birthweight and calving ease in heifers improves overall calf growth and development. As the heifers are only two years old, they are not fully grown, so their pelvic size is small. This means that larger birthweight calves are hard to push out. It is also the heifer's first calf, making it harder to calve. Reducing calf birthweight and improving calving ease in two-year-old heifers means that less assistance is required and that more calves are born alive. They will also be able to maximise the intake of digestible energy and protein required for growth, and muscle and tissue development. A calf needing assistance is more likely to get sick, largely due to the longer time from birth to initial nursing, which inhibits the amount of colostral antibodies absorbed through the calf's intestinal wall. Sick calves have higher mortality rates, and if they survive they will have lower growth rates.
(c)	**Evaluates** the effectiveness of low birthweight and calving ease sires by explaining how they would improve calf numbers and their effect on the economics of production. Reducing calf birthweight and improving calving ease in heifers means that less assistance is required in labour and that more calves are born alive, reducing economic loss. The stress, or even injury, sustained in a prolonged or assisted labour means heifers are less likely to claim back their calves. Also, calves born with difficulty are less healthy later in life, due to lower intake of colostrum. Heifers injured at birth are less likely to conceive at first mating, and some will need to be culled due to permanent injury. Overall, assisting heifers with calving costs time and money, reduces calf numbers, and results in less favourable economics of production.

Question TWO: NAIT tagging of livestock

Achievement	Achievement with Merit	Achievement with Excellence
Describes how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer.	**Explains** how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer.	**Justifies** the use of NAIT tagging to improve the quality of New Zealand's national cattle or deer herds, with reference to the economics of production.

N1	Some writing, but does not describe how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer.
N2	Partial or insufficient description of how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer.
A3	Describes how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer.
A4	Fully describes how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer, with reference to growth rates.
M5	Explains how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer, linking to growth rates.
M6	Fully explains how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer, linking food utilisation and energy intake to growth rates.
E7	Justifies the decision to use NAIT tagging to improve the quality of New Zealand's national cattle or deer herds, with reference to the economics of production. Comprehensive evidence for superiority in ONE aspect, with the other aspect well supported.
E8	Justifies the decision to use NAIT tagging to improve the quality of New Zealand's national cattle or deer herds, with reference to the economics of production. Comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Q2	Sample Evidence
(a)	**Describes** how using NAIT tagging assists in monitoring the health, growth, and development of cattle or deer. NAIT tags need to be inserted, using an applicator, in the central part of the right ear, with the white "female" part of the tag facing forward. This allows the accurate recording of production details about individual animals, such as their weight, health issues, breeding information, and milk production, and can be used to automate drafting of animals on predefined conditions. This information can be used to improve the animal's growth and development by identifying an animal that is sick and acting accordingly. Infectious diseases can spread rapidly throughout a herd, impeding their growth or even killing them. **Explains** how NAIT tagging assists in monitoring the health, growth, and development of cattle or deer. NAIT tagging means farmers, farms, and livestock are all linked. The livestock can be traced using the RFID tags. These tags are registered in a national database which stores details such as the animal's location, its movements throughout its life, and the farmer who owns it. This traceability means that if an animal is diagnosed with a disease such as tuberculosis (TB), other animals that have been in contact with it on any farm can be traced and tested for that disease. If an animal tests positive for TB, it is usually killed in order to keep the rest of the herd disease-free. Being TB-free ensures that animals maximise growth rates to maturity, as they have a higher feed intake and better utilise pasture, resulting in greater growth and higher liveweight gain. Higher feed intake increases digestion and absorption of nutrients, maximising the intake of digestible energy and protein required for growth, and muscle and tissue development.
(b)	**Justifies** the use of NAIT tagging to improve the quality of New Zealand's national cattle or deer herds, with reference to the economics of production. Tagged stock add value for lifetime traceability. The three main benefits are biosecurity, food safety / market access, and farm management. Being able to contain the disease through eradication improves the quality of New Zealand's national cattle and deer herds, and means that we can continue to export our meat products. By being TB-free, New Zealand is protecting the beef, dairy, and deer sectors from lost livestock production and value, as consumers view these food products as being of high quality. The use of NAIT tagging is an insurance policy and provides consumers with assurance about food safety and market access. If the NAIT tagging scheme was not mandatory, the number of animals with the disease would increase to unacceptable levels and jeopardise New Zealand's export trade in beef, dairy, and deer products, as consumers would not buy our food products, and there would be significant losses in export income. There are significant economic benefits, because when the farmer sells the animals, he or she can supply documentation outlining their treatments, withholding periods, and herd status, which add real market value, increasing the economics of production.

Question THREE: Velvet production in stags

Achievement	Achievement with Merit	Achievement with Excellence
Describes TWO management practices that deer farmers use to minimise damage to velvet on stags.	**Explains** how a management practice affects the growth and development of velvet, minimising potential damage and therefore ensuring the quality of the product.	**Justifies** how these velvet-harvesting management practices promote high quality velvet production for export, and good economic returns.

N1	Some writing, but does not describe TWO management practices that deer farmers use to minimise damage to velvet on stags.
N2	Partial or insufficient description of TWO management practices that deer farmers use to minimise damage to velvet on stags.
A3	Describes TWO management practices that deer farmers use to minimise damage to velvet on stags.
A4	Fully describes TWO management practices that deer farmers use to minimise damage to velvet on stags, with reference to velvet growth, and development or quality.
M5	Explains how a management practice affects the growth and development of velvet, minimising potential damage and therefore ensuring the quality of the product, showing links to velvet growth and development.
M6	Fully explains how a management practice affects the growth and development of velvet, minimising potential damage and therefore ensuring the quality of the product, linking food utilisation and energy intake to velvet growth and development.
E7	Justifies how these velvet-harvesting management practices promote high quality velvet production for export, and good economic returns. Comprehensive evidence for superiority in ONE aspect, with the other aspect well supported.
E8	Justifies how these velvet-harvesting management practices promote high quality velvet production for export, and good economic returns. Comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Q3	Sample Evidence
(a)	**Describes** TWO management practices that deer farmers use to minimise damage to velvet on stags. When yarding stags, never have large numbers in the yard area at any one time. Instead, bring the stags into a properly designed, large holding pen in groups of 50, then divide into appropriate numbers, depending on pen size. To avoid overcrowding, pile-up, and broken velvet, there should not be any more than five to a pen, and ensure there are no alarming noises or unusual visual stimuli. Mob size should be balanced with facility size, as most stress and potential for damage occurs through overcrowding in yards, particularly at first yarding. A settling period should be provided to ensure stags return to normal behaviour. Sort stags into groups of early, medium, and late velvet removal. It pays to do this before velvet is much longer than the brow tine to avoid damage. Avoid mixing mobs of stags once in full velvet, as this can cause fighting and velvet damage. Avoid grouping different age groups, breed types or known aggressive individuals together, as this will increase stress, due to older stags being dominant, and therefore they will fight, increasing the chances of injury and velvet damage. Care needs to be taken when giving supplements in the later stages of velvet growth. If supplements are not well spread out, stags can scrap over feed, causing damage to velvet. **Explains** how a management practice affects the growth and development of velvet, minimising potential damage and, therefore, ensuring the quality of the product. Using a management practice that minimises velvet damage ensures good growth and development of the velvet. Velvet antler is defined as growing antler that has an abundant blood and nerve supply, and fully intact skin with a covering of soft, fine hair. Velvet antler is very sensitive during this growth phase, and the male deer are protective of it and non-aggressive. Velvet antlers grow very rapidly, at a rate of up to 2 cm a day. Damaged velvet's development can be further deformed. Velvet antlers are easily bent or broken and can grow in unusual shapes. If the velvet is damaged at the pedicel, the base below the coronet, often it will never grow properly again. Broken tines stay broken until the antlers are finally shed or cut off, and broken velvet can affect the health of the deer. The stags can get infections through the broken velvet during the growth period, as there is still an active blood supply going to the velvet. Being injury-free ensures that stags maximise velvet growth rates, as they have a higher feed intake and better utilisation of pasture, which results in greater velvet growth. Good nutrition is required for the antlers to grow to the animal's full genetic potential. Minerals obtained from the diet, such as calcium and phosphorus, are likely to be the key source of antler material. Quality feed increases digestion and absorption of nutrients, maximising the intake of digestible energy and protein required for growth, muscle, and tissue development. Carrying out management practices that minimise damage to the velvet help to ensure that it will reach the highest possible grade.

(b)	**Justifies** how these velvet-harvesting management practices promote high quality velvet production for export and good economic returns. Velvet is harvested after 55–60 days of growth, for Oriental medicine, which seeks optimal nutrient levels. After that, the velvet's nutrient value will be compromised by further growth. If harvested too early, the farmer will miss out on expected growth; if harvested too late, mineral deposition occurs which reduces the quality of the velvet, resulting in it being downgraded and its price reduced. Safe, high-quality velvet removal practices, such as controlled surgical procedures carried out by an approved technician, ensure that animal welfare standards are met. This has direct economic benefits through enabling continued market access to countries that do not practice velvet removal. In addition, it is important to maintain a credible system to control the use of animal remedies in food-producing animals; failure to do so could result in the loss of access to markets through the use of non-tariff trade barriers. Ultimately, having high standards of welfare benefits not only the animals but also the farmers and exporters, through enhanced productivity and better access to international markets. Safe, hygienic handling practices during storage and freezing include freezing as soon as practicable after removal to minimise bacterial growth; handling in a manner that distributes blood content evenly through the velvet, ensuring a high quality product; and having a dedicated velvet freezer with a clean interior and hygienic work surfaces that ensure no cross-contamination from other products or micro-organisms. Velvet is a food product, therefore any velvet with food safety risks must not be sold for human consumption. In particular, Deer Pox and ringworm are contagious and can be transferred to humans. Ensuring safe and hygienic practices eliminates these issues and ensures a quality export product with high economic returns.

Cut Scores

Not Achieved	Achieved	Achievement with Merit	Achievement with Excellence
0–7	8–12	13–18	19–24