

Leaving Certificate Higher Level Dairy Production Questions

2012

Option One

3. (a) Using a table or pie-chart, show the composition of cow's milk.

(b) (i) List **four** factors that can cause changes in milk composition.
(ii) Fully explain any **two** of the factors referred to above.

(c) Contamination of milk is a problem in milk processing.
(i) List **three** contaminants of milk.
(ii) Describe an experiment to test the hygienic quality of milk.
6. (b) Suggest a suitable mastitis-prevention programme in a spring-calving dairy herd.

(c) Outline the role of any **one** hormone in milk production in a lactating cow.

[Marking Scheme2012](#)

2011

1. (b) (i) What is meant by *condition scoring* in cows?
(ii) Give the recommended condition scores for a dairy cow at service and calving.

Option One

3. (b) Describe **four** qualities a farmer would look for when selecting replacement heifers for a dairy herd.

Option Two

3. (b) (i) Explain why a young animal should receive colostrum in the first day of life.
(ii) List three benefits of colostrum to the young animal.
5. (c) Red water fever in cattle is caused by a parasite. One symptom of the condition is that an affected animal's urine turns red.
Explain the reason for the red colour of the urine.
9. Give a scientific explanation for ... the following:
(b) Progeny testing of A.I. bulls.

[Marking Scheme2011](#)

2010

1. (c) Account for the increasing popularity of maize silage as a feed for dairy cows.

Option One

3. (a) The calving records on a dairy farm in one year show:
30% purebred Friesian calves born, 55% Continental X Friesian and
15% Aberdeen Angus X Friesian.

The farmer relies on A.I. and has no stock bull. He breeds his own replacements.

- (i) Why was the Friesian breed used **and** on which of his cows?
- (ii) Why are continental sires used for most inseminations?
- (iii) Why are Aberdeen Angus bulls used?
- (iv) What is his replacement rate for culled cows?

(b) Describe the physiological processes involved in the let-down of milk in farm animals.

(c) Suggest **four** reasons why dairies will not accept milk from cows that have been recently treated for mastitis.

[Marking Scheme2010](#)

2009

1. (c) In relation to dairy cows state, in days, the length of each of the following:
- (i) Gestation
 - (ii) Lactation
 - (iii) Oestrous.

Option One

3. (a) Outline the contrasting breeding strategies employed in two differing dairy farms, one involved in liquid milk production, the other a creamery milk supplier.
- (b) For a spring-calving maiden heifer construct a graph showing her growth-curve over the two-year period. Your graph should indicate target weights at:
- (i) birth
 - (ii) first winter housing
 - (iii) service
 - (iv) calving.
- (c) Give **three** reasons for the rest period between the end of one lactation and the start of the next.

[Marking Scheme2009](#)

2008

4. Describe a laboratory or field method to determine ... the following:
- (c) The butterfat content of milk.
5. (a) Describe how a farmer can ensure the production of high quality milk under the following headings;
- (i) hygiene
 - (ii) composition.
- (b) For a spring-calving herd, describe the feeding practices for a cow during the following periods;
- (i) early lactation,
 - (ii) mid-lactation,
 - (iii) late lactation.

6. (a) Account for the different nutrient compositions of a dairy ration and a beef ration.
- (b) Describe the feeding programme for a calf from birth to weaning in a spring-calving dairy herd.

[Marking_Scheme2008](#)

2007

1. (a) To measure how intensively a farm is being managed, the term livestock unit per hectare is used. Explain the term livestock unit and give an approximate value for the livestock unit per hectare for an intensively managed dairy farm.
6. (a) Outline the precautions taken to reduce mortality at calving time in a dairy herd.
- (c) The following table shows the effect of body condition score (BCS) at calving on milk production in early lactation.

Treatment	BCS	Milk Yield kg/cow/day	Milk Fat %	Milk Fat kg/cow/day	Milk Protein %	Milk Protein kg/cow/day
A	2.73	25.50	3.71	0.94	3.14	0.80
B	3.00	26.50	3.81	1.01	3.18	0.84

- (i) What is meant by a body condition score?
- (ii) What is the relationship between body condition score and milk yield in the data above?
- (iii) What is the total yield of fat plus protein under treatment A?
- (iv) State **two** factors, other than BCS, that may influence the percentage of fat in milk.
9. Give a scientific explanation for ... the following:
- (c) Feeding bought-in calves only water and glucose for the first 24 hours on arrival on a farm.

[Marking_Scheme2007](#)

2006

6. (b) Explain the following in relation to a dairy cow:
- (i) Length of lactation period
- (ii) Lactation curve
- (iii) The relationship between lactation peak and total lactation yield
- (iv) The management of feeding in a spring-calving dairy herd to ensure the potential lactation peak is achieved.
8. (a) (i) Describe **three** ways by which the health of a calf is influenced by its intake of colostrum after birth.
- (ii) Describe **two** environmental factors that need to be considered when housing farm animals.
- (iii) In animal production there are target weights that must be achieved. In the case of replacement heifers give **three** reasons for reaching these targets.

[Marking_Scheme2006](#)

2005

4. Describe a laboratory or field method to show ... the following:
 - (b) The bacterial quality of a sample of milk.

6. (c) Explain why cows usually lose body weight for a period of time after calving.

8. (a) (i) State the recommended age and body weight of a dairy heifer at first mating.

9. Give a scientific explanation for ... the following:
 - (b) Teat dipping of cows after milking.

[Marking Scheme2005](#)

2004

Option Two

3. (c) Outline the farm practices carried out in the production of high quality milk in a dairy enterprise.

4. Describe a laboratory or field method to show ... the following:
 - (d) The percentage of water and solids in a sample of milk.

8. (a) (ii) Distinguish between a maintenance ration and a production ration for dairy cows.

[Marking Scheme2004](#)

2003

Option One

3. (c) Write brief notes on ... the following:
 - (i) Importance of good body reserves in a cow at the time of calving.

8. (c) Explain ... the following:
 - (2) Progeny testing of dairy cows.

[Marking Scheme2003](#)

2002

5. (a) Discuss the rearing of replacement heifers on a dairy farm under the following headings:
 - (1) Growth targets
 - (2) Breeding policy

9. Give a scientific explanation for ... the following:
 - (b) The practice of including calcined magnesite in the diet of lactating cows in early spring

[Marking Scheme2002](#)

2001

Option Two

3. (c) Distinguish between the treatments used to improve the digestibility of cereal grains used as a foodstuff for (i) cows, (ii) pigs.

5. (c) Discuss the rearing of a spring-born calf out on grass under the following headings:
 - (i) disease control,
 - (ii) growth rate,
 - (iii) feeding principles.
6. (b) Describe the precautions necessary to minimise the mortality of cows at the time of calving.
8. (c) State **four** factors which influence the composition of cow's milk.
9. Give a scientific explanation for ... the following:
 - (a) The presence of a red colour in the urine of a bovine animal.
 - (d) Milking cows more frequently than twice daily increases their yields over a lactation period.

[Marking Scheme2001](#)

2000

1. (g) Explain what is meant by condition scoring of cows.

Option Two

3. (a) Write notes on ... the following:
 - (i) the principal factors which contribute to calf mortality on a farm,
 - (ii) a feeding programme for cows during their dry period.
6. (a) Explain why good bodily characteristics are desirable in new breeding stock in a named farm enterprise.

1999

4. Describe a laboratory method used to determine ... the following:
 - (i) The presence of bacteria in milk
5. (a) Explain how the systems of housing and feeding spring born calves may change between the first and second over-wintering periods.
 - (b) Describe, with the aid of a simple diagram, the variation in the conformation characteristics of named breeds of beef and dairy cows.
 - (c) Describe the advantages of allowing a reasonable rest period between the end of lactation and subsequent calving on the case of a dairy herd.

1998

Option One

3. (c) In the case of a dairy enterprise, outline a winter feeding programme, which includes silage, suitable for each of the following:
 - (i) Weanlings
 - (ii) One to two year olds.

4. (a) Describe a suitable feeding programme for cows at calving.

(b) Describe the relationship between feed intake, milk yield and body fat reserves of a dairy cow in early lactation.

9. Give a scientific explanation for ... the following:
 - (b) Land drainage of marshy ground adjacent to a dairy or sheep farm enterprise.

 - (d) Feeding 'beastings' to a calf after birth.

1997

1. (j) Mention three housing requirements of a new born calf.

6. (a) Discuss the rearing of either replacement heifers or beef cattle under each of the following headings:
 - (i) Selection of suitable calves
 - (ii) Housing and feeding of weanlings
 - (iii) Mean liveweight gain over the two-year period from birth.

1996

4. (a) Describe the methods used to control the population of microorganisms in a milking unit on a farm.

(b) Describe how bacteria present in a sample of milk may be grown in the laboratory for counting.

6. In relation to a named farm enterprise with which you are familiar:-
 - (a) describe the nature and extent of the production unit.

(b) outline a strategy you would recommend for the following:-
 - (i) Management;
 - (ii) Feeding.

2012 Marking Scheme

Option One

3. (a) Table/ pie chart 3, 1, 0m
Composition: Water 87.8%; Butterfat 3.5%; Protein 3.2%; Lactose 4.7%;
Minerals (or ash or named mineral) 0.8% Name: 4 x 1m
%: 4 x 1m
- (b) (i) Health (disease) / age / stage of lactation / diet / breed / milking interval /
morning or evening milk / stage of milking (strippings) 4 x 2m
- (ii) Health: mastitis reduces fat and protein / lameness reduces food intake
and reduce protein and fat.
Age: Butterfat and protein decline with age.
Stage of lactation: Protein and butterfat increase during the lactation.
Diet: High fibre diet increases butterfat / high protein diet (leafy grass) increases
protein.
Breed: Jersey has higher butterfat (than Holstein) / Jersey has higher protein
(than Holstein)
Milking Interval: Cows milk more in the morning and milk has
reduced butterfat. Any Two: 2 x 4m
- (c) (i) Antibiotics / bacteria / somatic cells / excess water / sediment
(soil particles) 3 x 2m
- (ii) Two sterile test tubes / two milk samples / one is a control /
add (10ml) milk to each tube / add (1ml of) Resazurin (or methylene
blue) to the samples / keep at 37°C / for 10 to 15 minutes / blue is best /
white is worst / pink or mauve or lilac (better than white, worse than blue) /
control stays blue.
OR
Two sterile petri dishes / nutrient agar in each / one is a control /
inoculate one with milk / using a sterile (inoculating) loop / seal Petri dish /
incubate at 37°C / invert / for 24 hours / compare with control / colonies of
bacteria in petri dish with milk / control is clear. 5 x 3m
6. (b) Hygiene in housing / washing udders and teats (before milking) / clean
milking machine / service milking machine / hygiene in the dairy / teat dips/
treat sores on teats / treat infected cows with antibiotics / insect control / milk
separately / cull cows prone to disease / dry cow treatment / do not over-milk
or under-milk. 4 x 4m
- (c) Oxytocin / pituitary gland / causes (muscles of) alveoli or milk secreting tissue /
to contract / forcing milk into the teat (cisterns) / resulting in milk letdown.
OR
Prolactin / pituitary gland / stimulates production of milk / in mammary glands /
maintains lactation. 3 x 4m

2011 Marking Scheme

1. (b) (i) Condition scoring = (ratio of) lean to fat on animals body / correct scale / feeling (by hand) along back. 4m
(ii) Calving 2.5-3.5, service 2-3 3m + 3m

Option One

3. (b) Replacement heifers; have good teeth / feet/ udder 4 teats / fertility / high milk yield / good conformation / comes from good EBI bull / come from mother that is prolific / good milker / docile / disease free (or healthy) / correct condition score / dairy breed or named / easy calving 4 x 4m

Option Two

3. (b) (i) Colostrum / intestine changes after 24 hours / antibodies absorbed 2m
(ii) Nutritious / laxative / good start in life / antibodies / immunity / warming / easily digested 8m + 3m + 3m
5. (c) Haemoglobin in urine / cell or red cell bursts / blood in urine 4m
9. (b) Calves or offspring are tested / growth rate / FCR / compared / with progeny of other bulls / kept under the same conditions / record kept / large statistical sample / very reliable in predicting results of a mating with a particular bull / more reliable than performance test / can predict lift in milk yield / fat or protein increase in herd. 4 x (4m+4m+4m)

2010 Marking Scheme

1. (c) High dry matter/ high dmd/ high yields/ palatable/ only one harvest/ lower cost/ high starch/ high protein
Reduces amount of concentrates needed/ Holstein-high yield cows will not get acidosis from too much meal/ climate milder/ new varieties suited to Ireland 6m + 4m

Option One

3. (a) (i) because it's a good dairy (dual purpose) breed/ on his top milkers (Friesians) 2 (2m)
(ii) beef calves for sale (or beef characteristics described) 4m
(iii) easy calving (heifers)/ small bull/ better quality beef 4m
(iv) 15-20% or correct fraction or decimal 4m
- (b) MILK LET-DOWN
cow relaxed/ when calf nuzzles udder/ milker rubs udder with wet warm cloth/ sensory nerves/ bring stimulus to brain/ oxytocin is released into blood/ from (anterior) pituitary/ oxytocin goes to udder/ causes milk alveoli to contract/ releasing milk 6m+6m+2m+2m

(c) WITHDRAWAL

antibiotics are present in the milk/ if this milk is consumed by the public/
 residues can be cause of antibiotic resistant bacteria occurring in the wider
 population/ can affect processing of milk in dairies/ affects milk quality/ high
 cell count/ stops yogurt bacteria from working/ affects cheese manufacture/
 quality control

6m+6m+2m+2m

2009 Marking Scheme

1. (c) Gestation = 280-286 days
 Lactation = 302-308 days
 Oestrous = 19-23 days

4m + 3m + 3m

Option One

3. (a) **Liquid Farm: Creamery farm:** Year-round calving (spring calving)/
 constant milk supply (break in milking)/ dairies pay for quantity (dairies pay for quality)/
 name of dairy bull pure breed (beef breed or cross)/ AI selected for kg of milk (AI selected
 for kg protein or fat)/ bull calves for veal export trade (bull calves sold to beef farmers.
 Any four contrasting points (or implied)

4 (4m)

- (b) **Both** axes labelled correctly

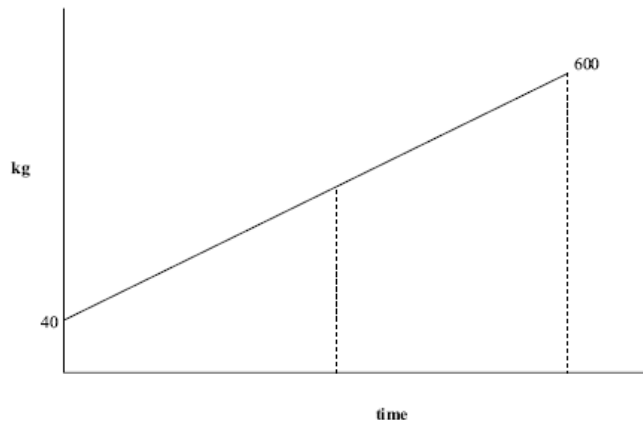
3m

Curve correct

3m

Birth = 40kg/ housing winter 1 = 200kg/ service = 300kg/ calving = 550kg

4 (3m)



- (c) Energy used up to carry calf/ energy used up giving birth/ colostrum and-or milk
 being secreted quicker than diet can replace/ milking off back/ repair of udder
 tissue/ to recover body condition (steaming up) **or** condition score stated
 Any three

5m + 5m + 4m

2008 Marking Scheme

4. (c) Sample of milk beginning of milking/ sample of milk from end of milking/
 (sample of milk: one point) bring sample to approx 20°C/ add (concentrated)
 sulphuric acid/ to butyrometer/ add milk gently down side of butyrometer/

- add (amyl) alcohol/ stopper/ invert/ transfer to centrifuge/ centrifuge/ remove samples/ place in water bath heated to 65°C/ leave/ read percentage fat from graduations/ result: 3-5% fat 6 (4m)
5. (a) (i) Clean housing/ washing cows udders and teats/ checking for mastitis/ fly control/ using filters/ wash bulk tank regularly/ wash the milk line/ milk cooled before entering bulk tank/ to 4°C/ operator hygiene 3 (3m)
- (ii) replace old cows/ use a named dairy breed/ of genetic merit (e.g. quality bull)/ good feeding/ milking interval/ health 2 (3m) + 2m
- (b) (i) fed ration/ and silage/ early grazing/ strip or paddock grazing 3m + 2m
- (ii) graze/ on leafy grass/ strip or paddock grazing 3m + 2m
- (iii) housed/ fed silage/ good autumn grass 3m + 2m
6. (a) dairy ration – more protein/ cow in calf or producing milk; More Ca/ prevent milk fever; more Mg/ prevent grass tetany (**any one difference + explanation**) 6m + 6m
- (b) colostrum/ milk/ milk replacer/ hay/ concentrates/ grass 6m + 3m + 3m

2007 Marking Scheme

1. (a) livestock unit – the number of farm livestock that consumes a quantity of food equivalent to that consumed by a mature productive cow (or 550kg animal or 5-7 sheep) 5m
- 2 – 2.5 lu per hectare 5m
6. (a) correct age at calving/ correct weight of cow/ easy calving bull/ know calving date from records/ regular inspection/ cleaning air passages/ clean environment/ fresh hay or straw/ navel dipping/ colostrum/ assist at calving/ calving jack/ reduce feeding prior to calving 6m + 6m + 3m
- (c) (i) examining animal by hand/ to assess the amount of fat cover under skin/ score range 6m
- (ii) Higher bcs gives greater yield 3m
- (iii) 1.74 3m
- (iv) age of cow/ breed/ genetics/ diet/ stage of lactation/ stage of milking 2 (3m)
9. (c) animals stressed after transport/ rehydration/ glucose for energy/ prevent

scour/ weaning on to food

6m + 3m + 3m

2006 Marking Scheme

6. (b) (i) 300 – 310 days (10 months) [allow “length of time milking”] 3m
(ii) change in milk yield (or graph of) throughout lactation period 3m
(iii) lactation peak x (200 to 220) = total lactation yield
[allow reference to direct proportion between peak and yield] 3m
(iv) concentrates/ hay or silage or grazing 2 (3m)
8. (a) (i) antibodies/ disease resistance/ nutrients/ laxative **any three** 4m + 3m + 2m
(ii) adequate space/ ventilation/ heat/ waste disposal/ water/ slats or straw/
hygienic conditions/ etc. **any two** 4m + 2m
(iii) big enough for mating/ good enough for calving/ to meet calving deadline/
potential for high milk yield/ development of reproductive organs/ financial **any three** 4m + 3m + 2m

2005 Marking Scheme

4. (b) Resazurin or Methylene Blue test/ sterile tube/ milk in tube/ add solution and stopper/ incubate/ examine colour/ blue is good quality/ pink or white is poor quality
OR
sterile/ agar plates/ inoculating loop/ smear with milk/ control/ seal/ incubate/
24 – 48 hours/ observe bacteria **any six** 6 (4m)
6. (c) cow uses energy carrying foetus/ uses energy giving birth/ milk yield increases after calving/ uses body reserves to make up deficit/ milking off back **any three** 2 (3m) + 6m
8. (a) (i) 15 months/ 300 – 320kg 2 (3m)
9. (b) teat dipped in antiseptic/ protection against mastitis or other disease 4m + 8m

2004 Marking Scheme

Option Two

3. (c) breed/ breeding programme/ AI/ top bulls/ good cows/ stripping milk/ milk recording/ culling programme/ feeding high quality foods
hygiene **one** point from: washing/ lime on bedding/ disinfecting/ cooling milk to 4°C **any four** 4 (4m)

4. (d) weigh container/ weigh sample and container/ weight of sample/ heat 105°C or boil/ weigh again/ calculate difference/ weight lost is water content/ estimate percentage of water/ estimate percentage of solids **any six** 6 (4m)
8. (a) (i) rumination (chewing)/ microbes, protozoa, fungi, flora (allow only two of these)/ in rumen/ fermentation of cellulose/ cellulose/ glucose/ regurgitation/ saliva neutralizes acid **any four** 4 (3m)
- (ii) maintenance: sufficient to maintain body weight (to maintain body condition) 6m
- production: extra food for muscle (or milk or developing embryo or growth) 6m

2003 Marking Scheme

Option One

3. (c) (i) for energy/ for lactation yield/ to produce colostrum/ for development of calf/ to prevent illness or death of cow (or calf)/ "milking off her back" **any three** 3m + 3m + 2m
8. (c) (2) Progeny testing = keeping records of animal's offspring/ growth rate/ efficiency at converting feed/ comparing with the offspring of other animals/ kept under similar conditions 3m + 3m + 2m

2002 Marking Scheme

5. (a) (1) Growth targets of calves born in January = April 72.5kg/ November 200kg/ fed good quality silage & meals over winter to reach the next target of 300kg in May/ grass for summer + meals if required/ at 2 years 450kg and 500 – 525kg before calving/ animals are not fully grown and should be fed for growth and maintenance and milk production during first lactation 4 (2m)
- (2) Heifers in heat (season / oestrus) at 8 – 12 months/ name of breed bull (idea of smaller first calf etc)/ not in calf before 15 months and 300kg/ could result in calving difficulties and will reach full size and milking potential/ heifers in calf May of 2nd year/ and will calve February at 2 years 4 (2m)
9. (b) use calcined magnesite against grass tetany – the staggers/ well-fertilised grass imbalance in magnesium can cause grass tetany 2 (6m)

2001 Marking Scheme

Option Two

3. (c) Cows - Roll barley/ break husk/ cow can now digest as it is a ruminant 2 (4m)
 Pigs – grind/ small particles/ digestive enzyme breakdown/ non-ruminant 2 (4m)
5. (c) (i) Disease control – colostrum is a natural form of immunity/ graze on fresh pastures/ head of older cattle less chance of infestation 5m
 (ii) Growth rate – born at 40kg/ grass at 80kg/ growth at a fast rate/ reasonable size to be housed in Autumn or sold 5m
 (iii) Feeding principles – mothers milk for colostrum/ whole milk/ milk replacer/ hay or grass to develop rumen/ fresh grass or hay/ creep feed 3m + 3m
6. (b) Isolate cow 1-2 days before calving/ inspect regularly/ experienced person at hand/ assistance/ vet if needed/ calf not too big for heifer – selective breeding / reduce feed for last 2 months/ choice of bull/ cow in good condition **any four** 4 (4m)
8. (c) age of animal/ feed quality/ stage of lactation/ type of cow/ breed/ time of year (spring low solids)/ time of milking (early milk low in fat to late milk)/ feed intervals/ somatic cell counts higher in older animals **any four** 4 (6m)
9. (a) Babesiosis (Babesia bovis)/ parasite spread by common tick/ destroys RBC's 2 (6m)
red water fever **6 marks only**
- (d) Milking empties the udder/ this stimulates the milk secreting alveoli to start further secretion/ higher yield results from frequent milking 2 (6m)