CAMBRIDGE

Study & Master

Support Pack | Grade 12

CAPS

Module 2 Units 6 – 7

Agricultural Sciences

Animal feed

This support pack for the **Animal feed** module in the **Agricultural Sciences Grade 12 CAPS curriculum** provides valuable revision activities. All activities have the answers provided. Learners can work through these individually at home or these could form the basis of a catch-up class or online lesson. You have permission to print or photocopy this document or distribute it electronically via email or WhatsApp.

Cambridge University Press Africa is a proudly South African publisher – we are providing this material in response to the need to support teachers and learners during the school shutdown and for the remainder of the 2020 school year.

For more information on our *Study & Master* CAPS-approved textbooks and valuable resource materials, visit ***www.cambridge.org***

We are all in this together!

Module 2 – Animal feed

Unit 6 Types of feed

Short questions

1. Various possible answers are provided for the following questions. Write only the correct letter (A–D) next to the question number.

1.1 ..... is an example of a succulent roughage.

A Silage
B Lucerne hay
C Oat hay
D Chaff

1.2 The digestibility of hay is also influenced by the age of the plant. Lucerne hay cut ..... will have the lowest digestibility.

A after the flowering stage
B during the full flowering stage
C at the beginning of flowering
D before flowering

1.3 Which ONE of the following feeds is an example of a protein-rich concentrate?

A soybean oilcake meal
B soybean hay
C yellow-maize meal
D silage

1.4 The ingredient to be included in a winter lick to regulate the intake quantities by ruminant animals is ..... .

A bonemeal
B maize meal
C fishmeal
D salt

1.5 The palatability and digestibility of a low-grade roughage for a ruminant can be improved by ..... .

A supplementing with molasses
B adding cellulose
C supplementing it with teff hay
D supplementing it with NPN sources

5 × 2 (10)

2. Change the underlined words in each of the following statements to make them TRUE.

2.1 Molasses is the compound commonly used as non-protein nitrogen source in ruminant feeds.

2.2 Fodder is a roughage feed with a high moisture content that is mostly used as a feed source for dairy cattle.

2.3 Antibiotics are nutrient supplements that are placed in a pasture field to provide the grazing animals with additional nutrients.

2.4 The correct term used for dry roughage feeds such as lucerne hay is silage.

2.5 In ruminant animals the required protein value for a ration is supplemented by adding urea, a nitrogen compound, to make the feed mixture more cost-effective.

5 × 2 (10)

3. In the table below a description and TWO possible answers are given. Decide whether the description in column B relates to A only, B only, both A and B or neither A nor B of the answers in column A.

Column A			Column B
3.1	A	Oats	Contain(s) a small percentage of digestible nutrients and a high crude fibre content
	B	Silage	
3.2	A	Lucerne hay	The feed that is the most cost effective source of carbohydrates for livestock
	B	Oatmeal	
3.3	A	Molasses	Increases the palatability and digestibility of poor roughage
	B	Hormones	
3.4	A	Maize meal	An example of a concentrate that is rich in protein
	B	Bonemeal	
3.5	A	Mineral lick	Recommended as a supplement for protein in the ration of ruminant animals
	B	Urea	

5 × 2 (10)

Longer questions

4. Read the following scenario and then answer the questions that follow.

> The digestive system of a horse is adapted to digest roughages. The large intestine is a large fermentation vessel where food is broken down into simpler and smaller substances with the aid of bacteria and other micro-organisms. The best diet for a horse is green pasture that has been well fertilised and contains other herbal plants.
>
> Horses not working need $^1/_3$ concentrate and $^2/_3$ roughage. Horses that are handled and trained need $^1/_2$ concentrate and $^1/_2$ roughage. Horses that are driven and prepared for endurance rides need $^2/_3$ concentrate and $^1/_3$ roughage in their rations. Old horses need more fibre and foals should not consume feed from their mothers' manger until they are six months old. After excessive rain when grasses in the pastures are very green and juicy, it would be risky to take the horses out of the stable as the excessively green fodder could be toxic to them.
>
> Adapted from *Farmer's Weekly*, 18 July 2008

4.1 Tabulate FOUR differences between roughages and concentrates. (8)
4.2 Supply ONE reason why the large intestine is more adapted for digesting roughages. (1)
4.3 With reference to your answer in 4.2, classify the horse as a specific type of animal according to the type of digestion. (1)
4.4 Briefly explain the difference between digestion in the horse and the cow. (2)
4.5 Supply a reason why a foal should not eat from the feed in its mother's manger until it is six months old. (1)
4.6 Supply justification for the differences in the ratios of concentrates and roughages specified for different categories of horses in the extract. (2)
4.7 Identify the type of dry roughage that is more digestible and more palatable. (1)
4.8 Name the type of roughage that has a high moisture content. (1)
4.9 Briefly explain why old horses need more fibrous feeds. (2)
4.10 Classify the grasses in the pastures that are very and juicy as a type of feed. (1)

Unit 7 Planning a feed flow programme

Short questions

1. Various possible answers are provided for the following questions. Write only the correct letter (A–D) next to the question number.

1.1 A maintenance ration is the amount of food an animal requires to support ..... .

i) vital bodily functions such as respiration
ii) meat and milk production
iii) body temperature
iv) life, production and work

Which ONE of the following combinations is correct?

A (i), (ii) and (iv)
B (ii), (iii) and (iv)
C (i) and (iii)
D (ii) and (iii)

1.2 A lactating dairy cow should be fed a ..... ration.

A production
B maintenance
C maintenance and nutritive
D maintenance and production

1.3 Which ONE does not fit? A production ration is needed for ..... .

A milk production
B reproduction
C work
D respiration

1.4 ..... are examples of feeds that are suitable to be included in a production ration.

A Maize, lucerne hay and oats straw
B Maize, teff hay and fishmeal
C Lucerne hay, maize and soya bean meal
D Lucerne hay, fishmeal and teff hay

1.5 A production ration that includes fishmeal for high-producing dairy cows ..... .

i) contains more than 60% TDN
ii) contains less than 12% digestible proteins
iii) has a high BV
iv) is a protein-rich concentrate

Which ONE of the following combinations is correct?

A (i), (ii) and (iii)
B (i), (iii) and (iv)
C (ii), (iii) and (iv)
D (i), (ii), (iii) and (iv) 5 × 2 (10)

Longer questions

2. Briefly explain maintenance rations and production rations. (4)

3. A farmer needs 500 kg of a feed mixture for his dairy cows. The feed mixture consists of sunflower oilcake meal with a CP value of 40% and maize meal with a CP value of 10,5%. The required CP of the mixture is 18%.

3.1 Use the Pearson square method to determine the ratio of sunflower oilcake meal to maize in the mixture to obtain the required CP of the mixture. (9)
3.2 Determine the percentage of each feed component in the mixture. (8)
3.3 Determine the amount of each feed component in 500 kg of the mixture. (4)
3.4 At which stage should maize be harvested to be used as silage? (2)
3.5 Classify silage as a specific type of feed. (1)

Memorandum

Unit 6

Short questions

1.1 A **1.2** A **1.3** A **1.4** D **1.5** A (10)

2.1 Urea **2.2** Silage **2.3** Mineral licks **2.4** Fodder
2.5 Non-protein nitrogen (10)

3.1 B **3.2** B **3.3** A **3.4** B **3.5** B (10)

Longer questions

4.1 Differences between roughages and concentrates:

Roughages	Concentrates
Any four: • Bulky feeds • Low % digestible nutrients • Less than 60% TDN • Low mass-to-volume ratio • High crude fibre content	Any four: • Not bulky feeds • High % digestible nutrients • More than 60% TDN • High mass-to-volume ratio • Low crude fibre content

(8)

4.2 Adaptation of large intestine to digest roughages (any one reason):
- Presence of bacteria/micro-organisms/microbes
- Large caecum that acts as fermentation vessel (1)

4.3 Non-ruminant (1)

4.4 Horse – large intestine (caecum and colon) is fermentation vessel.
Cow (ruminant) – rumen (largest component of stomach) is a fermentation vat. (2)

4.5 The stomachs of young non-ruminants are not fully developed before six months. (1)

4.6 Rations of different horses:
- Horses for endurance rides need more concentrates to supply energy and less roughages.
- Non-working horses need more roughage for maintenance and less concentrates. (2)

4.7 Protein-rich dry roughage (1)

4.8 Succulent roughage/Forage (1)

4.9 Old horses do not work or produce any more, so they do not need protein-rich feed for production purposes or energy for work. (2)

4.10 Succulent roughage/Forage (1)

Unit 7

Short questions

1.1 C **1.2** D **1.3** D **1.4** C **1.5** B (10)

Longer questions

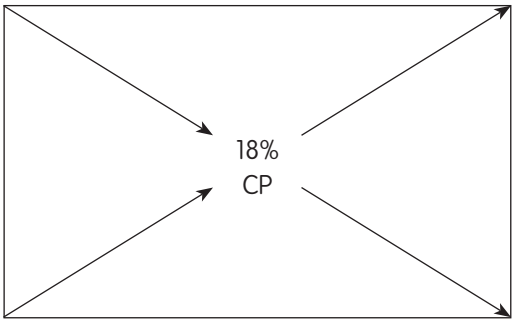
2. Maintenance ration:
- The minimum amount of feed an animal needs to stay alive and in good condition
- Does not supply enough energy for work or production

Production ration:
- The additional amount of feed over and above the maintenance ration
- Used to produce products such as meat, milk, wool and eggs as well as energy for work (4)

3. The Pearson square is prepared as follows:
- Draw a Pearson square.
- Place the desired ratio crude protein percentage in the centre of the Pearson square.
- Label the feeds with their crude protein percentages at the top (Feed 1) and bottom (Feed 2) left-hand corners.

- Label the feeds on the right-hand corners as well.
- Subtract the nutrient requirement (middle of square) along the diagonal lines from the nutrient concentration for feed 1 (top left-hand corner) and write the answer at the bottom right-hand corner. For feed 2 the nutrient concentration (bottom left-hand corner) is subtracted diagonally from the nutrient requirement (middle of square) and the answer is written at the top right-hand corner.
- Add the parts of the two feeds on the right-hand side to get the total.

3.1 **Feed 1**
Sunflower oilcake meal 40%



Sunflower oilcake meal
(18% – 10,5% = 7,5 parts)

Feed 2
Maize meal 10,5%

Maize meal
(40% – 18% = 22 parts)

Ratio: Sunflower oilcake meal : Maize = 7,5 : 22
OR
Mix 7,5 parts of sunflower oilcake meal with 22 parts of maize meal

Total = 7,5 + 22
= 29,5 parts

(9)

3.2

Calculation of % sunflower oilcake meal in the ration:

$$\frac{\text{Parts of sunflower oilcake meal in mixture}}{\text{Total parts in the mixture}} \times \frac{100}{1}$$
$$= \frac{7,5}{29,5} \times \frac{100}{1}$$
$$= 25,424\% = 25,4\%$$

Calculation of % maize meal in the ration:

$$\frac{\text{Parts of maize meal in mixture}}{\text{Total parts in the mixture}} \times \frac{100}{1}$$
$$= \frac{22}{29,5} \times \frac{100}{1}$$
$$= 74,576\% = 74,6\%$$

(8)

3.3

$$\text{Sunflower oilcake meal} = \frac{25,4}{100} \times \frac{500}{1}$$
$$= 127 \text{ kg}$$

$$\text{Maize meal} = \frac{74,6}{100} \times \frac{500}{1}$$
$$= 373 \text{ kg}$$

(4)

3.4 When the plant is green and juicy and the fruit immature (2)

3.5 Succulent roughage (1)