

The University of Melbourne
Land and Food Resources

Semester 1, 2005

208263 Animal Science & Nutrition

Reading time: 10 minutes

Writing time: 2.5 hours

This paper has fifteen pages plus the multi-choice answer sheet at the end.

Authorised Materials:

Apart from writing materials, students may bring a simple calculator, which does not have a text storage function.

Instructions to Invigilators:

1. Each student should receive a question paper, an answer sheet for Section A and three written answer booklets for Section B
2. All calculations and other “scrap” writing must be written in the answer books provided and submitted.
3. The question paper must be submitted with the answers.
4. Supervisors at remote locations may contact the subject coordinator on 0419516135 or via reception, Dookie on 0358 339200

Instructions to Students:

1. Total marks 100: Section A - 50 marks. Section B - 50 marks
2. Answer all questions in Section A on sheet provided (back page)
3. Answer questions in Section B in the booklets provided
4. Section B: answer each question in a separate booklet as directed

Section A Multiple choice (50 marks)

This section has 50 questions. There are four options for each statement – A, B, C, D. Indicate the best option by crossing on the answer sheet provided –

A ~~B~~ C D indicates that you have selected option B

If there is any doubt about the option you have selected, it will be marked incorrect. If there is likely to be any doubt, write the option you have chosen to the right of the answer box.

1. Which of the following is *NOT* a measure of female fertility?
 - A. ovulation rate
 - B. pregnancy rate
 - C. number of offspring born per animal served
 - D. condition score

2. Which of the following does *NOT* have the potential to improve reproductive efficiency?
 - A. AI
 - B. sex determination
 - C. embryo transfer
 - D. good management

3. Which of the following will respond to PGF₂α?
 - A. a cow on day 8 of her oestrus cycle
 - B. a cow on day 2 of her oestrus cycle
 - C. a cow with a Graafian follicle
 - D. a cow that is not cycling

4. Which of the following hormones is used for super-ovulation?
 - A. prostaglandin F₂α
 - B. pregnant mare serum gonadotrophin
 - C. progesterone
 - D. oestrogen

5. Which of the following would be considered a state and not event in the behaviour recording of cattle?
- A. bellowing
 - B. pawing the ground
 - C. mounting
 - D. ruminating
6. Which of the following lists of behaviours could not be accurately represented on a piechart?
- A. standing, grazing, ruminating
 - B. bellowing, interacting with other cows, pawing ground, other
 - C. grazing, ruminating, doing nothing, other
 - D. lying, standing, walking
7. Which of the following lists contains only animals where the rumen is the major site of microbial fermentation?
- A. camel, sheep, deer
 - B. buffalo, horse, rabbit
 - C. human, horse, rabbit
 - D. pig, kangaroo, camel
8. Select the most typical energy (MJ/kg DM) and protein values (CP%) for a feed lot ration fed *ad lib.* to beef cows
- A. 20 MJ/kgDM and 15% CP
 - B. 20 MJ/kgDM and 25% CP
 - C. 12 MJ/kgDM and 15% CP
 - D. 12 MJ/kgDM and 25% CP
9. The feed analysis acid detergent fibre refers mainly to:
- A. the density of the ration
 - B. the cellulose and lignin in the ration
 - C. the Browning value of the ration
 - D. the acidity of the ration
10. Which of the following usually differentiate animal based ingredients from plant ingredients: Animal based ingredients usually have?
- A. higher ether extract and protein and no fibre
 - B. lower ether extract, lower ADF and ash
 - C. higher protein and nitrogen free extract
 - D. A and C are both correct

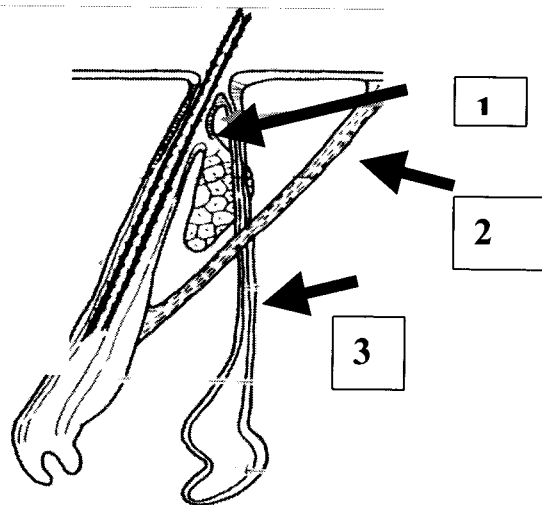
11. The daily dry matter intake of a 450kg steer is most likely to be:
- A. 5kg DM/d
 - B. 10 kg DM/d
 - C. 15 kg DM/d
 - D. 20 kg DM/d
12. High cereal grain diets can be dangerous if not introduced carefully because:
- A. cereal grains are acidic
 - B. rumen bacteria must be replaced by protozoa
 - C. cereal grain is calcium deficient
 - D. rumen metabolism can produce too much acid
13. Intake of a feed which is low in rumen degradable protein and high in energy may result in:
- A. faster rumen turnover
 - B. greater production of urea
 - C. less microbial biomass production than is possible
 - D. increased ammonia absorption
14. Ruminants differ from monogastrics in that:
- A. digestion is aerobic in monogastrics and anaerobic in ruminants
 - B. only ruminants have microbes in their digestive tracts and monogastrics use enzymes to digest food
 - C. only monogastrics produce hydrochloric acid and ruminants produce pepsin to digest protein
 - D. monogastrics use glucose and ruminants use fatty acids as their major energy source
15. One nutritional advantage for pregastric fermenters is:
- A. they are able to convert cheap, non-protein sources of nitrogen into protein
 - B. they are able to increase the efficiency of glucose synthesis for production
 - C. they can utilise high quality protein more efficiently
 - D. they can produce their own minerals, reducing the occurrence of deficiencies
16. One reason that rumen undegradable protein is required for high production, even on high protein feeds is because:
- A. it improves the efficiency of rumen metabolism
 - B. it reduces acidosis
 - C. it is an important source of propionate in the small intestines
 - D. it supplies additional amino acids to the circulation

17. The addition of a urea supplement to ruminant diets would be limited to low levels because:
- A. urea can rapidly increase ammonia to toxic levels
 - B. the energy in urea causes rapid production of lactic acid
 - C. urea competes with amino acids for microbial energy metabolism
 - D. most rumen microbes are inhibited by urea even at low levels
18. Which of the following statements about young ruminants compared to adults is true
- A. In young ruminants the abomasum is the major stomach and their digestion is more like that of a monogastric
 - B. Young ruminants have different microorganisms which digest milk much more efficiently than adults
 - C. Young ruminants need more fibre to scratch their rumen
 - D. A), B) and C) are all true
19. In horses, microbial digestion is achieved by:
- A. a large and complex caecum and large intestines
 - B. a large sac in the distal end of the colon
 - C. an additional reticulum
 - D. an extended jejunum with sacculated pockets
20. Given that a sample of oats has an energy value of 11.5 MJ/kg DM and a sample of lucerne hay has an energy value of 7.5 MJ/kg DM . What percentage of oats would give a mix with an energy value of 10 MJ/kg DM
- A. 37.5
 - B. 50.0
 - C. 62.5
 - D. 77.5
21. What is a reasonable recommendation for minimum fibre in a diet fed *ad lib.* to rapidly growing lambs?
- A. > 5%
 - B. > 10%
 - C. > 20%
 - D. > 40%

22. In a trial with sheep, the diet dry matter (DM) was found to contain 850 g DM / kg fresh weight. The faeces contained 300g DM / kg fresh weight. The sheep ate 900 g of the fresh ration per day and 800g of "wet" faeces were collected each day. Which of the following is closest to the dry matter digestibility of the diet?
- A. 48%
 - B. 58%
 - C. 68%
 - D. 78%
23. "Metabolisable Energy" in ruminants refers to the energy available after losses in:
- A. faeces
 - B. faeces, and urine and heat
 - C. faeces, urine and gas
 - D. urine, gas and heat
24. Feeding diets with higher fibre concentration will often result in greater amounts of:
- A. propionate being absorbed from the rumen
 - B. lactate being absorbed from the rumen
 - C. acetate being absorbed from the rumen
 - D. microbial protein which is found in the small intestines
25. Even on high diets with relatively high fibre, animals can suffer digestive upsets that it was intended to prevent because:
- A. the fibre form, can affect how long it stays in the rumen
 - B. some fibres will not produce sufficient amino acids
 - C. some fibres lack buffering capacity
 - D. the fibre can be absorbed from the rumen too fast
26. Compensatory gain is:
- A. the advantage in weight of the heavier animals at the beginning of a growing period.
 - B. the ability of animals which have been restricted in growth to grow more rapidly than better fed animals, when placed on good feed
 - C. the gain which cannot be measured until the end of the growing period
 - D. the difference in weight between well fed and poorly fed animals

27. The medulla is:
- A. the hollow found in some fibres
 - B. a solid keratin core found in some fibres
 - C. a rough surface layer surrounding the wool fibre
 - D. a small area of mitotic cells in the base of the wool
28. Nutrition can affect follicle size, although changes in follicle size are slow. In general, larger follicles produce:
- A. fibres with a stronger cuticle
 - B. fibres with lower staple strength
 - C. fibres with a thinner cortex
 - D. fibres with a higher fibre diameter

For Q29 and 30, Consider the following diagram of a fibre producing structure in the skin of a sheep



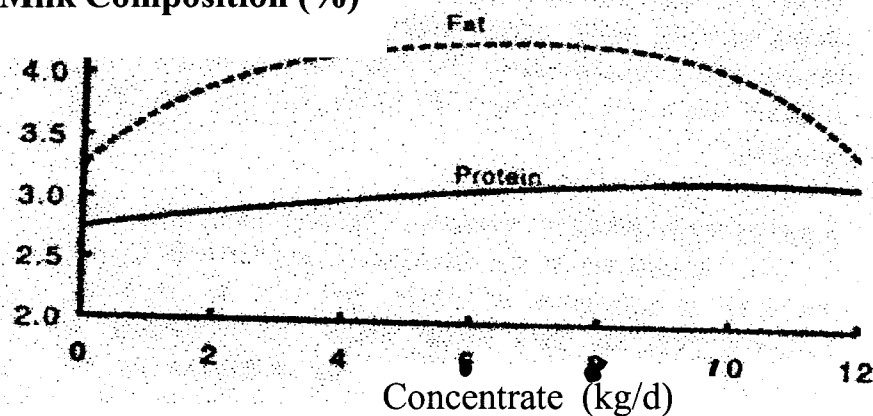
29. This is a diagram of
- A. a primary follicle
 - B. a secondary follicle
 - C. a tertiary follicle
 - D. a primary and a secondary follicle combined
30. Label 2 indicates
- A. a sebaceous gland
 - B. a suint gland
 - C. a muscle
 - D. a medulla

31. When sheep with the same micron are compared the ones, which are genetically superior for wool yield:
- A. have higher crude protein intakes
 - B. eat more nutritious diets
 - C. have a more efficient metabolism
 - D. have a higher concentration of amino acids in their wool
32. Older bulls produce meat, which is tough. One reason for this is that bulls :
- A. have a greater proportion of insoluble connective tissue
 - B. have a greater proportion of glycogen than younger animals
 - C. are stronger than steers or heifers
 - D. have higher testosterone which binds actin and myosin
33. Beef with a pH around 5.5 can have better flavour and keeping quality because at this pH
- A. amylases release sugars which inhibit spoilage and taste good
 - B. lipases release fatty acids which inhibit spoilage and taste good
 - C. proteases prefer this pH and spoilage microbes do not
 - D. cold shortening at this pH reduces spoilage and enhances quality
34. Carcass temperature at the start of *rigor mortis* is important because:
- A. calcium is released at temperatures above 5 °C
 - B. there is more glycogen at higher temperatures
 - C. carcasses at temperatures above 15 °C do not begin *rigor mortis*
 - D. the strength of rigor contraction is greater below 10 °C
35. Pre-slaughter stress in well-fed pigs can cause pale soft exudative pork. This is due to:
- A. depletion of lactic acid reserves pre-slaughter
 - B. low glycogen pre slaughter due to stress
 - C. breakdown of myoglobin post slaughter
 - D. a high level of lactic acid post slaughter
36. Myoglobin is
- A. a protein which holds water strongly
 - B. a breakdown product of ageing enzymes
 - C. a muscle protein which is red when it binds oxygen
 - D. a compound which bind muscle to bone

37. For a specified market fatness (e.g. fat depth) later maturing steers would be saleable at:
- similar weights early maturing steers
 - similar ages to early maturing steers
 - heavier weights than early maturing steers
 - lighter weights than early maturing steers
38. When suckling or milking occurs, cows “let down” their milk. This is a result of:
- rising adrenalin levels cause the milk cistern to contract
 - rising oxytocin levels cause the contraction of myoepithelial cells
 - falling prolactin levels stimulate the teat sphincter to relax
 - an increase in both oxytocin and prolactin cause secreting cells to contract

Response of dairy cows on pasture and fed increasing levels of concentrate supplement

Milk Composition (%)



39. Consider the diagram above. Which of the following comments is true:
- butterfat depression starts to occur when concentrate intake exceeds about 50% of total dry matter intake
 - increasing protein intake causes an initial rise in butterfat then a decline
 - feeding concentrate at more than 4 kg/d is no use
 - concentrate should be fed at 6 kg/d
40. Before calving dairy cows need to be in reasonable condition because:
- they produce colostrum which has a very high energy demand
 - post calving energy intake will be insufficient to meet requirements
 - mobilising fat will increase butterfat percentage
 - calcium is required post calving

41. Whey contains
- A. none of the calcium in the milk
 - B. many small micelles of casein and lactose
 - C. the water and other substances left behind when casein is precipitated
 - D. a protein which is precipitated in the presence of immunoglobulin
42. The major compositional determinant of milk volume is
- A. lactalbumin
 - B. lactose
 - C. butter fat
 - D. casein
43. After a cross between a homozygous male (AA) and a homozygous female (aa), one of the male progeny is selected. The gametes of this male will be:
- A. a mixture of sperm with A and sperm with a
 - B. sperm with A only
 - C. sperm with Aa only
 - D. a mixture of sperm with AA and aa
44. Groppledorf is a recessive trait, which affects rabbits and in the recessive form causes embryo mortality. The heterozygote rabbits have no tail. In a matings of ten normal females to one normal male rabbit, two offspring from one female rabbit had no tail. This suggests that:
- A. the mother of these offspring was a carrier but the male was probably normal
 - B. none of the other offspring will be carrying this recessive allele
 - C. the mother of these offspring was a carrier and so was the father
 - D. none of the other mothers were carriers
45. The incidence of the deleterious recessive disorder mannosidosis in a cattle population is known to be 1%. Using Hardy Weinberg assumptions, calculate the proportion of sperm, carrying the defective allele in this population.
- A. 0.1 %
 - B. 1.0 %
 - C. 1.1 %
 - D. 10.0 %

46. A gene, which controls coat colour in cattle, has 2 alleles; C^R (red) and C^W (white). The heterozygotes have a roan colour. If roan cattle are crossed to white cattle the following phenotypic ratios would be expected in the offspring:
- A. 3 red : 1 white
 - B. 1 red : 2 roan : 1 white
 - C. 1 white : 1 roan
 - D. 1 white : 1 roan : 1 red
47. Genetic defects are frequently the result of the homozygous recessive genotype. This is most likely because:
- A. recessive genotypes always result in inferior phenotypes
 - B. the heterozygous genotype cannot be identified
 - C. there is more inbreeding with recessive alleles
 - D. the heterozygous phenotype is often inferior to the homozygous recessive
48. Given that $P = G + E$, heritability is an estimate of the proportion of:
- A. P controlled by E
 - B. G controlled by E
 - C. P controlled by G
 - D. G controlled by P
- (Where P = phenotype and G = genotype)
49. Inbreeding will occur when:
- A. there is no heterozygosity in the flock
 - B. animals with a common ancestor produce offspring
 - C. genetic defects appear in a population
 - D. homozygous individuals are selected
50. In terms of a measured trait, heterosis may be defined as an indication of:
- A. the superiority of both parents which is inherited in the progeny
 - B. the average performance of the progeny
 - C. the average performance of the progeny divided by the average performance of the parents
 - D. the difference between the average of the parents and the average of the progeny

END OF SECTION A