Animal Science Reviewer (100 Questions)

By Agriculture Review

Topic Covered: Animal Nutrition

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1. Which of the following compartments of the ruminant stomach is considered the 'true, glandular stomach'?

1. Rumen
2. Reticulum
3. Omasum
4. Abomasum

2. What is the primary function of the reticulum in the ruminant digestive system?

1. Secretion of gastric juices
2. Absorption of water and VFAs
3. Trapping large, heavy objects and hardware
4. Primary site of enzymatic digestion

3. Which compartment of the ruminant stomach is known as the 'manyplies' due to its leaf-like folds that absorb water?

1. Rumen
2. Reticulum
3. Omasum
4. Abomasum

4. The largest compartment of the adult ruminant stomach, serving as a massive fermentation vat, is the:

1. Abomasum
2. Omasum
3. Reticulum
4. Rumen

5. Ruminants differ from monogastric animals primarily because they have symbiotic microbes capable of digesting which complex carbohydrate?

1. Starch
2. Glycogen
3. Cellulose
4. Sucrose

6. Which of the following livestock species is considered a monogastric animal?

1. Cattle
2. Sheep
3. Swine
4. Goat

7. In poultry, what is the anatomical equivalent of the mammalian glandular stomach?

1. Crop
2. Proventriculus
3. Gizzard
4. Cloaca

8. The mechanical breakdown of feed in poultry primarily occurs in which organ?

1. Proventriculus
2. Gizzard
3. Cecum
4. Crop

9. What is the primary function of the crop in the avian digestive system?

1. Microbial fermentation
2. Enzymatic digestion of proteins
3. Temporary storage and softening of food
4. Absorption of water

10. Which of the following livestock species is classified as a hindgut fermenter?

1. Horse
2. Pig
3. Cow
4. Chicken

11. The process by which ruminants expel fermentation gases from the rumen is called:

1. Mastication
2. Eructation
3. Regurgitation
4. Peristalsis

12. Rumination involves all of the following steps EXCEPT:

1. Regurgitation
2. Remastication
3. Eructation
4. Reswallowing

13. The major end products of carbohydrate fermentation by rumen microbes, which provide the bulk of energy for ruminants, are:

1. Amino acids
2. Glucose molecules
3. Volatile fatty acids (VFAs)
4. Triglycerides

14. Which organ produces bile, a substance necessary for the emulsification of dietary fats?

1. Pancreas
2. Gallbladder
3. Liver
4. Small Intestine

15. Where is bile stored before it is secreted into the small intestine?

1. Liver
2. Gallbladder
3. Pancreas
4. Cecum

16. Nutrients are absorbed into the bloodstream primarily through the walls of the:

1. Stomach
2. Large Intestine
3. Small Intestine
4. Esophagus

17. Which class of nutrients provides the most concentrated source of energy?

1. Carbohydrates
2. Proteins
3. Fats
4. Vitamins

18. Fats contain approximately how many times more energy per gram than carbohydrates?

1. 1.50
2. 2.25
3. 3.00
4. 4.15

19. Proteins are complex organic molecules made up of smaller units called:

1. Monosaccharides
2. Fatty acids
3. Amino acids
4. Nucleotides

20. Which essential amino acid is typically the most limiting in swine and poultry diets based on corn and soybean meal?

1. Methionine
2. Tryptophan
3. Lysine
4. Valine

21. Which nutrient class is primarily composed of carbon, hydrogen, and oxygen, usually with a hydrogen-to-oxygen ratio of 2:1?

1. Proteins
2. Minerals
3. Lipids
4. Carbohydrates

22. The primary structural carbohydrate in plant cell walls that is completely indigestible even to ruminant microbes is:

1. Cellulose
2. Hemicellulose
3. Lignin
4. Starch

23. The primary storage carbohydrate found in feed grains like corn and wheat is:

1. Starch
2. Glycogen
3. Cellulose
4. Fructose

24. Average feed protein contains approximately what percentage of nitrogen?

1. 10%
2. 16%
3. 25%
4. 6.25%

25. To calculate the Crude Protein content of a feedstuff, the analyzed nitrogen content is multiplied by:

1. 1.60
2. 2.25
3. 6.25
4. 10.0

26. Which nutrient is considered the most vital for animal survival, with a loss of just 10% often leading to death?

1. Water
2. Energy
3. Protein
4. Salt

27. Which macromineral is required in the highest amounts for skeletal formation and eggshell production?

1. Phosphorus
2. Calcium
3. Potassium
4. Magnesium

28. Which mineral functions closely with calcium in bone development and energy metabolism?

1. Sodium
2. Chlorine
3. Sulfur
4. Phosphorus

29. Which of the following acts as a non-protein nitrogen (NPN) source that ruminants can use to synthesize microbial protein?

1. Fish meal
2. Soybean meal
3. Urea
4. Alfalfa hay

30. Fatty acids that contain no double bonds between carbon atoms are classified as:

1. Unsaturated fatty acids
2. Polyunsaturated fatty acids
3. Saturated fatty acids
4. Essential fatty acids

31. The storage form of carbohydrates in the animal body, primarily found in the liver and muscles, is:

1. Starch
2. Glucose
3. Glycogen
4. Glucagon

32. What is the general term for the portion of a feedstuff that remains after all water has been removed?

1. As-fed
2. Organic matter
3. Dry matter
4. Ash

33. Which vitamin is essential for proper blood clotting?

1. Vitamin A
2. Vitamin D
3. Vitamin E
4. Vitamin K

34. Which vitamin plays a critical role in the absorption of calcium and phosphorus from the intestinal tract?

1. Vitamin A
2. Vitamin B12
3. Vitamin C
4. Vitamin D

35. Which vitamin acts primarily as an intracellular antioxidant, working synergistically with the mineral selenium?

1. Vitamin A
2. Vitamin E
3. Vitamin K
4. Vitamin C

36. Night blindness and reproductive failures in cattle are classic symptoms of a deficiency in:

1. Vitamin A
2. Vitamin D
3. Vitamin E
4. Vitamin K

37. Parakeratosis, a skin condition characterized by thickened, crusty lesions in swine, is primarily caused by a deficiency of:

1. Iron
2. Zinc
3. Copper
4. Iodine

38. An enlargement of the thyroid gland, known as goiter, occurs due to a dietary deficiency of:

1. Calcium
2. Selenium
3. Iodine
4. Manganese

39. Grass tetany (hypomagnesemic tetany) in grazing cattle is associated with a deficiency of:

1. Calcium
2. Phosphorus
3. Magnesium
4. Potassium

40. To prevent nutritional anemia, piglets raised in confinement on concrete floors must be injected with:

1. Cobalt
2. Iron
3. Zinc
4. Selenium

41. White muscle disease in calves and lambs is linked to a dietary deficiency of:

1. Copper
2. Iron
3. Selenium
4. Iodine

42. Rickets in young, growing animals is caused by a deficiency of:

1. Vitamin A
2. Vitamin D, Calcium, or Phosphorus
3. Iron or Copper
4. Vitamin E or Selenium

43. Curled toe paralysis in young chicks is a classic sign of a deficiency of:

1. Thiamine (B1)
2. Riboflavin (B2)
3. Pantothenic Acid
4. Choline

44. Polyneuritis ('stargazing' posture) in poultry is caused by a deficiency of which B-vitamin?

1. Thiamine (B1)
2. Niacin
3. Pyridoxine
4. Biotin

45. Perosis, or slipped tendon, in growing birds is heavily associated with a deficiency of:

1. Iron
2. Manganese
3. Iodine
4. Cobalt

46. Encephalomalacia, also known as 'crazy chick disease', is caused by a deficiency of:

1. Vitamin A
2. Vitamin D
3. Vitamin E
4. Vitamin K

47. Which mineral is a central component of the hemoglobin molecule, essential for oxygen transport?

1. Copper
2. Cobalt
3. Zinc
4. Iron

48. Which trace mineral must be present in the diet for rumen microbes to synthesize Vitamin B12?

1. Copper
2. Cobalt
3. Selenium
4. Molybdenum

49. Which of the following groups consists exclusively of fat-soluble vitamins?

1. B, C
2. A, D, E, K
3. A, B, C, D
4. E, K, B12

50. Farm livestock generally do NOT require supplementation of which vitamin, as it is synthesized in their body tissues?

1. Vitamin A
2. Vitamin D
3. Vitamin C
4. Vitamin E

51. Excessive dietary levels of which mineral cause toxicity symptoms including mottled teeth and exostosis (bone outgrowths)?

1. Selenium
2. Fluorine
3. Copper
4. Zinc

52. What system of chemical analysis is historically used to divide feedstuffs into six nutritional fractions?

1. Van Soest system
2. Proximate Analysis
3. Bomb Calorimetry
4. In Vitro Digestibility

53. In Proximate Analysis, the Kjeldahl procedure is used to determine which fraction?

1. Crude Fiber
2. Ether Extract
3. Crude Protein
4. Ash

54. The Ether Extract portion of a proximate analysis represents the feed's:

1. Mineral content
2. Fat (lipid) content
3. Protein content
4. Soluble carbohydrates

55. Burning a feed sample in a muffle furnace at 500-600°C leaves a residue that represents the feed's inorganic content, called:

1. Crude Fiber
2. Dry Matter
3. Nitrogen-Free Extract
4. Ash

56. Which fiber analysis system partitions plant cell walls into Neutral Detergent Fiber (NDF) and Acid Detergent Fiber (ADF)?

1. Kjeldahl system
2. Proximate Analysis
3. Van Soest system
4. Soxhlet system

57. In proximate analysis, Nitrogen-Free Extract (NFE) is calculated by difference and roughly estimates the feed's:

1. Soluble carbohydrates (sugars and starches)
2. Indigestible fiber
3. Lipid content
4. True protein

58. What mathematical tool is used to quickly determine the proportion of two feed ingredients needed to meet a specific protein requirement?

1. Punnett Square
2. Pearson Square
3. Regression equation
4. Ration matrix

59. A feed ingredient that is high in energy and low in crude fiber (less than 18%) is classified as a:

1. Roughage
2. Concentrate
3. Supplement
4. Additive

60. A feedstuff that is bulky, high in fiber (more than 18%), and relatively low in digestible energy is a:

1. Roughage
2. Concentrate
3. Mineral supplement
4. Vitamin premix

61. If a feed sample contains 15% moisture, what is its dry matter percentage?

1. 15%
2. 85%
3. 100%
4. 0%

62. Of the Volatile Fatty Acids (VFAs) produced in the rumen, which one is the primary precursor for glucose synthesis in the liver?

1. Acetate
2. Propionate
3. Butyrate
4. Valerate

63. Which VFA is produced in the greatest proportion during forage fermentation and is a major precursor for milk fat synthesis?

1. Acetate
2. Propionate
3. Butyrate
4. Lactate

64. Rumen acidosis is primarily caused by:

1. Excessive roughage intake
2. Rapid fermentation of highly digestible carbohydrates (grain)
3. Deficiency of water
4. Excessive intake of urea

65. What anatomical structure in nursing calves allows milk to bypass the rumen and flow directly into the omasum/abomasum?

1. Pyloric sphincter
2. Reticular (esophageal) groove
3. Cardiac sphincter
4. Ileocecal valve

66. Which digestive process breaks down large fat globules into smaller particles to increase surface area for enzyme action?

1. Hydrolysis
2. Fermentation
3. Emulsification
4. Oxidation

67. What enzyme is secreted in the saliva of swine (but not ruminants) to begin the digestion of starch?

1. Pepsin
2. Lipase
3. Amylase
4. Trypsin

68. Which enzyme, prominent in the abomasum of young mammals, is responsible for the coagulation of milk protein?

1. Rennin
2. Amylase
3. Lipase
4. Lactase

69. The proteolytic enzyme pepsin is secreted as the inactive zymogen pepsinogen. What substance activates it in the stomach?

1. Bile
2. Amylase
3. Hydrochloric acid (HCl)
4. Sodium bicarbonate

70. Which segment of the small intestine is the principal site for the absorption of digested nutrients?

1. Duodenum
2. Jejunum
3. Ileum
4. Cecum

71. The cecum in hindgut fermenters like the horse serves a functional role most analogous to which ruminant organ?

1. Abomasum
2. Omasum
3. Rumen
4. Reticulum

72. Rabbits practice coprophagy (eating their own feces) primarily to recover:

1. Undigested starch
2. Water
3. B-vitamins and microbial protein
4. Bile salts

73. Phytate phosphorus in grains is poorly digested by swine. What exogenous enzyme is commonly added to swine diets to release this phosphorus?

1. Amylase
2. Phytase
3. Cellulase
4. Lipase

74. Raw soybeans contain an anti-nutritional factor that reduces protein digestion. Heating the soybeans destroys this factor, known as:

1. Gossypol
2. Tannin
3. Trypsin inhibitor
4. Phytic acid

75. Gossypol is a toxic pigment and anti-nutritional factor commonly found in which feed ingredient?

1. Soybean meal
2. Cottonseed meal
3. Canola meal
4. Alfalfa meal

76. Parturient paresis (milk fever) in dairy cows is caused by a rapid drop in blood levels of which mineral at the onset of lactation?

1. Phosphorus
2. Magnesium
3. Potassium
4. Calcium

77. Pica, a condition of depraved appetite where animals chew on wood or bones, is often a symptom of which mineral deficiency?

1. Calcium
2. Phosphorus
3. Iron
4. Zinc

78. When using the Pearson Square to formulate a diet for protein, what rule must absolutely apply to the target crude protein percentage?

1. It must be higher than both ingredients
2. It must be lower than both ingredients
3. It must fall between the protein percentages of the two ingredients
4. It must exactly equal the average of the two ingredients

79. In the energy partitioning scheme, Gross Energy minus Fecal Energy equals:

1. Digestible Energy
2. Metabolizable Energy
3. Net Energy
4. Heat Increment

80. The primary nitrogenous waste product excreted by mammals is urea. In poultry, the primary nitrogenous waste product is:

1. Ammonia
2. Urea
3. Uric acid
4. Creatinine

81. In formulating swine diets, the concept of an 'ideal protein' refers to a protein source that:

1. Is 100% digestible
2. Has an amino acid profile exactly matching the animal's requirements for maintenance and growth
3. Contains no non-protein nitrogen
4. Is derived entirely from plant sources

82. Essential fatty acid requirements for livestock are generally met by ensuring adequate dietary levels of:

1. Stearic acid
2. Palmitic acid
3. Linoleic acid
4. Oleic acid

83. Frothy bloat in cattle involves the entrapment of fermentation gases in a stable foam within the:

1. Abomasum
2. Rumen
3. Cecum
4. Small Intestine

84. In avian digestion, the common chamber into which the digestive, urinary, and reproductive tracts empty is the:

1. Crop
2. Proventriculus
3. Cloaca
4. Cecum

85. Using the Pearson Square, if you formulate a 16% CP diet using Corn (9% CP) and Soybean Meal (44% CP), what percentage of the mixture must be corn?

1. 80%
2. 20%
3. 72%
4. 28%

86. If a feed sample contains exactly 3% nitrogen according to the Kjeldahl analysis, what is its estimated Crude Protein content?

1. 3.00%
2. 18.75%
3. 16.00%
4. 6.25%

87. A steer consumes 20 kg of a total mixed ration on an 'as-fed' basis. If the ration is 40% dry matter, how many kilograms of dry matter did the steer consume?

1. 12 kg
2. 20 kg
3. 8 kg
4. 16 kg

88. In the energy evaluation system, Net Energy (NE) is calculated by subtracting the Heat Increment (heat of digestion and metabolism) from:

1. Gross Energy (GE)
2. Digestible Energy (DE)
3. Metabolizable Energy (ME)
4. Fecal Energy (FE)

89. In the Van Soest fiber analysis system, Neutral Detergent Fiber (NDF) estimates the total cell wall (hemicellulose, cellulose, and lignin). Acid Detergent Fiber (ADF) estimates only:

1. Hemicellulose and Lignin
2. Cellulose and Lignin
3. Hemicellulose and Cellulose
4. Lignin and Silica

90. The interior lining of this ruminant stomach compartment has a mucosal surface that resembles a honeycomb, functioning to trap foreign hardware. Which compartment is it?

1. Reticulum
2. Rumen
3. Omasum
4. Abomasum

91. In non-ruminant herbivores like horses and rabbits, the microbial fermentation of fibrous feeds primarily takes place in which part of the digestive tract?

1. Stomach and duodenum
2. Crop and proventriculus
3. Cecum and large intestine
4. Rumen and reticulum

92. While lysine is typically the first limiting amino acid in swine diets, which amino acid is generally considered the first limiting in poultry diets based on corn and soybean meal?

1. Tryptophan
2. Methionine
3. Valine
4. Threonine

93. Which trace mineral is a critical structural component of the hormone thyroxine, which regulates the basal metabolic rate in animals?

1. Iron
2. Zinc
3. Iodine
4. Copper

94. What trace mineral functions synergistically with Vitamin E as a biological antioxidant to prevent conditions like exudative diathesis in chicks and white muscle disease in calves?

1. Cobalt
2. Manganese
3. Fluorine
4. Selenium

95. Which elemental component is uniquely present in all dietary proteins but is absent in pure carbohydrates and lipids?

1. Carbon
2. Hydrogen
3. Oxygen
4. Nitrogen

96. In the standard proximate analysis of feeds, what does the abbreviation NFE stand for?

1. Nitrogen-Free Extract
2. Neutral Fiber Evaluation
3. Non-Fecal Energy
4. Nutrient Feed Equivalency

97. A laboratory analysis reveals that a sample of dried forage contains exactly 2.5% elemental nitrogen. What is the estimated Crude Protein (CP) content of this forage?

1. 10.50%
2. 15.625%
3. 25.00%
4. 6.25%

98. What is the primary physiological function of the proventriculus in the avian digestive system?

1. Mechanical grinding of seeds
2. Microbial fermentation of cellulose
3. Secretion of gastric juices like hydrochloric acid and pepsinogen
4. Absorption of volatile fatty acids

99. Which of the following is classified as a water-soluble vitamin and must be synthesized or supplied daily because it is not stored in large amounts in the animal's body?

1. Vitamin A
2. Vitamin C
3. Vitamin D
4. Vitamin K

100. Using the Pearson Square method, formulate a 100 kg mixed ration containing 16% Crude Protein (CP) using Sorghum (10% CP) and Peanut Meal (40% CP). How many kilograms of Sorghum and Peanut Meal are required, respectively?

1. 80 kg Sorghum, 20 kg Peanut Meal
2. 75 kg Sorghum, 25 kg Peanut Meal
3. 20 kg Sorghum, 80 kg Peanut Meal
4. 50 kg Sorghum, 50 kg Peanut Meal

Answer Key

1. D
2. C
3. C
4. D
5. C
6. C
7. B
8. B
9. C
10. A
11. B
12. C
13. C
14. C
15. B
16. C
17. C
18. B
19. C
20. C
21. D
22. C
23. A
24. B
25. C
26. A
27. B
28. D
29. C
30. C
31. C
32. C
33. D
34. D
35. B
36. A
37. B
38. C
39. C
40. B
41. C
42. B
43. B
44. A
45. B
46. C
47. D
48. B
49. B
50. C
51. B
52. B
53. C
54. B
55. D
56. C
57. A
58. B
59. B
60. A
61. B
62. B
63. A
64. B
65. B
66. C
67. C
68. A
69. C
70. B
71. C
72. C
73. B
74. C
75. B
76. D
77. B
78. C
79. A
80. C
81. B
82. C
83. B
84. C
85. A
86. B
87. C
88. C
89. B
90. A
91. C
92. B
93. C
94. D
95. D
96. A
97. B
98. C
99. B
100. A