Comprehensive Animal Nutrition – Mock Exam

Name: _____
Date: _____

Section 1: Multiple Choice – Monogastrics (Circle the correct answer)

1. Which process describes prehension?
   a) Absorption of nutrients in the small intestine
   b) Grinding food mechanically in the gizzard
   c) Getting food into the mouth
   d) Secreting digestive enzymes

2. Which type of saliva in pigs begins chemical digestion?
   a) Serous – watery, enzyme-rich
   b) Mucous – lubrication only
   c) Parietal – acid secretion
   d) Goblet – mucus

3. The gizzard (ventriculus) in birds is primarily responsible for:
   a) Chemical digestion of proteins
   b) Mechanical grinding of food
   c) Absorption of carbohydrates
   d) Microbial fermentation

4. Which of the following is NOT a function of the small intestine?
   a) Nutrient absorption
   b) Secretion of digestive enzymes
   c) Water absorption
   d) Mechanical breakdown of large particles

5. In pigs, which organ is responsible for most microbial fermentation of fiber?
   a) Stomach
   b) Small intestine
   c) Cecum
   d) Liver

6. Parietal cells secrete:
   a) Pepsinogen
   b) HCl and intrinsic factor
   c) Mucus
   d) Lipase

7. The pancreas secretes exocrine products that:
   a) Include insulin and glucagon
   b) Neutralize acidic chyme and digest macromolecules
   c) Store bile
   d) Grind food mechanically

8. Which enzyme converts inactive pepsinogen into pepsin?
   a) Lipase
   b) Rennin
   c) HCl
   d) Amylase

9. Which small intestine cell type is primarily absorptive?
   a) Enterocyte
   b) Goblet cell
   c) Enteroendocrine cell
   d) Chief cell

10. Compared to swine, poultry have:
    a) Longer large intestines
    b) Slower rate of passage
    c) Smaller large intestine capacity and faster rate of passage
    d) More extensive microbial fermentation

Section 2: True / False – Monogastrics (Write T or F)

1. Pigs have four types of teeth for mastication. T
2. Swine saliva contains enzymes that begin carbohydrate digestion. T
3. Horses and pigs both have significant microbial fermentation in the cecum. T
4. The proventriculus in birds secretes acid and enzymes, while the gizzard provides mechanical digestion. T
5. The ileum is the primary site for nutrient absorption in both pigs and birds. T
6. The liver stores bile salts and aids in fat digestion and cholesterol metabolism. F
7. Goblet cells secrete mucus to protect intestinal lining and aid in lubrication. T
8. Enteroendocrine cells secrete hormones that regulate digestion. T

9. Birds rely more on microbial fermentation than pigs for fiber digestion. F
10. The pancreas has both endocrine (insulin, glucagon) and exocrine (digestive enzymes, bicarbonate) functions. T

Section 3: Matching – Monogastrics

Match the digestive organ with its primary function. Write the correct letter.

Organs:
A. Mouth / Teeth
B. Esophagus
C. Stomach / Proventriculus
D. Gizzard
E. Small intestine
F. Cecum
G. Colon / Large intestine
H. Liver
I. Gallbladder
J. Pancreas
K. Crop

Functions:

1. Stores and softens food (birds) K
2. Mechanical breakdown of food D
3. Chemical digestion of proteins with enzymes and acid C
4. Transport food from mouth to stomach B
5. Major site of nutrient absorption E
6. Microbial fermentation of fiber and vitamin synthesis F
7. Water absorption and feces formation G
8. Secretes bile and aids in fat absorption H
9. Stores bile (in pigs) I
10. Secretes bicarbonate and digestive enzymes; endocrine hormones J
11. Chewing and physical reduction of particle size A

Section 1: Multiple Choice – Ruminants

1. Which of the following is NOT a compartment of the ruminant stomach?
   a) Rumen
   b) Reticulum
   c) Omasum
   d) Cecum
   e) Abomasum

2. Ruminant saliva is highly important because it:
   a) Contains digestive enzymes to break down starch
   b) Produces bicarbonate to buffer rumen pH
   c) Is secreted in small amounts (~1 L/day in cows)
   d) Contains hydrochloric acid

3. Hardware disease occurs when:
   a) Sharp metal objects puncture the reticulum
   b) Frothy gas builds up in the rumen
   c) Acetic acid production in the rumen is too low
   d) Microbial populations die due to low fiber intake

4. Which VFA is primarily gluconeogenic in ruminants?
   a) Acetic acid
   b) Propionic acid
   c) Butyric acid
   d) Lactic acid

5. The reticular groove allows:
   a) Milk to bypass fermentation in the rumen and reticulum
   b) Gas to escape from the rumen
   c) Fibers to be digested more efficiently
   d) VFAs to be absorbed in the abomasum

6. In horses, fiber is fermented primarily in the:
   a) Rumen
   b) Reticulum
   c) Cecum and large colon
   d) Abomasum

7. The papillae in the rumen:
   a) Secrete digestive enzymes
   b) Increase surface area for VFA absorption
   c) Trap heavy metals

d) Reduce particle size physically

8. A cow on a high-grain diet may develop rumen acidosis. This occurs because:
   a) VFA production decreases
   b) Propionate increases relative to acetate
   c) Rumen pH drops due to excess fermentation of starch
   d) Saliva production increases

9. Frothy bloat in ruminants is most often caused by:
   a) Sharp metal ingestion
   b) Rapid consumption of fresh legume pasture
   c) High fiber roughage
   d) Low microbial populations

Section 2: True / False – Ruminants

1. True ruminants have upper incisor teeth. F
2. Rumination involves regurgitation, re-chewing, re-salivation, and re-swallowing. T
3. The omasum primarily functions to reduce particle size and absorb water. T
4. Microbial protein from rumen fermentation can be digested and absorbed in the abomasum. T
5. Hindgut fermenters like horses can utilize microbial protein efficiently. F
6. Salivary glands in ruminants are stimulated by chewing. T
7. The reticular groove in young calves allows milk to bypass the rumen. T
8. VFAs produced in the rumen provide the majority of energy for ruminants. T

Section 3: Matching – Ruminants

Match the term with its function or description.

Terms:
A. Rumen
B. Reticulum
C. Omasum
D. Abomasum
E. Reticular groove
F. Acetate
G. Propionate

H. Butyrate
I. Bicarbonate
J. Papillae

Functions / Descriptions:

1. Primary site of microbial fermentation A
2. Honeycomb structure, traps heavy objects B
3. Reduces particle size and absorbs water C
4. True glandular stomach, secretes HCl and enzymes D
5. Directs milk past rumen in calves E
6. Lipogenic VFA, energy for fat synthesis F
7. Gluconeogenic VFA, converted to glucose G
8. Lipogenic VFA, stimulates rumen epithelium H
9. Buffers rumen pH I
10. Increases surface area for VFA absorption J
