Here is a question bank focusing on "Nutrition in Animals," drawing exclusively from the provided sources:

Question Bank

2-Mark Questions (10 Numbers)

1. **Define digestion.**
    - **Answer:** Digestion is defined as **the breakdown of complex components of food into simpler substances**. Our body cannot utilise complex substances like carbohydrates, fats, and proteins as such, so they must be broken down.
2. **Name the two main types of digestion that occur in the human body.**
    - **Answer:** The two main types of digestion are **mechanical digestion and chemical digestion**. Mechanical digestion involves the physical breaking down of food, while chemical digestion is the chemical breakdown of food into molecules the body can absorb.
3. **List the parts of the human alimentary canal.**
    - **Answer:** The human alimentary canal, also known as the digestive tract, consists of the **buccal cavity, food pipe or oesophagus, stomach, small intestine, large intestine, and the anus**.
4. **What is the role of saliva in the mouth during digestion?**
    - **Answer:** Saliva, produced by salivary glands in our mouth, plays a crucial role in **chemical digestion by causing the breakdown of starches into sugars**. This happens alongside mechanical digestion, where teeth break food into smaller pieces.
5. **Where does the digestion of protein primarily begin in the human digestive system?**
    - **Answer:** The digestion of protein primarily **starts in the stomach**. In the stomach, food is churned and mixed with digestive juices, including hydrochloric acid, which break down proteins into simpler substances.
6. **What are villi and what is their function in the small intestine?**
    - **Answer:** Villi are **tiny, finger-like structures** that line the inside of the small intestine. Their interesting part is that they **increase the surface area for the absorption of digested food** into the bloodstream.
7. **Define assimilation.**

    - **Answer:** Assimilation is the process where the **absorbed substances from digested food are transported via blood vessels to different organs of the body**, where they are then **used to build complex substances, such as proteins**.
8. **Why is the absorption of water in the large intestine important?**
    - **Answer:** The absorption of most of the water and some salts from the undigested food in the large intestine is **important because recovering water keeps us safe from getting dehydrated**.
9. **What are ruminants? Give two examples.**
    - **Answer:** Ruminants are **grazing animals that quickly ingest and swallow their leafy food, storing it in a part of their stomach called the rumen**, and later return it to their mouth to chew again. Examples include **cows and buffaloes**.
10. **How does an Amoeba ingest its food?**
    - **Answer:** An Amoeba ingests its food by **constantly changing its shape and position, pushing out finger-like projections called pseudopodia (or false feet)**. It uses these pseudopodia to capture microscopic organisms as its food, which then become trapped in a food vacuole.

5-Mark Questions (2 Numbers with Split-up Questions)

Question 1: (a) Describe the journey of food from the oesophagus to the small intestine in humans. (3 marks) (b) Explain the role of the liver and pancreas in the digestion process within the small intestine. (2 marks)

- **Answer:**
    - **(a)** After food becomes a soft mass in the mouth, the tongue pushes it to the oesophagus, a long tube from the neck to the chest. The **movements of the oesophagus walls force the food to the stomach**. The **stomach is the widest part of the alimentary canal**; here, food is churned and mixed with digestive juices, including hydrochloric acid, which break down proteins. A mucus lining protects the stomach from these acids. After about four hours, food changes to **chyme** and moves into the small intestine.
    - **(b)** Both the **liver and pancreas** play crucial roles in digestion in the small intestine. The **liver secretes bile juice**, which is stored in a gall bladder and **helps in the digestion of fats**. The **pancreas produces pancreatic juice**, which breaks down proteins and carbohydrates. These juices, along with intestinal juices, complete the digestion of all food components in the small intestine.

Question 2: (a) What is rumination? (2 marks) (b) Describe the process of digestion in a ruminant animal. (3 marks)

- **Answer:**
    - **(a) Rumination is the process where partially digested food (called cud) returns to the mouth in small lumps from the rumen, and the animal chews it again**. This allows ruminants to further break down the tough plant material they ingest.
    - **(b)** Grazing animals like cows and buffaloes are ruminants. They **quickly ingest and swallow grass, storing it in a part of their stomach called the rumen**. In the rumen, the food gets partially digested and is referred to as **cud**. Later, the **cud returns to the mouth in small lumps, and the animal re-chews it**. This process, known as rumination, helps them to effectively digest the fibrous plant material.

Case Study Questions (2 Numbers)

Case Study 1: A student eats a sandwich containing bread (carbohydrates) and cheese (proteins and fats). (a) In which part of the alimentary canal will the digestion of carbohydrates begin? (b) Name the widest part of the alimentary canal where protein digestion starts. What substance protects its inner lining from acids? (c) Where does the complete digestion of carbohydrates, fats, and proteins occur? Which accessory organs contribute to this process?

- **Answer:**
    - **(a)** The digestion of carbohydrates (like starch from bread) will begin in the **buccal cavity (mouth)**, where saliva causes their breakdown into sugars.
    - **(b)** The widest part of the alimentary canal where protein digestion starts is the **stomach**. A lining of **mucus protects its inner lining from acids**.
    - **(c)** The complete digestion of carbohydrates, fats, and proteins occurs in the **small intestine**. The accessory organs that contribute to this process are the **liver (secretes bile for fat digestion) and the pancreas (produces pancreatic juice for protein and carbohydrate breakdown)**.

Case Study 2: An organism found in pond water is observed to constantly change its shape and capture microscopic food particles without a mouth. Once captured, the food is enclosed in a sac-like structure where digestive juices act upon it. (a) Identify the organism described. (b) What are the finger-like projections used by this organism to capture food called? (c) How is undigested food expelled from this organism?

- **Answer:**
    - **(a)** The organism described is **Amoeba**.
    - **(b)** The finger-like projections used by this organism to capture food are called **pseudopodia** or false feet.
    - **(c)** The undigested food in Amoeba is **expelled outside by the food vacuole**.

HOTS Questions (2 Numbers)

1. **Compare and contrast the basic process of digestion in a human and an Amoeba, highlighting similarities and key differences in their feeding mechanisms and digestive structures.**

    - **Answer:**
        - **Similarity:** Despite their vast differences in complexity, **all animals, including humans and Amoeba, share the same basic process of digestion**: the breakdown of complex food components into simpler substances. In both, digestive juices act on food to break it down, and undigested waste is expelled.
        - **Differences in Feeding Mechanisms:**
            - **Humans:** Ingest food through a **mouth**. This involves mechanical digestion (chewing with teeth) and initial chemical digestion (saliva).
            - **Amoeba:** Does **not have a mouth**. It uses **finger-like projections called pseudopodia (false feet)** to constantly change shape and capture microscopic food organisms.
        - **Differences in Digestive Structures:**
            - **Humans:** Possess a **complex, multi-organ alimentary canal** (digestive tract) consisting of the buccal cavity, oesophagus, stomach, small intestine, large intestine, and anus, along with accessory glands like the liver and pancreas. Digestion occurs in distinct stages across these specialised organs.
            - **Amoeba:** Is a **single-celled organism** and does **not have a digestive system**. Food is trapped in a **food vacuole** within its cytoplasm, where digestive juices act on it. Undigested food is expelled by the vacuole directly.
2. **Imagine a scenario where the villi in the small intestine were completely absent. How would this impact the overall process of human digestion and nutrient absorption, and what potential health issues could arise?**

    - **Answer:**
        - **Impact on Nutrient Absorption:** The small intestine is where most nutrients of the food are absorbed. Villi are crucial as they **increase the surface area for the absorption of digested food**. If villi were completely absent, the **surface area available for absorption would drastically reduce**. This would mean that even if food were fully digested into simpler substances (like glucose, fatty acids, and amino acids), the body would be **unable to efficiently absorb these nutrients into the bloodstream**.
        - **Potential Health Issues:** The primary issue would be **severe nutrient deficiencies**, as the body wouldn't receive enough vital components to function. This could lead to a range of health problems, including:

- **Malnutrition and weight loss**, despite adequate food intake, due to insufficient absorption of calories and building blocks.
- **Weakness and fatigue** as the body lacks the necessary energy from absorbed sugars and fats.
- **Impaired growth and development** in children, as amino acids and other building blocks for complex substances (like proteins) cannot be adequately assimilated.
- **Compromised immune function** and other systemic issues due to the lack of essential vitamins, minerals, and proteins, which are normally absorbed in the small intestine. In essence, the body would be starving at a cellular level, even with food in the digestive tract.