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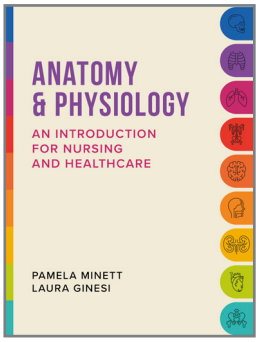

Questions to accompany *Anatomy and Physiology*

CHAPTER 7 THE DIGESTIVE SYSTEM

Multiple Choice Questions (MCQs)

Each question consists of a stem statement or question, and 5 options.
You must pick the one correct answer.

1. The muscular tube that extends from the mouth to the anus is called:

A. the gullet
B. the intestine
C. the colon
D. the alimentary canal
E. the pancreatic duct

2. Which organ in the list is the largest gland in the human body?

A. parotid
B. liver
C. pancreas
D. thyroid
E. adrenal

3. Which layer of GI tract forms the innermost lining and continuously secretes mucus?

A. serosa
B. muscularis externa
C. muscularis mucosa
D. submucosa
E. mucosa

4. Which structure helps to prevent a bolus of food from entering the trachea during deglutition (swallowing)?

A. collagen
B. cardiac sphincter
C. larynx
D. epiglottis
E. soft palate

5. Food and chyme are pushed through the digestive system by:

A. ingestion
B. mastication
C. assimilation
D. peristalsis
E. peritoneum

6. Which of the following secretions is NOT produced by gastric glands?

A. hydrochloric acid
B. intrinsic factor
C. pepsin
D. sebum
E. rennin

7. Which of the following digestive enzymes is NOT found in intestinal juice?

A. erepsin
B. trypsin
C. amylase
D. maltase
E. lactase

8. An important function of the intestinal villi is to:

A. increase the surface area for absorption of nutrients
B. move chyme along the alimentary canal
C. form a protective covering for the alimentary canal
D. synthesise amino acids
E. form faeces

9. Blood from the intestines travels to the liver via the:

A. hepatic artery
B. mesenteric artery
C. hepatic vein
D. hepatic portal vein
E. bile duct

10. The end product of digestion of starch which is absorbed into the bloodstream is:

A. amino acid
B. fatty acid
C. glucose
D. sucrose
E. lactose

11. Which of the following is a function of bile?

A. acidification of GI contents
B. emulsification of GI contents
C. enzymatic breakdown of fats
D. speeding up GI transit time
E. destruction of potentially harmful substances

12. Which of the following glands produces saliva?

A. pancreas
B. thyroid
C. pituitary
D. parotid
E. liver

13. The primary site for absorption of water by the digestive system is the:

A. oesophagus
B. colon (large intestine)
C. small intestine
D. liver
E. stomach

Critical thinking: ARQs (assertion reasoning questions)

These questions consist of two statements:

- an assertion, and
- a reason.

You must first determine whether each statement is *TRUE* or *FALSE*.

- If both statements are true, you must next determine whether the reason correctly explains the assertion. The answer will be option 1 or option 2.
- If one statement is true and the other is false then the answer is option 3 or option 4, depending on which of the statements is correct.
- If both statements are false, then the answer is option 5.

There is one option for each possible outcome.

Question 14

A = the Assertion	**R = the Reason**
Five pairs of salivary glands produce saliva, which contains amylase to start the digestion of dietary starch	Saliva is an alkaline fluid that keeps the mouth moist and aids with processes such as chewing, swallowing and tasting food
Options	
1) Both A and R are true and R is the correct explanation of A	
2) Both A and R are true but R is NOT the explanation of A	
3) A is true but R is false	
4) A is false but R is true	
5) Both A and R are false	

Question 15

A = the Assertion	**R = the Reason**
The liver is composed of units called lobules, each of which contains rows of hepatocytes that radiate outwards from a central vein	Hepatocytes are cuboidal epithelial cells that line the sinusoids and perform most of the liver's functions
Options	
1) Both A and R are true and R is the correct explanation of A	
2) Both A and R are true but R is NOT the explanation of A	
3) A is true but R is false	
4) A is false but R is true	
5) Both A and R are false	

Question 16

A = the Assertion	R = the Reason
Water is mainly absorbed from the alimentary canal as it moves through the large intestine	Food is pushed through the digestive tract by the process of peristalsis and segmentation
Options	
1) Both A and R are true and R is the correct explanation of A	
2) Both A and R are true but R is NOT the explanation of A	
3) A is true but R is false	
4) A is false but R is true	
5) Both A and R are false	

Question 17

A = the Assertion	R = the Reason
The luminal surface of the intestinal wall is smooth and slippery because it is made from peritoneum	The ileum provides a very large surface area for rapid absorption of nutrients because it has many villi, each of which has microvilli
Options	
1) Both A and R are true and R is the correct explanation of A	
2) Both A and R are true but R is NOT the explanation of A	
3) A is true but R is false	
4) A is false but R is true	
5) Both A and R are false	

Putting it all together

Question 18

Match the definitions in the list below with the correct term in the table:

A. Rhythmic contraction and relaxation of smooth muscle that propel food along the digestive tract.
B. Thin, tough, outer layer of the alimentary tract, which enables it to move smoothly against other organs.
C. Vomiting – the result of forceful contractions of the diaphragm and abdominal muscles.
D. The process of taking food, drink or other substance into the body by swallowing or absorbing it.
E. The uptake of substances by the GI tract.
F. The process of distributing absorbed nutrients to the cells of the body for growth and repair.
G. Circular muscles behind a bolus of food contract and longitudinal muscles relax, thus pushing a bolus of food onwards.

Process or part	Definition
Absorption	
Ingestion	
Assimilation	
Motility	
Serosa	
Peristalsis	
Emesis	

Question 19

Explain, in your own words, what happens in each of the following stages of digestion:

- oral phase
- gastric phase
- intestinal phase
- defecation.

Illustrate your answer with sketches and drawings.

Question 20

Create a mind map that shows the various different functions of the liver.
Use the diagram to help you to explain why liver disorders often have no symptoms in the early stages.

Question 21

Construct a diagram that shows how food is processed so that nutrients are distributed to the body's cells. Include the following keywords and write notes on your diagram to explain relationships between the words. You may repeat any words, or add new ones, in order to create your illustration.

Absorption	Assimilation	Ingestion	Tongue	Deglutition	Mechanical digestion	Mesentery
Digestion	Teeth	Peristalsis	Bolus	Cardiac sphincter	Bile	Hepatic portal vein
Saliva	Buccal cavity	Chewing	Gastric juice	Pyloric sphincter	Enzyme	Large intestine
Liver	Bile	Pancreatic juice	Chyme	Chemical digestion	Liver	Rectum

Answers to questions

Answers are supplied to most, but not all questions. Some may require you to carry out further research using the book.

Multiple Choice Questions (MCQs)

Each question consists of a stem statement or question, and 5 options.
You must pick the one correct answer.

1. **The muscular tube that extends from the mouth to the anus is called**
   D. the alimentary canal

2. **Which organ in the list is the largest gland in the human body?**
   B. liver

3. **Which layer of GI tract forms the innermost lining and continuously secretes mucus?**
   E. mucosa

4. **Which structure helps to prevent a bolus of food from entering the trachea during deglutition (swallowing)?**
   D. epiglottis

5. **Food and chyme are pushed through the digestive system by:**
   D. peristalsis

6. **Which of the following secretions is NOT produced by gastric glands?**
   D. sebum

7. **Which of the following digestive enzymes is NOT found in intestinal juice?**
   B. trypsin

8. **An important function of the intestinal villi is to:**
   A. increase the surface area for absorption of nutrients

9. **Blood from the intestines travels to the liver via the:**
   D. hepatic portal vein

10. **The end product of digestion of starch which is absorbed into the bloodstream is:**
    C. glucose

11. **Which of the following is a function of bile?**
    B. emulsification of GI contents

12. **Which of the following glands produces saliva?**
    D. parotid

13. **The primary site for absorption of water by the digestive system is the:**
    B. colon (large intestine)

Critical thinking: ARQs (assertion reasoning questions)

These questions consist of two statements:
- an assertion, and
- a reason.

You must first determine whether each statement is *TRUE* or *FALSE*.
- If both statements are true, you must next determine whether the reason correctly explains the assertion. The answer will be option 1 or option 2.
- If one statement is true and the other is false then the answer is option 3 or option 4, depending on which of the statements is correct.

- If both statements are false, then the answer is option 5.

There is one option for each possible outcome.

Question 14

A = the Assertion	R = the Reason
Five pairs of salivary glands produce saliva, which contains amylase to start the digestion of dietary starch	Saliva is an alkaline fluid that keeps the mouth moist and aids with processes such as chewing, swallowing and tasting food
4. A is false but R is true	

Explanation

There are three pairs of salivary glands in humans so the Assertion (A) is *FALSE*.

Saliva wets the food, thus enabling it to be tasted, chewed and swallowed. The Reason (R) is therefore *TRUE*.

Option 4 is the correct answer.

Question 15

A = the Assertion	R = the Reason
The liver is composed of units called lobules, each of which contains rows of hepatocytes that radiate outwards from a central vein	Hepatocytes are cuboidal epithelial cells that line the sinusoids and perform most of the liver's functions
2. Both A and R are true but R is NOT the explanation of A	

Explanation

The Assertion (A) is *TRUE*. About 80% of the mass of the liver is composed of specialised cells called hepatocytes. Typically they are arranged in sheets that fan out from a central vein to form a structure called a lobule, with one side of each cell (called basolateral) facing the blood supply and the other (called apical) facing the canaliculus that drains bile away.

The Reason (R) is also *TRUE* because hepatocytes are in direct contact with the liver's blood supply. Hepatocytes are important for the liver's role in metabolism of nutrients, production of bile, defence against toxic substances and processing of drugs and medications including alcohol. The sinusoid capillaries carry blood from the edges of a lobule to the central vein. This arrangement enables the hepatocytes to be bathed on either side by blood, which facilitates transfer of a wide variety of substances.

Option 2 is thus the correct option because R does not provide an explanation for A.

Question 16

A = the Assertion	R = the Reason
Water is mainly absorbed from the alimentary canal as it moves through the large intestine	Food is pushed through the digestive tract by the process of peristalsis and segmentation

2. Both A and R are true but R is NOT the explanation of A

Explanation

The Assertion (A) is *TRUE*. The contents that leave the small intestine contain mostly water and undigested matter. The large intestine absorbs most of the water into the bloodstream, leaving the faeces as a semi-solid mass of food remains, mucus, bilirubin and microorganisms, which is eliminated from the body via the anus.

The Reason (R) is *TRUE*. Peristalsis is the name given to the rhythmic, wave-like, squeezing movements of the wall of the digestive tract.

Peristalsis is the main wave in the oesophagus, with contractions of longitudinal muscles pushing the contents forwards in one direction towards the stomach. Segmentation contractions involve the circular muscles, moving chyme in both directions and allowing greater mixing with intestinal secretions.

Both statements are correct, but the Assertion (A) concerns the process of absorption while the Reason (R) relates to the muscular activity of the digestive tract.

Therefore option 2 is the correct solution.

Question 17

A = the Assertion	R = the Reason
The luminal surface of the intestinal wall is smooth and slippery because it is made from peritoneum	The ileum provides a very large surface area for rapid absorption of nutrients because it has many villi, each of which has microvilli

4. A is false but R is true

Explanation

The Assertion (A) is *FALSE*. The peritoneum is a thin, tough, fibrous tissue that lines the abdominal cavity and covers all the abdominal organs; therefore it does not form the luminal surface of the intestine.

The term 'luminal surface' refers to its inner cavity (open space) whose surface includes epithelial cells and goblet cells; their function is to produce mucus, which lubricates it.

The Reason (R) is *TRUE*. The ileum is the final section of the small intestine and is the part where reabsorption of small nutrient molecules, including sugars, amino acids, lipids, vitamin B12 and bile salts, takes place. Each of the villi, which are the finger-like folds in the ileum, has a thin epithelial wall, which is covered with microvilli to provide a vast surface area.

Thus answer 4 is the correct option.

Putting it all together

Question 18

Match the definitions in the list below with the correct term in the table:

A. Rhythmic contraction and relaxation of smooth muscle that propel food along the digestive tract.
B. Thin, tough, outer layer of the alimentary tract, which enables it to move smoothly against other organs.
C. Vomiting – the result of forceful contractions of the diaphragm and abdominal muscles.
D. The process of taking food, drink or other substance into the body by swallowing or absorbing it.
E. The uptake of substances by the GI tract.
F. The process of distributing absorbed nutrients to the cells of the body for growth and repair.
G. Circular muscles behind a bolus of food contract and longitudinal muscles relax, thus pushing a bolus of food onwards.

Process or part	Definition
Absorption	**E**
Ingestion	**D**
Assimilation	**F**
Motility	**A**
Serosa	**B**
Peristalsis	**G**
Emesis	**C**