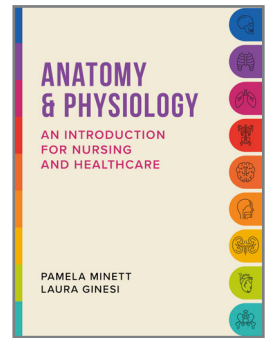




Lantern



Questions to accompany *Anatomy and Physiology*

CHAPTER 1 INTRODUCTION

Multiple Choice Questions (MCQs)

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

- The sagittal plane divides the human body into:**
 - upper and lower portions
 - left and right portions
 - superior and inferior portions
 - ventral and dorsal portions
 - thoracic and abdominal cavities
- The lungs are situated within which body cavity?**
 - cranial
 - thoracic
 - abdominal
 - pelvic
 - spinal
- Which plane divides the human body into dorsal (back) and ventral (front) or posterior and anterior planes?**
 - sagittal
 - coronal
 - transverse
 - horizontal
 - superior
- Which directional term means “towards the middle” of the body?**
 - lateral
 - proximal
 - medial
 - superior
 - inferior
- The largest hollow space in the human body is:**
 - the cranial cavity
 - the pelvic cavity
 - the thoracic cavity
 - the abdominal cavity
 - the spinal cavity
- Which part of the body begins the breakdown of foods and makes digestive juice that can kill most bacteria?**
 - liver
 - heart
 - colon
 - stomach
 - skin
- The body system that provides an outer covering that protects the body from the external environment is:**
 - respiratory
 - urinary
 - cardiovascular
 - skin
 - reproductive
- Which body system provides the cells of the body with nutrients?**
 - respiratory
 - digestive
 - cardiovascular
 - endocrine
 - urinary

9. The fluid portion of blood is called:

- A. interstitial fluid
- B. tissue fluid
- C. platelets
- D. intracellular fluid
- E. plasma

10. The varying conditions outside the human body are sometimes referred to as:

- A. internal environment
- B. external environment
- C. homeostasis
- D. disease
- E. set points

11. The self-correcting process that helps to maintain stability and restore a homeostatic set point is known as:

- A. negative feedback
- B. stimulus
- C. sensor
- D. positive feedback
- E. disease

12. Which hormone helps to maintain glucose homeostasis by stimulating liver cells to take up and remove additional glucose?

- A. insulin
- B. glucagon
- C. pancreas
- D. response
- E. starch

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 13

A = the Assertion	R = the Reason
The concentration of glucose in blood varies widely because of differences in the amount of carbohydrate eaten each day	Homeostasis of blood glucose levels is achieved through the activity of two pancreatic hormones, insulin and glucagon
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 correct 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 14

A = the Assertion	R = the Reason
The homeostatic control centre(s) in the human body respond to stimulation by sensors and activate responses that involve effectors	Any event that disturbs homeostasis is known as a stimulus and is detected by a sensor, which then relays information to a homeostatic control centre
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 correct 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 the largest gland in the human body	The liver produces bile for the digestion of fat that has been ingested in the diet
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 correct 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
The systems of the body work independently	A tissue is a tiny unit of living matter
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 correct 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
Body temperature is an example of a parameter that is maintained through homeostatic regulation	A cascade of biochemical events leads to clotting of blood and sealing of blood vessels
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 correct 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**

Human beings are mammals who are adapted to living on planet Earth. Explain how the external environment differs from the internal environment of the body.

Question 19

Outline how the hormone oxytocin contributes to the birth of a baby. Why is this an example of positive feedback?

Question 20

Refer to **Fig. 1.4** in the book then create your own flow diagram or spider diagram that shows how the various body systems work together to maintain steady (or fairly steady) and optimal conditions of the internal environment that are necessary for survival and wellbeing.

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 sagittal plane divides the human body into:**
B. left and right portions
- 2. The lungs are situated within which body cavity?**
B. thoracic
- 3. Which plane divides the human body into dorsal (back) and ventral (front) or posterior and anterior planes?**
B. coronal
- 4. Which directional term means “towards the middle” of the body?**
C. medial
- 5. The largest hollow space in the human body is:**
D. the abdominal cavity
- 6. Which part of the body begins the breakdown of foods and makes digestive juice that can kill most bacteria?**
D. stomach
- 7. The body system that provides an outer covering that protects the body from the external environment is:**
D. skin
- 8. Which body system provides the cells of the body with nutrients?**
B. digestive
- 9. The fluid portion of blood is called:**
E. plasma
- 10. The varying conditions outside the human body are sometimes referred to as:**
B. external environment
- 11. The self-correcting process that helps to maintain stability and restore a homeostatic set point is known as:**
A. negative feedback
- 12. Which hormone helps to maintain glucose homeostasis by stimulating liver cells to take up and remove additional glucose?**
A. insulin

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 13

A = the Assertion	R = the Reason
The concentration of glucose in blood varies widely because of differences in the amount of carbohydrate eaten each day	Homeostasis of blood glucose levels is achieved through the activity of two pancreatic hormones, insulin and glucagon
4. <i>A is false but R is true</i>	
<p><i>Explanation</i></p> <p>Glucose is a carbohydrate and is a nutrient that is normally supplied through the diet; however, its level in blood is maintained at a relatively stable level – within the physiological range – through homeostatic mechanisms known as negative feedback regulation. Thus the Assertion (A) is <i>FALSE</i>.</p> <p>The digestive system breaks down carbohydrates to simple sugars that can be absorbed into the bloodstream in the intestine. The glucose may be used immediately or it can be stored in the liver as glycogen or in adipose tissue as fat for future use. The process of homeostatic regulation depends on the body's needs and is under the control of two hormones, insulin and glucagon. Thus the Reason (R) is <i>TRUE</i>.</p> <p>Option 4 is the correct answer.</p>	

Question 14

A = the Assertion	R = the Reason
The homeostatic control centre(s) in the human body respond to stimulation by sensors and activate responses that involve effectors	Any event that disturbs homeostasis is known as a stimulus and is detected by a sensor, which then relays information to a homeostatic control centre
2. <i>Both A and R are true but R is NOT the correct explanation of A</i>	
<p><i>Explanation</i></p> <p>Homeostasis is achieved through many regulatory mechanisms and all homeostatic control mechanisms have at least three inter-dependent components for the variable(s) being regulated: a sensor that monitors and responds to change(s), a control centre and an effector which is the target that is acted upon. The Assertion (A) is <i>TRUE</i>.</p> <p>In physiology, a stimulus is thought of as a detectable change in the internal or external environment that triggers a response or a reaction. Sensory receptors – such as baroreceptors or the rods and cones of the retina of the eye – are the sensors that can detect changes in physiological parameters. They receive information about any change(s) that arise either inside or outside the human body so they are the first component of homeostatic control systems and so the Reason (R) is <i>TRUE</i>. However, neither the stimulus nor the sensor(s) directly activate the response.</p> <p>Option 2 is the correct answer because R does not provide a complete explanation for A.</p>	

Question 15

A = the Assertion	R = the Reason
The liver is the largest gland in the human body	The liver produces bile for the digestion of fat that has been ingested in the diet
2. Both A and R are true but R is NOT the correct explanation of A	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>TRUE</i> because the liver is the heaviest internal organ in the human body and is classed as a gland. It is located in the right upper quadrant of the abdomen and weighs 1.44–1.66 kg in adults. The liver is a remarkable organ that carries out many crucial physiological functions including regulation of glycogen, production of plasma proteins, decomposition of red blood cells and breakdown of drugs and toxins. The liver is also able to completely regrow after physical damage, as long as approximately 25% of the tissue remains.</p> <p>The liver carries out very many physiological functions including the production of bile – a special digestive juice that emulsifies fats. This process enables them to be digested and absorbed in the small intestine. Thus the Reason (R) is <i>TRUE</i>.</p> <p>However, the statements are not directly linked and so option 2 is the correct answer.</p>	

Question 16

A = the Assertion	R = the Reason
The systems of the body work independently	A tissue is a tiny unit of living matter
5. Both A and R are false	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>FALSE</i> because every body system is composed of a group of organs each of which contributes to homeostasis in its own specific way; they all contribute to maintaining life by working together.</p> <p>The Reason (R) is <i>FALSE</i> because a tissue is defined as a group of cells that are specialised to perform a particular function within the living body.</p> <p>Option 5 is the correct answer.</p>	

Question 17

A = the Assertion	R = the Reason
Body temperature is an example of a parameter that is maintained through homeostatic regulation	A cascade of biochemical events leads to clotting of blood and sealing of blood vessels
2. Both A and R are true but R is NOT the correct explanation of A	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>TRUE</i>.</p> <p>The Reason (R) is <i>TRUE</i>.</p> <p>However, temperature control – known as thermoregulation – and the clotting of blood (a process known as haemostasis) are distinct physiological processes.</p> <p>Thus option 2 is the best answer to choose.</p>	

Putting it all together**Question 18**

Human beings are mammals who are adapted to living on planet Earth. Explain how the external environment differs from the internal environment of the body.

The term “external environment” refers to the ever-changing conditions outside the human body, such as ambient temperature, time of day, altitude above sea level, food availability, clothing and family circumstances – all of which play a role in determining the health and wellbeing of the individual.

Physiologists and healthcare professionals use the term “internal environment” to describe the fluid contained within the body and found around cells of the human body. This fluid is called extracellular fluid or interstitial fluid, and its composition is maintained in a stable state through homeostasis.

Substances are continually moved through the extracellular fluid between plasma (of blood) through the interstitial fluid to reach cells – which contain intracellular fluid. This transfer allows fine adjustments to be achieved to maintain homeostasis and enable cells to function normally.

Question 19

Outline how the hormone oxytocin contributes to the birth of a baby. Why is this an example of positive feedback?

Labour is the process that leads to delivery of a baby.

Oxytocin is a hormone from the pituitary gland of the brain, the function of which is to make the muscle of the uterus contract.

Input: the contractions press the unborn baby’s head against the cervix (neck of the womb), which in turn stimulates the release of more oxytocin through positive feedback process that amplifies the response.

Output: the contractions dilate the cervix, enable the formation of the birth canal and then push the baby out into the world.

When the baby has been born, the input stimulus to the pituitary gland is removed and secretion of oxytocin reduces and eventually stops.