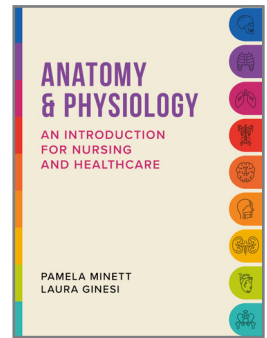




Lantern



Questions to accompany *Anatomy and Physiology*

CHAPTER 10 THE SENSORY 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. Photoreceptors are located:**
 - A. on the surface of the tongue
 - B. in the ear
 - C. on the skin
 - D. in the eye
 - E. in the nose
- 2. The choroid of the eye is:**
 - A. a gland that secretes fluid to lubricate the eye and wash away foreign particles such as dust
 - B. the 'white of the eye' – an opaque, fibrous, protective layer
 - C. a layer containing arteries and veins that contains a black pigment called melanin
 - D. the thin lining of the eye that contains rods, cones and ganglion cells
 - E. a thin layer of epithelium that lines the eyelid and covers the sclera
- 3. Cones are more numerous in the part of the retina opposite to the pupil, which is known as:**
 - A. the macula lutea
 - B. optic disc
 - C. blind spot
 - D. aqueous humour
 - E. lens
- 4. The amount of light passing through the pupil of the eye is adjusted by the:**
 - A. lens
 - B. optic nerve
 - C. iris
 - D. retina
 - E. optic disc
- 5. Light is focused on the lens through the action of _____ on suspensory ligaments.**
 - A. the optic nerve
 - B. the ciliary muscles
 - C. the iris
 - D. the retina
 - E. the optic disc
- 6. A sudden flash of light would:**
 - A. shrink the vitreous humour
 - B. cause dilation of the pupil
 - C. increase the size of the lens
 - D. cause constriction of the pupil
 - E. flatten the lens
- 7. Which of the following anatomical structures would NOT be found in the ear?**
 - A. cochlea
 - B. tympanic membrane
 - C. incus
 - D. olfactory glomerulus
 - E. semicircular canal
- 8. The Eustachian tube connects:**
 - A. the pharynx with the middle ear
 - B. the auditory canal with the cochlea
 - C. the incus with the stapes
 - D. cerumen and the tympanic membrane
 - E. the cochlea with the labyrinth

9. Sound waves are transmitted from the outer ear to the cochlea because of movement of the:

- A. oval window
- B. ossicles
- C. tympanic membrane
- D. semicircular canals
- E. round window

10. Receptors for hearing are:

- A. tectorial membrane
- B. cochlear duct
- C. stereocilia
- D. oval window
- E. otoliths

11. The structure(s) associated with sensing changes in the position of the head are:

- A. the ossicles
- B. the cochlea
- C. the fovea
- D. incus and stapes
- E. the semicircular canals

12. Which of the following structures is NOT part of the vestibular apparatus of the inner ear?

- A. the utricle
- B. the saccule
- C. the ampulla
- D. the otolithic membrane
- E. the pinna

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
Baroreceptors are a form of stretch receptor that are able to respond to changes in blood pressure	Proprioceptors in the muscles, tendons and joints monitor changes in the position of the body
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 14

A = the Assertion	R = the Reason
The function of vitreous humour is to maintain the spherical shape of the eyeball	Vitreous humour circulates around the posterior cavity of the eye, supplying cornea and lens with nutrients
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 term 'sensory threshold' refers to the minimum amount of a stimulus that can be detected by a sensory nerve ending	If sensory nerve endings are exposed to a stimulus that is stronger than threshold and which does not change over time, its effect becomes reduced with time - a phenomenon known as sensory adaptation
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
Olfactory epithelium is a small patch of tissue in the olfactory bulb that contains receptors that are stimulated by odours in very small concentrations	Odours dissolve in the olfactory epithelium and stimulate olfactory receptors to initiate impulses that are transmitted to the olfactory bulb
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

Label the diagram of the eye. Outline the function of each part from 1-14.

Question 18

Enter the anatomical structures A–G in the table below, to match with their correct function. Number the structures from 1 to 7 according to the order in which they are involved in the process of hearing.

- A. Auditory canal
- B. Organ of Corti
- C. Ossicles
- D. Oval window
- E. Stereocilia
- F. Tympanic membrane
- G. Vestibulocochlear nerve

Structure	Function	Number
	Membrane covering the entrance to the cochlea in the inner ear	
	Sound-sensitive structure in the inner ear	
	Entry for sound waves into the ear	
	Vibrates in response to incoming air	
	Inner hair cells of the cochlea that bend and initiate action potentials for auditory processing	
	Transmits impulses from the inner ear to the auditory cortex	
	Three tiny bones that transmit sounds from the air to the cochlea	

Question 19

Create a sketch or diagram that shows the process of gustation – the mechanisms for tasting substances in food that is ingested. Include the structure and function of taste buds and the major sensory pathways from the tongue and mouth in your illustration.

Question 20

Briefly outline the range of different sense organs in the human body. Use your own words to explain, using at least two examples, why the process of perception begins when an event or object from the external environment stimulates them.

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. Photoreceptors are located:**
D. in the eye
- 2. The choroid of the eye is:**
C. a layer containing arteries and veins that contains a black pigment called melanin
- 3. Cones are more numerous in the part of the retina opposite to the pupil, which is known as:**
A. the macula lutea
- 4. The amount of light passing through the pupil of the eye is adjusted by the:**
C. iris
- 5. Light is focused on the lens through the action of _____ on suspensory ligaments.**
B. the ciliary muscles
- 6. A sudden flash of light would:**
D. cause constriction of the pupil
- 7. Which of the following anatomical structures would NOT be found in the ear?**
D. olfactory glomerulus
- 8. The Eustachian tube connects:**
A. the pharynx with the middle ear
- 9. Sound waves are transmitted from the outer ear to the cochlea because of movement of the:**
A. oval window
- 10. Receptors for hearing are:**
C. stereocilia
- 11. The structure(s) associated with sensing changes in the position of the head are:**
E. the semicircular canals
- 12. Which of the following structures is NOT part of the vestibular apparatus of the inner ear?**
E. the pinna

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
Baroreceptors are a form of stretch receptor that are able to respond to changes in blood pressure	Proprioceptors in the muscles, tendons and joints monitor changes in the position of the body
2. Both A and R are true but R is NOT the explanation of A	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>TRUE</i>. Baroreceptors belong to the wider group of mechanoreceptors – sensory endings that detect changes in the level of force within the body, in this case pressure on the walls of blood vessels.</p> <p>The Reason (R) is <i>TRUE</i>.</p> <p>The two statements are not related so (R) does not provide an explanation for (A).</p> <p>Thus Option 2 is the correct answer.</p>	

Question 14

A = the Assertion	R = the Reason
The function of vitreous humour is to maintain the spherical shape of the eyeball	Vitreous humour circulates around the posterior cavity of the eye, supplying cornea and lens with nutrients
3. A is true but R is false	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>TRUE</i>. The vitreous humour is a clear, colourless jelly-like substance that fills the posterior cavity of the eyeball – the space between the lens and the retina. Since it is a semi-solid substance, it helps to maintain sufficient pressure that the eyeball does not collapse.</p> <p>The Reason (R) is <i>FALSE</i>. Vitreous humour does not circulate. Aqueous humour is a fluid that is secreted by the ciliary body that flows around the anterior chamber of the eye, supplying nutrients to the cornea and lens, before draining away in the canal of Schlemm.</p> <p>Option 3 is the correct answer to this question.</p>	

Question 15

A = the Assertion	R = the Reason
The term 'sensory threshold' refers to the minimum amount of a stimulus that can be detected by a sensory nerve ending	If sensory nerve endings are exposed to a stimulus that is stronger than threshold and which does not change over time, its effect becomes reduced with time – a phenomenon known as sensory adaptation
2. Both A and R are true but R is NOT the explanation of A	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>TRUE</i> because the sensory threshold for a sensory neuron is the minimum (weakest) stimulus required to produce change in the membrane potential.</p> <p>The Reason (R) is also <i>TRUE</i>. Receptors for every sensory system are limited by the amount of stimulus change that can be detected because they adapt and reduce their sensitivity to the stimulus over time. Some receptors adapt rapidly, some more gradually.</p> <p>Both statements are <i>TRUE</i> but they refer to different aspects of sensory perception and the Reason (R) does not provide an explanation for the Assertion (A).</p> <p>Thus option 2 is the correct answer.</p>	

Question 16

A = the Assertion	R = the Reason
Olfactory epithelium is a small patch of tissue in the olfactory bulb that contains receptors that are stimulated by odours in very small concentrations	Odours dissolve in the olfactory epithelium and stimulate olfactory receptors to initiate impulses that are transmitted to the olfactory bulb
4. A is false but R is true	
<p><i>Explanation</i></p> <p>The Assertion (A) is <i>FALSE</i>. Olfactory epithelium is located in the roof of each nasal cavity. The olfactory bulb is located in the brain.</p> <p>The Reason (R) is <i>TRUE</i>. The mechanism for detection of odourant molecules is described correctly and enables the olfactory bulb – which is part of the limbic cortex of the brain – to identify the odour.</p> <p>The correct choice is option 4.</p>	

Question 17

Label the diagram of the eye. Outline the function of each part from 1–14.

The diagram shows a cross-section of the human eye. The following table lists the labels and their corresponding parts in the diagram:

Label Number	Part Name
1	iris
2	cornea
3	conjunctiva
4	ciliary body
5	suspensory ligament
6	lens
7	pupil
8	sclera
9	choroid
10	retina
11	optic disc
12	optic nerve
13	central artery and vein of the retina
14	extraocular muscles

Question 18

Enter the anatomical structures A–G in the table below, to match with their correct function. Number the structures from 1 to 7 according to the order in which they are involved in the process of hearing.

- A. Auditory canal
- B. Organ of Corti
- C. Ossicles
- D. Oval window
- E. Stereocilia
- F. Tympanic membrane
- G. Vestibulocochlear nerve

Structure	Function	Number
D	Membrane covering the entrance to the cochlea in the inner ear	4
B	Sound-sensitive structure in the inner ear	5
A	Entry for sound waves into the ear	1
F	Vibrates in response to incoming air	2
E	Inner hair cells of the cochlea that bend and initiate action potentials for auditory processing	6
G	Transmits impulses from the inner ear to the auditory cortex	7
C	Three tiny bones that transmit sounds from the air to the cochlea	3