

Matching Questions

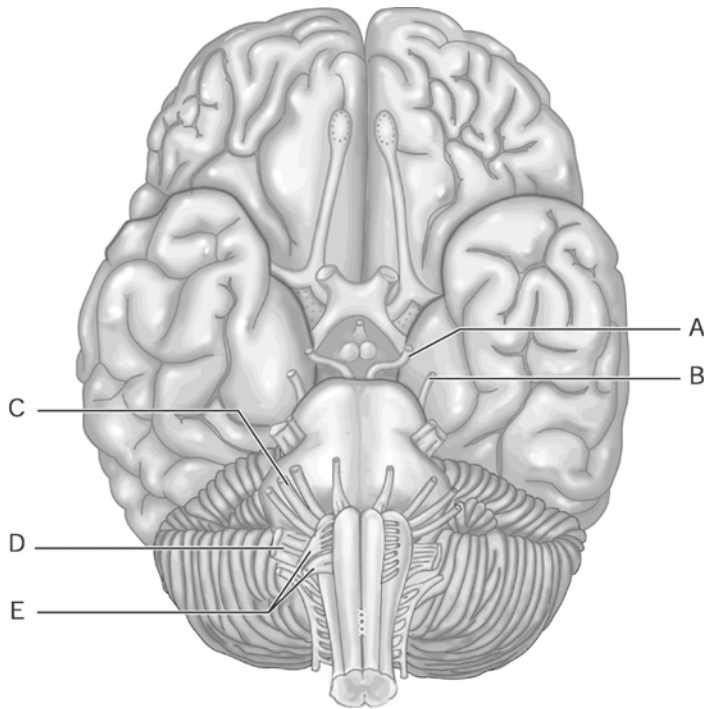


Figure 13.1

Using Figure 13.1, match the following:

- 1) Innervates the superior oblique muscle.

Answer: B

Diff: 1 Page Ref: 501; Fig. 13.5

- 2) Longest cranial nerve.

Answer: D

Diff: 2 Page Ref: 500; Fig. 13.5

- 3) Damage to this nerve would cause dizziness, nausea, and loss of balance.

Answer: C

Diff: 2 Page Ref: 500; Fig. 13.5

- 4) Involved in the regulation of breathing.

Answer: D

Diff: 2 Page Ref: 500; Fig. 13.5

- 5) Damage to this nerve would cause difficulty in speech.

Answer: E

Diff: 2 Page Ref: 500; Fig. 13.5

- 6) Damage to this nerve would keep the eye from rotating counterclockwise interlaterally.

Answer: B

Diff: 2 Page Ref: 500; Fig. 13.5

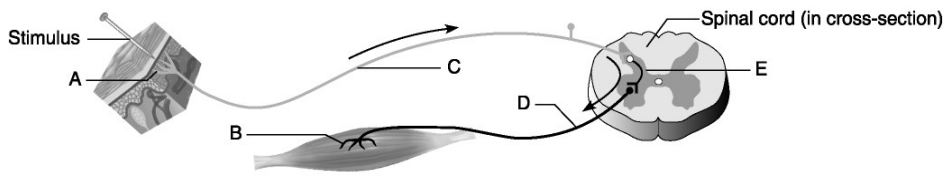


Figure 13.2

Using Figure 13.2, identify the following components of the reflex arc:

7) Integration center.

Answer: E

Diff: 1 Page Ref: 521; Fig. 13.14

8) Sensory neuron.

Answer: C

Diff: 1 Page Ref: 521; Fig. 13.14

9) Effector.

Answer: B

Diff: 1 Page Ref: 521; Fig. 13.14

10) Motor neuron.

Answer: D

Diff: 1 Page Ref: 521; Fig. 13.14

11) Receptor.

Answer: A

Diff: 1 Page Ref: 521; Fig. 13.14

Match the following:

12) Formed by the union of cranial and a spinal root. A) Abducens

Answer: D

Diff: 1 Page Ref: 508

B) Vagus

C) Vestibulocochlear

13) Receptors located in epithelium of the nasal cavity.

Answer: E

Diff: 1 Page Ref: 502

D) Accessory

E) Olfactory

14) Serves the senses of hearing and equilibrium.

Answer: C

Diff: 2 Page Ref: 506

15) Helps to regulate blood pressure and digestion.

Answer: B

Diff: 3 Page Ref: 507

16) Turns the eyeball laterally.

Answer: A

Diff: 2 Page Ref: 505

Match the following reflexes to their function:

17) Tests both upper and lower motor pathways. The sole of the foot is stimulated with a dull instrument extension.

Answer: A

Diff: 2 Page Ref: 527

- A) Plantar
- B) Flexor
- C) Abdominal
- D) Stretch

18) Checks the integrity of the spinal cord and dorsal rami at the level of T₈ to T₁₂.

Answer: C

Diff: 2 Page Ref: 527

19) Produces a rapid withdrawal of the body part from a painful stimulus; ipsilateral.

Answer: B

Diff: 2 Page Ref: 525-526

20) Prevents muscle overstretching and maintains muscle tone.

Answer: D

Diff: 2 Page Ref: 523; Fig. 13.16

Match the following:

21) The obturator and femoral nerves branch from this plexus.

Answer: A

Diff: 1 Page Ref: 514; Fig. 13.10

- A) Lumbar plexus
- B) Brachial plexus
- C) Sacral plexus
- D) Cervical plexus

22) Striking the funny bone may cause injury to a nerve of this plexus.

Answer: B

Diff: 1 Page Ref: 512; Fig. 13.9

23) Trauma to a nerve of this plexus may cause wrist drop.

Answer: B

Diff: 2 Page Ref: 512; Fig. 13.9

24) Improper administration of an injection to the buttocks may injure a nerve of this plexus.

Answer: C

Diff: 2 Page Ref: 516; Fig. 13.11

25) The phrenic nerve branches from this plexus.

Answer: D

Diff: 2 Page Ref: 511; Fig. 13.8

Match the following:

26) Regulates motor activity.

Answer: B

Diff: 1 Page Ref: 520; Fig. 13.13

A) Projection level

B) Precommand level

27) Central pattern generators.

Answer: C

Diff: 1 Page Ref: 519; Fig. 13.13

C) Segmental level

28) Intermediate relay for incoming and outgoing neurons.

Answer: A

Diff: 1 Page Ref: 520; Fig. 13.13

29) The cerebellum and basal nuclei.

Answer: B

Diff: 1 Page Ref: 520; Fig. 13.13

30) Includes cortical and brain stem motor areas.

Answer: A

Diff: 1 Page Ref: 520; Fig. 13.13

31) The neural machinery of the spinal cord.

Answer: C

Diff: 1 Page Ref: 519; Fig. 13.13

True/False Questions

- 1) The meningeal branch of a spinal nerve actually reenters the vertebral canal to innervate the meninges and blood vessels.
Answer: TRUE
Diff: 1 Page Ref: 508; Fig. 13.6
- 2) In the somatosensory system there are no third-order neurons in the cerebellum.
Answer: TRUE
Diff: 2 Page Ref: 495; Fig.13.2
- 3) There are 41 pairs of spinal nerves.
Answer: FALSE
Diff: 1 Page Ref: 508; Fig.13.6
- 4) The glossopharyngeal nerve is the only cranial nerve that contains sensory fibers.
Answer: FALSE
Diff: 1 Page Ref: 500; Fig.13.5
- 5) The musculocutaneous nerve is a major nerve of the brachial plexus.
Answer: TRUE
Diff: 1 Page Ref: 512
- 6) The second cranial nerve forms a chiasma at the base of the brain for partial crossover of neural fibers.
Answer: TRUE
Diff: 1 Page Ref: 501
- 7) The only cranial nerves to extend beyond the head and neck region are the vagus nerves.
Answer: TRUE
Diff: 1 Page Ref: 507
- 8) The dorsal ramus consists only of motor fibers bringing information to the spinal cord.
Answer: FALSE
Diff: 1 Page Ref: 509
- 9) Dermatomes are skin segments that relate to sensory innervation regions of the spinal nerves.
Answer: TRUE
Diff: 1 Page Ref: 516-518
- 10) Spinal roots and rami are similar in that they both contain sensory and motor fibers.
Answer: TRUE
Diff: 1 Page Ref: 509
- 11) Irritation of the phrenic nerve may cause diaphragm spasms called hiccups.
Answer: TRUE
Diff: 1 Page Ref: 512
- 12) The obturator nerve branches from the sacral plexus.
Answer: FALSE
Diff: 2 Page Ref: 514-515

- 13) Reciprocal inhibition means that while one sensory nerve is stimulated, another sensory neuron in the same area is inhibited and cannot respond.
Answer: FALSE
Diff: 2 Page Ref: 524
- 14) External strabismus and ptosis could be caused by damage to the oculomotor nerve.
Answer: TRUE
Diff: 2 Page Ref: 503
- 15) In order to regulate motor activity, to start and stop movements, and to coordinate postural movements, the cerebellum and basal nuclei are involved.
Answer: TRUE
Diff: 2 Page Ref: 520-521

Multiple-Choice Questions

- 1) The "knee jerk" reflex is an example of a(n) _____.
A) extensor thrust reflex
B) stress reflex
C) cross extensor reflex
D) stretch reflex
Answer: D
Diff: 1 Page Ref: 523
- 2) The _____ nerve is *not* a branch of the trigeminal nerve.
A) ophthalmic
B) maxillary
C) cervical
D) mandibular
Answer: C
Diff: 1 Page Ref: 504
- 3) Which of the following nerves does *not* arise from the brachial plexus?
A) median
B) phrenic
C) radial
D) ulnar
Answer: B
Diff: 1 Page Ref: 512
- 4) Which of the following is at the lowest level of the CNS?
A) direct system
B) indirect system
C) projection level
D) CPG
Answer: D
Diff: 1 Page Ref: 520

- 5) The three primary levels of neural integration in a sensory system include all of the following *except* the _____.
- A) receptor level
 - B) circuit level
 - C) perceptual level
 - D) effector level

Answer: D

Diff: 1 Page Ref: 494

- 6) The posterior side of the thigh, leg, and foot is served by the _____ nerve.
- A) obturator
 - B) common fibular
 - C) tibial
 - D) femoral

Answer: C

Diff: 1 Page Ref: 516

- 7) Starting at the spinal cord, the subdivisions of the brachial plexus are, in order _____.
- A) rami, trunks, divisions, and cords
 - B) rami, divisions, cords, and trunks
 - C) divisions, rami, trunks, and cords
 - D) trunks, divisions, cords, and rami

Answer: A

Diff: 1 Page Ref: 512-513

- 8) The cranial nerve with a dual origin (brain and spinal cord) is the _____.
- A) hypoglossal
 - B) accessory
 - C) vagus
 - D) glossopharyngeal

Answer: B

Diff: 1 Page Ref: 508

- 9) Which of the following is *not* a nerve plexus?
- A) brachial
 - B) cervical
 - C) lumbar
 - D) thoracic

Answer: D

Diff: 1 Page Ref: 510-511

- 10) A major nerve of the lumbar plexus is the _____.
- A) femoral
 - B) iliohypogastric
 - C) sciatic
 - D) ilioinguinal

Answer: A

Diff: 2 Page Ref: 514

11) Spinal nerves exiting the cord from the level of L₄ to S₄ form the _____.

- A) lumbar plexus
- B) femoral plexus
- C) sacral plexus
- D) thoracic plexus

Answer: C

Diff: 1 Page Ref: 516

12) The abducens nerve _____.

- A) supplies innervation to the lateral rectus muscle of the eye
- B) relays sensory information from taste buds on the tongue
- C) exits from the medulla
- D) if paralyzed, exhibits Bell's palsy

Answer: A

Diff: 1 Page Ref: 505

13) Basic reflexes _____.

- A) are rapid, predictable, learned responses
- B) may be modified by learned behavior
- C) are autonomic only
- D) are always mediated by the brain

Answer: B

Diff: 1 Page Ref: 521

14) Which of the following is *not* true about the integration center of a reflex arc?

- A) The center may be a single synapse between a motor and a sensory neuron.
- B) There are always multiple synapses with chains of interneurons.
- C) It is always located in the CNS.
- D) The center is a simple reflex arc.

Answer: B

Diff: 1 Page Ref: 521-522

15) Striking the "funny bone" is actually stimulation of the _____.

- A) radial nerve
- B) sciatic nerve
- C) ulnar nerve
- D) median nerve

Answer: C

Diff: 1 Page Ref: 512-513

16) Which of the following numbers of pairs of spinal nerves is correct?

- A) six cervical
- B) twelve thoracic
- C) six lumbar
- D) eight sacral

Answer: B

Diff: 1 Page Ref: 508-509

- 17) Select the statement about plexuses that is most correct _____.
- A) The dorsal rami of all spinal nerves unite to form complex networks
 - B) Only ventral rami form plexuses
 - C) Each branch of the plexus contains fibers from a single spinal nerve
 - D) The ventral rami of thoracic spinal nerves unite to form the thoracic plexus

Answer: B

Diff: 1 Page Ref: 510

- 18) A reflex that causes muscle relaxation and lengthening in response to muscle contraction is called a _____.
- A) Golgi tendon reflex
 - B) flexor reflex
 - C) crossed extensor reflex
 - D) plantar reflex

Answer: A

Diff: 1 Page Ref: 525

- 19) Pressure, pain, and temperature receptors are _____.
- A) interoceptors
 - B) exteroceptors
 - C) proprioceptors
 - D) chemoreceptors

Answer: B

Diff: 1 Page Ref: 491

- 20) Potentially damaging stimuli that result in pain are selectively detected by _____.
- A) interoceptors
 - B) photoreceptors
 - C) nociceptors
 - D) proprioceptors

Answer: C

Diff: 1 Page Ref: 491

- 21) Meissner's corpuscles _____.
- A) are found primarily in connective tissue
 - B) are anatomically unencapsulated
 - C) are interoceptors
 - D) are mechanoreceptors

Answer: D

Diff: 1 Page Ref: 492

- 22) Which receptors adapt most slowly?
- A) smell receptors
 - B) pressure receptors
 - C) nociceptors
 - D) touch receptors

Answer: C

Diff: 1 Page Ref: 492-493

23) The abducens nerve conveys proprioceptor impulses from the _____ to the brain.

- A) medial rectus muscle
- B) lateral rectus muscle
- C) superior rectus muscle
- D) inferior rectus muscle

Answer: B

Diff: 1 Page Ref: 505

24) Nerves that carry impulses toward the CNS only are _____.

- A) afferent nerves
- B) efferent nerves
- C) motor nerves
- D) mixed nerves

Answer: A

Diff: 2 Page Ref: 499

25) After axonal injury, regeneration in peripheral nerves is guided by _____.

- A) Wallerian cells
- B) Schwann cells
- C) dendrites
- D) Golgi organs

Answer: B

Diff: 1 Page Ref: 499-500

26) Regeneration within the CNS _____.

- A) is more successful than with the PNS
- B) typically allows axonal sprouting of 20 mm
- C) is complicated by secondary demyelination
- D) is promoted by growth inhibitors and glial scars

Answer: C

Diff: 1 Page Ref: 499-500

27) In a crossed extensor reflex, if the right arm were grabbed it would flex and the left arm would _____.

- A) also flex
- B) extend
- C) abduct
- D) adduct

Answer: B

Diff: 1 Page Ref: 525-526

28) Select the correct definition.

- A) Magnitude estimation is the simplest level of sensation.
- B) Perceptual detection is the ability to detect how much stimulus is applied to the body.
- C) Pattern recognition allows us to see a familiar face.
- D) Spatial discrimination allows us to recognize textures.

Answer: C

Diff: 1 Page Ref: 498

29) All processing at the circuit level going up to the perceptual level must synapse in the _____.

- A) pons
- B) thalamus
- C) reticular formation
- D) medulla

Answer: B

Diff: 1 Page Ref: 495-496

30) The sciatic nerve is a combination of which two nerves?

- A) pudendal and posterior femoral cutaneous
- B) posterior femoral cutaneous and tibial
- C) pudendal and common fibular
- D) common fibular and tibial

Answer: D

Diff: 1 Page Ref: 516

31) The largest and longest nerve of the body is found in the _____.

- A) cervical plexus
- B) brachial plexus
- C) lumbar plexus
- D) sacral plexus

Answer: D

Diff: 1 Page Ref: 516

32) Irritation of a major nerve of this plexus may cause hiccups.

- A) cervical plexus
- B) lumbar plexus
- C) sacral plexus
- D) thoracic plexus

Answer: A

Diff: 1 Page Ref: 511-512

33) Bell's palsy _____.

- A) is characterized by partial paralysis of diaphragm muscles
- B) is characterized by loss of vision
- C) is often caused by inflammation of the trigeminal nerve
- D) is characterized by paralysis of facial muscles

Answer: D

Diff: 1 Page Ref: 505

34) Babinski's sign is _____.

- A) normal in an infant less than 4 years old
- B) a reflex whose physiological mechanism is well understood
- C) when the great toe dorsiflexes and the other toes fan laterally
- D) caused by incomplete development of the thalamus in the infant

Answer: C

Diff: 1 Page Ref: 527

- 35) A simple spinal reflex goes along which of the following reflex arcs?
- A) effector, afferent neuron, integration center, efferent neuron, receptor
 - B) receptor, afferent neuron, integration center, efferent neuron, effector
 - C) effector, efferent neuron, integration center, afferent neuron, receptor
 - D) receptor, efferent neuron, integration center, afferent neuron, effector

Answer: B

Diff: 2 Page Ref: 521-522

- 36) Mixed cranial nerves containing both motor and sensory fibers include all *except* which of the following?
- A) oculomotor
 - B) vestibulocochlear
 - C) trigeminal
 - D) facial

Answer: B

Diff: 2 Page Ref: 500-501

- 37) Transduction refers to conversion of _____.
- A) presynaptic nerve impulses to postsynaptic nerve impulses
 - B) stimulus information to nerve impulses
 - C) receptor energy to stimulus energy
 - D) afferent impulses to efferent impulses

Answer: B

Diff: 2 Page Ref: 494

- 38) _____ always takes a nonspecific ascending pathway.
- A) Touch
 - B) Pain
 - C) Temperature
 - D) Arousal

Answer: A

Diff: 1 Page Ref: 497-498

- 39) The flexor muscles in the anterior arm (biceps brachii and brachialis) are innervated by what nerve?
- A) radial
 - B) median
 - C) ulnar
 - D) musculocutaneous

Answer: D

Diff: 2 Page Ref: 512

- 40) The cranial nerves that have neural connections with the tongue include all *except* the _____.
- A) trigeminal
 - B) facial
 - C) glossopharyngeal
 - D) trochlear

Answer: D

Diff: 2 Page Ref: 503

41) Problems in balance may follow trauma to which nerve?

- A) abducens
- B) vestibulocochlear
- C) trigeminal
- D) accessory

Answer: B

Diff: 2 Page Ref: 506

42) A fracture of the ethmoid bone would result in damage to which cranial nerve?

- A) glossopharyngeal
- B) vagus
- C) olfactory
- D) accessory

Answer: C

Diff: 2 Page Ref: 502

43) Select the statement that is most correct.

- A) Ganglia are collections of neuron cell bodies in the CNS that are associated with efferent fibers.
- B) Afferent nerve fibers contain cell bodies of sensory neurons.
- C) The dorsal root ganglion is a motor-only structure.
- D) The cell bodies of afferent ganglia are located in the spinal cord.

Answer: B

Diff: 2 Page Ref: 499

44) An improperly delivered gluteal injection could result in _____.

- A) neurofibromatosis
- B) postpoliomyelitis muscular atrophy
- C) paresthesia
- D) sciatica

Answer: D

Diff: 2 Page Ref: 516

45) Which nerve does *not* use the jugular foramen as a route of exit from the skull?

- A) trigeminal
- B) accessory
- C) vagus
- D) glossopharyngeal

Answer: A

Diff: 2 Page Ref: 504

46) The peripheral nervous system includes _____.

- A) sensory receptors
- B) basal nuclei
- C) the spinal cord
- D) the corpus callosum

Answer: A

Diff: 2 Page Ref: 491

47) Feeling a gentle caress on your arm would likely involve all of the following *except* _____.

- A) Meissner's corpuscles
- B) Merkel discs
- C) Pacinian corpuscles
- D) root hair plexuses

Answer: C

Diff: 2 Page Ref: 492

48) A patient who received a blow to the side of the skull exhibits the following signs and symptoms on that side of the face: he is unable to close his eye, and the corner of his mouth droops. Which cranial nerve has been damaged?

- A) facial
- B) glossopharyngeal
- C) hypoglossal
- D) accessory

Answer: A

Diff: 3 Page Ref: 505

49) The circuit level of the somatosensory system involves CNS centers in all of the following *except* the _____.

- A) spinal cord
- B) thalamus
- C) brain stem
- D) cerebral cortex

Answer: D

Diff: 3 Page Ref: 494-495

50) The projection level of the brain does *not* include the _____.

- A) basal nuclei
- B) brain stem nuclei
- C) reticular formation
- D) cerebellum

Answer: A

Diff: 2 Page Ref: 520

51) If the ventral root of a spinal nerve were cut, what would be the result in the tissue or region that nerve supplies?

- A) complete loss of sensation
- B) a complete loss of voluntary movement
- C) loss of neither sensation nor movement but only of autonomic control
- D) a complete loss of sensation and movement

Answer: B

Diff: 3 Page Ref: 509

Fill-in-the-Blank/Short Answer Questions

- 1) _____ law states that any nerve serving a muscle that produces movement at a joint also innervates the joint itself and the skin over the joint.
Answer: Hilton's
Diff: 1 Page Ref: 516
- 2) _____ are modified free-nerve endings found in the stratum germinativum.
Answer: Merkel discs
Diff: 1 Page Ref: 492
- 3) The perineurium defines the boundary of a _____.
Answer: fascicle
Diff: 1 Page Ref: 498
- 4) The _____ nerve is the largest of the cranial nerves.
Answer: trigeminal
Diff: 1 Page Ref: 504
- 5) Ventral spinal cord roots contain _____ fibers, while the dorsal roots contain _____ fibers.
Answer: motor (efferent); sensory (afferent)
Diff: 1 Page Ref: 509
- 6) The facial nerve is cranial nerve number _____.
Answer: VII
Diff: 1 Page Ref: 505
- 7) _____ is a protective reflex that overrides the spinal pathways and prevents any other reflexes from using them at the same time.
Answer: Flexor (polysynaptic) reflex
Diff: 2 Page Ref: 525-526
- 8) _____ is the tingling sensation or numbness when blood has been cut off from an area, as when the foot "goes to sleep."
Answer: Ischemia
Diff: 1 Page Ref: 514
- 9) Pain perception is involved in the _____ ascending pathways of the somatosensory system.
Answer: nonspecific
Diff: 2 Page Ref: 497
- 10) Complex motor behavior such as walking depends on _____ patterns.
Answer: fixed-action
Diff: 1 Page Ref: 520-521
- 11) Mr. Smith staggered home after a long night at the local pub. While attempting to navigate the stairs, he passed out cold and lay all night with his right armpit straddling the staircase banister. When he awoke the next morning, he had a severe headache, but what bothered him more was that he had no sensation in his right arm and hand. Explain what caused this symptom in his arm.
Answer: Continuous pressure interrupts blood flow along with oxygen and nutrients to the neuronal processes. As a result, impulse transmission is inhibited temporarily.
Diff: 3 Page Ref: 514

- 12) Define Golgi tendon organs and muscle spindles relative to the stretch reflex.
Answer: Golgi tendon organs work with muscle spindles to act as proprioceptors in skeletal muscles and their associated tendons. When muscles are stretched due to contraction of antagonist muscles, the sensory neurons send impulses to the spinal cord, where they synapse with motor neurons of the stretched muscle. Impulses are then sent to the stretched muscle, which then resists further stretching. This prevents muscle tissue damage.
Diff: 3 Page Ref: 525-526
- 13) Distinguish between monosynaptic and polysynaptic reflexes and between ipsilateral and contralateral reflex responses.
Answer: Monosynaptic refers to a single synapse in the reflex arc (one sensory and one motor neuron). Polysynaptic refers to more than one synapse in the arc involving sensory neurons, interneurons, and motor neurons. Ipsilateral refers to a reflex arc limited to one side of the spinal cord, while contralateral reflexes cross to the opposite side.
Diff: 3 Page Ref: 521, 524
- 14) What is the normal response of the plantar reflex? What is Babinski's sign and what does it indicate?
Answer: The plantar reflex tests the integrity of the spinal cord from L₄ to S₂ and also determines if corticospinal tracts are functioning and properly myelinated. The normal plantar response is downward flexion of the toes. If there is damage, the great toe dorsiflexes and smaller toes fan laterally (Babinski's sign). Infants, who normally lack complete myelination, exhibit this sign.
Diff: 3 Page Ref: 527
- 15) List and describe the functions of the three cranial nerves that serve the muscles of the eye.
Answer: The three cranial nerves are: oculomotor, trochlear, and abducens. The oculomotor is mostly motor, with branches to the inferior oblique and superior, inferior, and medial rectus muscles, as well as to the muscles of the iris and lens. The trochlear supplies mostly motor fibers to the superior oblique muscles of the eye. The abducens supplies mostly motor fibers to the lateral rectus muscles of the eye.
Diff: 3 Page Ref: 503, 505
- 16) Name an exteroceptor that is not a cutaneous receptor and explain why.
Answer: Exteroceptors that are not cutaneous receptors include the chemoreceptors of the tongue and nasal mucosa, the photoreceptors of the eyes, and the mechanoreceptors of the inner ear. These all monitor changes in the external environment, so they are classified as exteroceptors.
Diff: 3 Page Ref: 491-492
- 17) What is the benefit of having the nerve supply of the diaphragm, which is located in the thoracic-lumbar area of the spinal cord, arise from cervical nerves?
Answer: The fact that the phrenic nerve originates so high in the spinal cord reduces the likelihood of spinal damage above the phrenic origin, thereby reducing the possibility that a spinal injury would stop the diaphragm from working.
Diff: 3 Page Ref: 511-512
- 18) George, a 20-year-old man, injured his jaw and lost several teeth in a barroom brawl. Several weeks later he began to experience sharp stabbing pain in his lower jaw. After visiting the dentist, he was told that he had trigeminal neuralgia. What is this condition and how is it treated?
Answer: Trigeminal neuralgia, or tic douloureux, is an inflammation of the trigeminal nerve, probably caused by the fight and subsequent damage to the jaw.
Diff: 2 Page Ref: 504, 527

- 19) How is a receptor potential similar to an excitatory postsynaptic potential (EPSP) generated at a synapse?
Answer: A receptor potential acts essentially the same as an EPSP in that stimulus causes changes in permeability of the receptor membrane, which results in a graded potential. It will increase or decrease depending on the intensity of the stimulus.
Diff: 3 Page Ref: 494
- 20) How does accommodation of muscle spindles figure in the importance of stretch routines as a warm-up for exercise?
Answer: Initially, as muscle spindles are stretched, the reflex sends impulses back to contract the muscle. With prolonged stretching, accommodation decreases the vigor of the stretch reflex somewhat, and the muscle can relax and stretch more, reducing the risk of tearing muscle tissue during exercise.
Diff: 3 Page Ref: 525
- 21) Name three unencapsulated sensory receptors and tell what they are used for.
Answer: 1. Free nerve endings are found throughout the body. They are used by most body tissues to determine stretching, joint positioning, etc. In the epidermis they become pain receptors, heat and cold receptors, and possibly very light pressure receptors.
2. Modified free nerve endings called Merkel disks. They are used as light touch receptors.
3. Hair follicle receptors are mechanical receptors that become very fine touch receptors.
Diff: 2 Page Ref: 493
- 22) When we hear a strange sound in a room what perceptual level is activated?
Answer: The perceptual detection level is the only level acted upon. In some cases this alone allows our imagination to go "wild" with possibilities.
Diff: 2 Page Ref: 497
- 23) What is Wallerian degeneration?
Answer: The complete degeneration of the distal end of an axon after it has been severed.
Diff: 2 Page Ref: 499

Clinical Questions

- 1) Ralph sustained a leg injury in a bowling accident and had to use crutches. Unfortunately, he never took the time to learn how to use them properly. After two weeks of use, he noticed his fingers were becoming numb. Then he noticed his arms were getting weaker and tingling. What could be his problem?
Answer: Compression of the radial nerve (in the region of the armpit) may cause temporary cessation of nervous transmission, often called "Saturday night paralysis." Continued pressure could cause permanent damage.
Diff: 2 Page Ref: 514
- 2) A patient suffers nerve damage to the sciatic nerve, requiring surgery to suture the nerve back together. After surgery, the patient reports that sensation from the lateral and medial sides of the knee seem to be reversed. How could this happen?
Answer: In suturing the nerve back together, there is no guide to ensure that each nerve fiber continues across the transection into the same neurilemma in which it started. Nerve fibers can grow into pathways different from their original ones and establish new synapses. The brain cannot keep track of which nerve fibers have grown into different pathways, and projects sensations back to the point of origin.
Diff: 3 Page Ref: 499-500

- 3) David, an aspiring baseball player, was struck on the left side of his face with a fastball pitch. He was not wearing a safety helmet. His zygomatic arch was crushed, as well as parts of the temporal bone. Following the accident and reconstructive surgery, he noted that his left lower eyelid was still drooping and the corner of his mouth sagged. What nerve damage did he sustain?
Answer: He suffered facial nerve damage on his left side. Due to the bone damage, branches to the eye and jaw were probably damaged. It is possible that the damage could be reversible if the nerves were not cut or crushed completely.
Diff: 3 Page Ref: 505
- 4) A nurse explains that the excruciating pain of tic douloureux is caused by what?
Answer: The excruciating pain is caused by inflammation of the trigeminal nerve.
Diff: 2 Page Ref: 504
- 5) A patient received Morphine Sulfate, 10 mg IV, two hours ago for standard postoperative pain. She is now crying and complaining of continued pain. Is this an example of pain threshold or pain tolerance? Explain why.
Answer: This is an example of pain tolerance. Pain tolerance is the maximum amount and duration of pain that an individual is willing to tolerate. In this case the patient appears to have a low tolerance because she is crying and complaining of continued pain.
Diff: 3 Page Ref: 496
- 6) The patient is receiving transcutaneous electrical nerve stimulation (TENS) for back pain. Describe how this may work based on the gate control theory.
Answer: According to this theory, small-diameter nerve fibers carry pain stimuli through a gate, but larger diameter nerve fibers going through the same gate can inhibit the transmission of those pain impulses by closing the gate. The electrical stimulation of the skin's large touch fibers causes the gates to close, thereby inhibiting pain.
Diff: 3 Page Ref: 497

