Name _____KEY_____

Lab Section _____

Nsci 2100: Human Neuroanatomy
2018 Examination 2

On this page, write your name and lab section.

On your scantron answer sheet, enter your name (last name space first name), internet ID (X.500 name) and student number. Please do it now!!!

Lecture 12 brainstem (from Dr. Wessendorf)

1. Which of the following are anatomical features of the medulla?
   - A. It is partially covered by the 4th ventricle.
   - B. It is partially covered by the cerebellum.
   - C. The olives are present on its ventrolateral sides.
   - D. The pyramids are present on its ventral surface.
   - → E. More than one of the above are features of the medulla.

2. Which of the following anatomical structures is NOT present in the midbrain?
   - A. the red nucleus
   - B. substantia nigra
   - C. the decussation of the superior cerebellar peduncle
   - D. the cerebral peduncles
   - → E. None of the above is correct, as all are structures in the midbrain.

3. The axon bundles that connect the cerebellum to the brain stem include …
   - A. the dorsal cerebellar peduncles.
   - B. the ventral cerebellar peduncles.
   - C. the lateral cerebellar peduncles.
   - → D. the middle cerebellar peduncles.
   - E. the posterior cerebellar peduncles.

4. At what level of the brainstem do fibers of the corticospinal tract (i.e. the pyramidal tract) cross the midline?
   - A. midbrain
   - → B. caudal medulla
   - C. rostral medulla
   - D. pons

Lecture 13 forebrain (from Dr. Wessendorf)

5. Which part of the diencephalon is most directly involved with gating information flow into the cerebral cortex?
   - A. hypothalamus
   - → B. thalamus
   - C. epithalamus
   - D. subthalamus
   - E. None of the above is correct.

6. Which part of the diencephalon is most directly involved with control of body temperature, eating and drinking?
→ A. hypothalamus
B. thalamus
C. epithalamus
D. subthalamus
E. None of the above is correct.

7. The internal capsule constitutes a superhighway of axons, all of which are entering or exiting what structure?
A. the cerebellar cortex
B. the spinal cord
C. the thalamus
→ D. the cerebral cortex

8. Which of the following is NOT part of the telencephalon?
A. the basal ganglia
B. cerebral neocortex
C. olfactory bulbs
D. limbic cortex
→ E. None of the above is correct, as all are part of the telencephalon.

Lecture 14 cranial nerves (from Dr. Wessendorf)

9. Which of the following is NOT a function of the glossopharyngeal nerve (CN IX)?
A. It innervates skeletal muscles.
B. It has a parasympathetic component that controls certain glandular secretions.
C. It carries visceral sensory information (e.g. the sense of blood pressure).
D. It carries “special” sensory information on taste.
→ E. None of the above is correct, as all are functions of the glossopharyngeal nerve.

10. How are the hypoglossal nerve (CN XII) and the oculomotor nerve (CN III) alike?
→ A. Both nerves have motor axons that innervate skeletal muscles.
B. Both nerves have axons that carry information on a special sense.
C. Both nerves have parasympathetic axons (visceral motor).
D. Both nerves have axons that carry somatosensory information.

11. What level of the brainstem has motor neurons that innervate the extraocular (eye) muscles?
A. pons
B. midbrain
C. medulla
D. thalamus
→AB E. More than one of the above are correct.

12. Which cranial nerve directly controls the rate of heart contractions?
A. optic (CN II)
B. oculomotor (CN III)
C. glossopharyngeal (CN IX)
→ D. vagus (CN X)
E. None of the above is correct. The heart is controlled by spinal nerves only.

Lecture 15 somatosensory I (from Dr. Wessendorf)

13. Which of the following is a sense of the somatosensory system?
    A. vision
→ B. itch
    C. smell
    D. taste
    E. None of the above is correct.

14. Where are somas of somatosensory primary afferent neurons located?
    A. in intervertebral foramina (foramens)
    B. within the cranium
    C. in dorsal root ganglia
    D. in cranial nerve sensory ganglia
→all E. More than one of the above are correct.

15. Which of the following is NOT a true statement about encapsulation of nerve endings?
    A. It generally will increase the sensitivity of the nerve fiber.
    B. A Ruffini corpuscle is a type of encapsulated nerve ending.
    C. Encapsulation 'tunes' nerve endings so that they receive a more specific stimulus.
→ D. All of the above are true statements regarding encapsulation.
    E. More than one of the above are not true.

16. Piezo2 is a gated ion channel expressed by certain sensory neurons that is activated by …
    A. low temperatures.
    B. tissue damage.
    C. sound.
→ D. mechanical force.

Lecture 16 somatosensory II (from Dr. Wessendorf)

17. Which of the following are true statements regarding pain?
    A. The costs to society of chronic pain are greater than those of heart disease, diabetes, and cancer combined.
    B. Neurons encoding pain and those encoding vibration project to the same part of the thalamus.
    C. Chronic pain can result in depression.
    D. The axons of neurons encoding pain from the lower body cross the midline in the spinal cord.
→all E. More than one of the above are correct.

18. Inflammation can result in persistent pain. Which of the following is a characteristic of persistent pain?
    A. It outlasts the injury that originally caused the pain
    B. It is associated with the healing process
    C. It is protective during healing
→ D. More than one of the above are correct.
    E. None of the above is correct.

19. Which of the following statements regarding nociceptive sensitization is/are true?
    A. Sensitization can be induced by prolonged application of painful stimuli.
    B. Sensitization results in nociceptors responding to non-painful stimuli.
    C. Sensitization is often caused by inflammation.
    D. A common example of sensitization would be the sensitivity to touch that we experience after sunburn .
→all E. More than one of the above are correct.

20. Which statement regarding nociceptors is NOT true?
    A. Polymodal nociceptors fire in response to a temperature of 50° C.
    B. Most nociceptors are free nerve endings.
→ C. Mechanical nociceptors fire in response to stimuli over any part of a large, continuous patch of skin.
    D. Cold nociceptors have thresholds starting at about 0° C.

Lecture 17 & 18 vision

21. Tears are secreted onto the front surface of the eye by the …
    A. tarsal gland.
→ B. lacrimal gland.
    C. nasal gland.
    D. meibomian gland.
    E. scleral gland.

22. A facial nerve (CN VII) palsy (i.e. loss of facial nerve function) is likely to result in …
    A. an inability to direct the gaze (i.e. move the eyes) in certain directions.
    B. an inability to constrict the pupil.
    C. an inability to dilate the pupil.
→ D. an inability to close the eyelids.
    E. an inability to open the eyelids.

23. What is the first cell type that light encounters when it reaches the retina?
    A. bipolar cell
    B. photoreceptor cell
    C. horizontal cell
→ D. ganglion cell
    E. pigment epithelial cell

24. The axons from retinal ganglion cells on the nasal (nose) side of the left retina …
    A. synapse in the optic chiasm.
    B. carry information about the right visual hemifield.
→ C. synapse in the right lateral geniculate nucleus.
    D. run in the left optic tract.
    E. More than one of the above are correct.

25. Information regarding day and night carried by retinal axons to which of the following brain centers is important for the control of circadian rhythms?
    A. pretectal nuclei
    B. lateral geniculate nuclei
    C. superior colliculi
    D. inferior colliculi
→ E. suprachiasmatic nuclei

26. Axons from neurons in the lateral geniculate nucleus synapse mainly in what cell layer of primary visual cortex?
    A. I
    B. II & III
→ C. IV
    D. V
    E. VI

27. Visual information from visual cortex is described as being carried in 'streams'. What stream is most important for identifying a photograph of your mother?
    A. dorsal stream
    B. frontal stream
→ C. ventral stream
    D. limbic stream
    E. posterior stream

28. Imagine that you and a good friend are in a dimly lit room. What would happen to her pupils, if you shined a pen light in her right eye while avoiding shining the light in her left eye?
    A. Both pupils would remain dilated because the overall room luminance is dark.
    B. The right pupil would constrict, and the left pupil would remain dilated.
    C. The left pupil would constrict, and the right pupil would remain dilated.
→ D. Both pupils would constrict.
    E. There is too little information to answer this question.

Lecture 19 hearing & balance

29. Receptor cells most activated by angular acceleration are present in the …
    A. spiral ganglion.
    B. vestibulocochlear ganglion.
    C. organ of corti.
→ D. semicircular canals.
    E. cochlear nucleus.

30. Vestibular sense is relayed to the cortex via the ventral posterior nucleus of the thalamus. What other modality is relayed to cortex via this nucleus?
→ A. somatosensory
    B. vision
    C. auditory
    D. motor
    E. None of the above are correct.

31. What is the function of a tiny muscle that attaches to an auditory bone in the middle ear?
    A. No such muscle exists.
    B. The muscle amplifies low volume (quiet) sounds so they can be heard.
→ C. The muscle protects the auditory system from extremely loud sounds.
    D. The muscle contracts in response to a pressure differential between the middle ear and outside world to reduce pain (such as when taking off in an airplane).
    E. The muscle is important for sensing repetitive sounds such as when someone is beating a drum the same way continually.

32. The axons of neurons in the vestibular nuclei in the brainstem synapse …
    A. with hair cells in the semicircular canal or otoliths.
    B. in the vestibular ganglion in the inner ear.
→ C. in the flocculonodular lobe in the cerebellum.
    D. in the parietal lobe of cerebral cortex.
    E. in the frontal lobe of cerebral cortex.

Lecture 20 chemical senses

33. Most of the cell bodies of the olfactory receptor neurons are in the …
→ A. nose.
    B. tongue.
    C. olfactory bulb.
    D. frontal cortex.
    E. sensory ganglia of cranial nerves.

34. Taste information is carried into the central nervous system by axons in which cranial nerve?
    A. trigeminal nerve (CN V)
    B. facial nerve (CN VII)
    C. glossopharyngeal nerve (CN IX)
    D. accessory nerve (CN XI)
→BC E. More than one of the above are correct.

35. The cell membrane of olfactory receptor neurons have receptor proteins that are activated by odors. Which of the following statements regarding these receptors is true?
    A. Each receptor neuron and its receptors are activated by only a single chemical (i.e. an odorant).
→ B. Each receptor neuron expresses only one receptor protein.
    C. Each receptor neuron expresses several receptor proteins (typically three to five), and the combination of these receptors determines the unique sensitivity of each neuron.
    D. Each receptor neuron expresses 339 odorant receptor proteins, and central processing in the brain distinguishes the different odors.

36. Axons run from the olfactory bulb to the cortex in the olfactory nerve (CN I). True or false?
    A. true
→ B. false

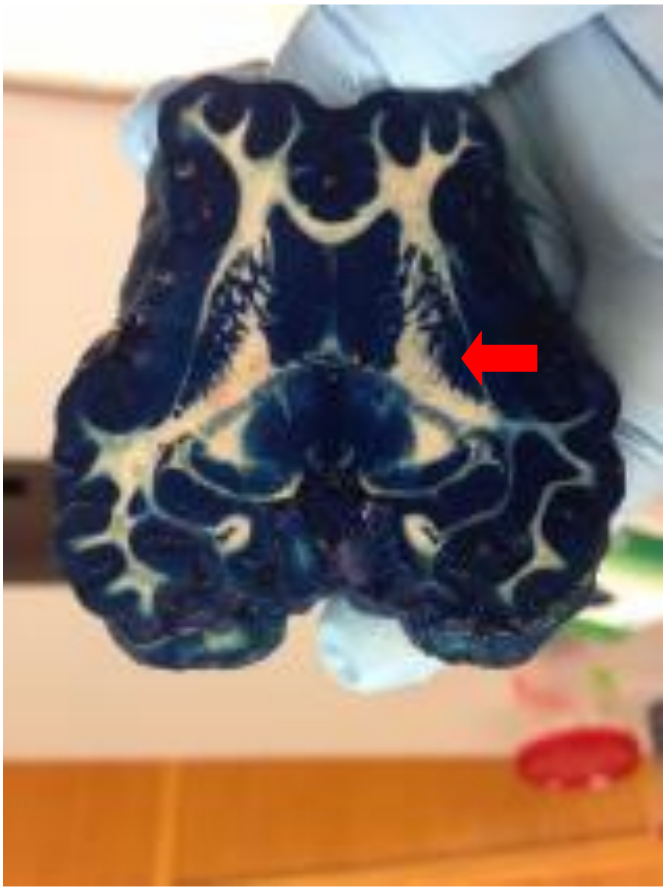
Lab #3-5 (from Dr. Riedl)

37. Which of the following stains will allow the best visualization of dendritic spines?
    A. Cresyl violet stain
    B. Weigert's stain
    C. Prussian blue stain
→ D. Golgi stain

38. What brain structure is shown in the image below, and what region is at the tip of the arrow?

A. cerebellum, granule cell layer
B. cerebellum, Purkinje cell layer
C. hippocampus, CA1
D. hippocampus, CA3
→ E. hippocampus, dentate gyrus

39. To what structure does the arrow point in the following picture of a sheep brain?



A. Caudate
→ B. Putamen
C. Thalamus
D. Cortex
E. Hippocampus

40. What is the plane of section in the image of the sheep brain in the question above?
A. Coronal
B. Sagittal
→ C. Horizontal

The End!

Please <u>turn in this exam and your bubble sheet</u> in the box at the back of the room.

Double check that your name is on both.