SAMPLE FINAL EXAM QUESTIONS (from an earlier Anatomy |9|535 final exam).
Many of the questions have been truncated, and not all are included in this sample!

DEPARTMENT OF ANATOMY AND CELL BIOLOGY

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Anatomy |9|535 **Anatomical Foundations of Neuroscience** Final examination

10)12 a.m. Medical Sciences Building, Rm 18

Read these instructions!

Answer **all** the questions in Section A (24%)
[Multiple choice: A(i) - A(xxiv); each 1%]
Answer **all** the questions in Section B (34%)
[Very short answers: B(i) -B(xvii); each 2%]
Answer **any two** questions from Section C (42%)
[Each a written composition, worth 21%]

Allow enough time for the questions needing written answers.

Section A. 24 multiple choice questions. **Attempt all.**
Print the letter (A,B,C,D,E) to the right of each question.

[**MCQ answers here**]
9

A(i) Which part of the brain of an amphibian is rostral to the pallium?
A. The olfactory bulb
B. The optic nerve
C. The optic tectum
D. The corpus striatum
E. The third ventricle

A(ii) What is the name of the most caudally placed of the cranial nerves of a rat?
A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(iii) In a bony fish (teleost), which of the following **is not** a conduit for primary sensory axons entering the central nervous system?

A. Dorsal root
B. Intermediate nerve
C. Oculomotor nerve
D. Trigeminal nerve
E. Vagus neve

A(iv) Identify the **incorrect** association.

A. Dorsal root ganglion	-	Multipolar neurons
B. Mesencephalon	-	Tectum
C. Otic placode	-	Vestibular ganglion
D. Periaqueductal grey	-	Trigeminal ganglion
E. Ventral root	-	Skeletal muscle

A(v) In mammalian embryonic development, where are the cells whose descendents become the cells of the ciliary ganglion?

A. In a plac
B. In the ne
C. In the ne
D. In the rh
E. In more than one of A,B,C or D above

A(vi) Which of the following is composed largely of cells derived from the neural crest?

A. Ad
B. Ep
C. Pi
D. Sp
E. None of A,B,C or D above

A(vii) Which part(s) of the central nervous system develop from cells other than those of the neural tube?

A. Hyp
B. Mot
C. Mic
D. Mor
E. Non

A(viii) Which animal has a lissencephalic (rather than a gyrencephalic) cerebrum?

A. Cow
B. Elephant
C. Gorilla
D. Mouse
E. Whale

A(ix) Which of the following is conspicuous for containing bipolar neurons?

A. Cerebral cortex
B. Dorsal root ganglia of adult mammals
C. Hippocampal sector CA1
D. Ventral lateral nucleus of thalamus
E. Vestibular ganglion

A(x) Which early developmental process allows the brain of a large mammal to fit into a cranial cavity that is not greatly elongated?

A. Contin- - -
B. Flexures
C. Formation of a sub- - -
D. Location of 90% of all central- - -
E. Transverse alignment of - - -

A(xi) Where are the neurons whose axons comprise the spinothalamic tract?

A. D- - -
B. G- - -
C. R - - -
D. V- - -
E. V- - -

A(xii) In the brain stem of any mammal, which of the following is a conspicuous feature (in a transverse section) at the level of the decussation of the corticospinal tracts?

A. Abducent nucleus
B. Facial nucleus
C. Fourth ventricle
D. Lateral- - -
E. Spinal- - -

A(xiii) Which sensory system has connections with the fastigial nucleus?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(xiv) Which of the following **does not** occur in the cuneate nucleus?

A. Feedb- - -
B. Feed- - -
C. Gating- - -
D. Inhi- - - E. Princ- - -

A(xv) When both eyes move to the right, what carries excitatory signals to the motor neurons that supply the left medial rectus muscle?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(xvi) At which site will a destructive lesion cause weakness or paralysis of the left lower limb and loss of pain and temperature sensations in the right lower limb?

A. Left h- - -
B. Left in - – -
C. Medial- - -
D. Right - - - -
E. Ventro- - -

A(xvii) In which place might a small destructive lesion cause paralysis of conjugate upward gaze?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(xviii) Consider the circuitry of the corpus striatum. Which nucleus contains neurons that project to the thalamus **and** inhibit thalamic neurons.

A. Ca - - -
B. Gl - - -
C. Gl - - -
D. Le - - -
E. Su - - -

A(xix) Where are the neuronal cell bodies of the fibres that constitute the perforant path to the dentate gyrus?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(xx) In an attack of temporal lobe epilepsy the first symptom can be ...

A. Baso - - -
B. Medi - - -
C. Para - - -
D. Para - - -
E. Olfa - - -

A(xxi) The Klüver-Bucy syndrome results from removal of both temporal lobes in the monkey. Which abnormality **is not** a feature of this condition?

A. Inability to respond appropriately to objects or events presented to the visual system
B. Inability to learn new activities in response to training
C. Instability of body temperature regulation, similar to that seen following destructive lesions in the posterior hypothalamus
D. Excessive and inappropriately directed sexual activity
E. Loss of the normal aggressive reaction to strange or potentially threatening circumstances

A(xxii) Which part of the thalamus has connections with the anterior (rostral) frontal cortex and with the basolateral nuclei of the amygdala?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

A(xxiii) Which sentence DOES NOT summarize a function of the lentiform nucleus?

A. It ensures ...
B. It inhibits the ...
C. It inhibits the ...
D. Lesions in the lentiform nucleus result in ...
E. Patterns of ...

A(xxiv) Where is a destructive lesion that causes blindness in the upper nasal quadrant of the visual field of the left eye AND in the upper temporal quadrant of the visual field of the right eye?

A. - - -
B. - - -
C. - - -
D. - - -
E. - - -

Section B. 17 questions with very short answers. **Attempt all.**
Write legibly above the dotted line. The required answer is rarely more than three words, often fewer.

B(i) Where are the cell bodies of neurons that innervate ...?

– –

B(ii) Name two sites of termination of axons of dopaminergic neurons.

– –

B(iii) What are the principal afferent and efferent connections of the .... group of nuclei of the mammalian thalamus?

– –

B(iv) Where is the primary cortical area for ..... sensation?

– –

B(v) Which thalamic nuclear group(s) is(are) notable for connections with .... ?

– –

B(vi) Which midbrain nucleus is an important source of descending motor fibres in quadrupedal animals but not in man?

– –

B(vii) Where do axons from the .... cross the midline?

_ _

B(viii) What sensory abnormality follows ... ... ?

_ _

B(ix) Where is a single destructive lesion that causes loss of pain and thermal sensations from the left side of the face and the right side of the body below the neck?

_ _

B(x) What is an -------?

_ _

B(xi) How do preganglionic sympathetic fibres travel from the spinal cord to .... ganglia?

_ _

B(xii) Which peptide is contained in and secreted by neurons that ..... ?

_ _

B(xiii) What are ..... Schäffer collaterals?

_ _

B(xiv) Which cortex receives afferents from the ..... and projects to the ..... ?

_ _

B(xv) What arrangement in the auditory pathway provides for binaural (stereophonic) hearing?

_ _

B(xvi) What happens if the **left** ..... nucleus is damaged following occlusion of a small branch of the ..... artery?

_ _

B(xvii) Name **two** sources of fibres afferent to the .... of the globus pallidus.

_ _

Section C. Choose and answer **two** of the following 6 questions.
Each answer should refer to relevant facts and hypotheses.
There is a **deduction** (up to 4/21) for writing that is irrelevant to the topic of any question in this Section.
Annotated **Diagrams** are acceptable for the presentation of systems of neuronal connections.

C(!!) Review the actions of the two hormones of the pituitary gland and the neural control of their secretion.

C(!!) Describe the neural pathways used by the cerebral cortex to direct a voluntary saccadic movement of both eyes to the left.

C(!!) Give a brief account of the composition and functions of **ONE** of these cranial nerves: *[4 listed]*. Relate the functional components to peripheral and central connections.

C(!!) Describe reflex pathways that **either** protect the retina from excessively bright light, **or** protect the organ of Corti from excessively loud sound, **or** protect the soles of the feet from mechanical injury on rough ground.

C(!!) How does the cerebellum make use of proprioceptive sensation from the lower limbs?

C(!!) Compare and contrast **two** types of aphasia and identify the sites of the lesions that cause the disorders.