Neuroscience Exam Sensory and Motor Systems

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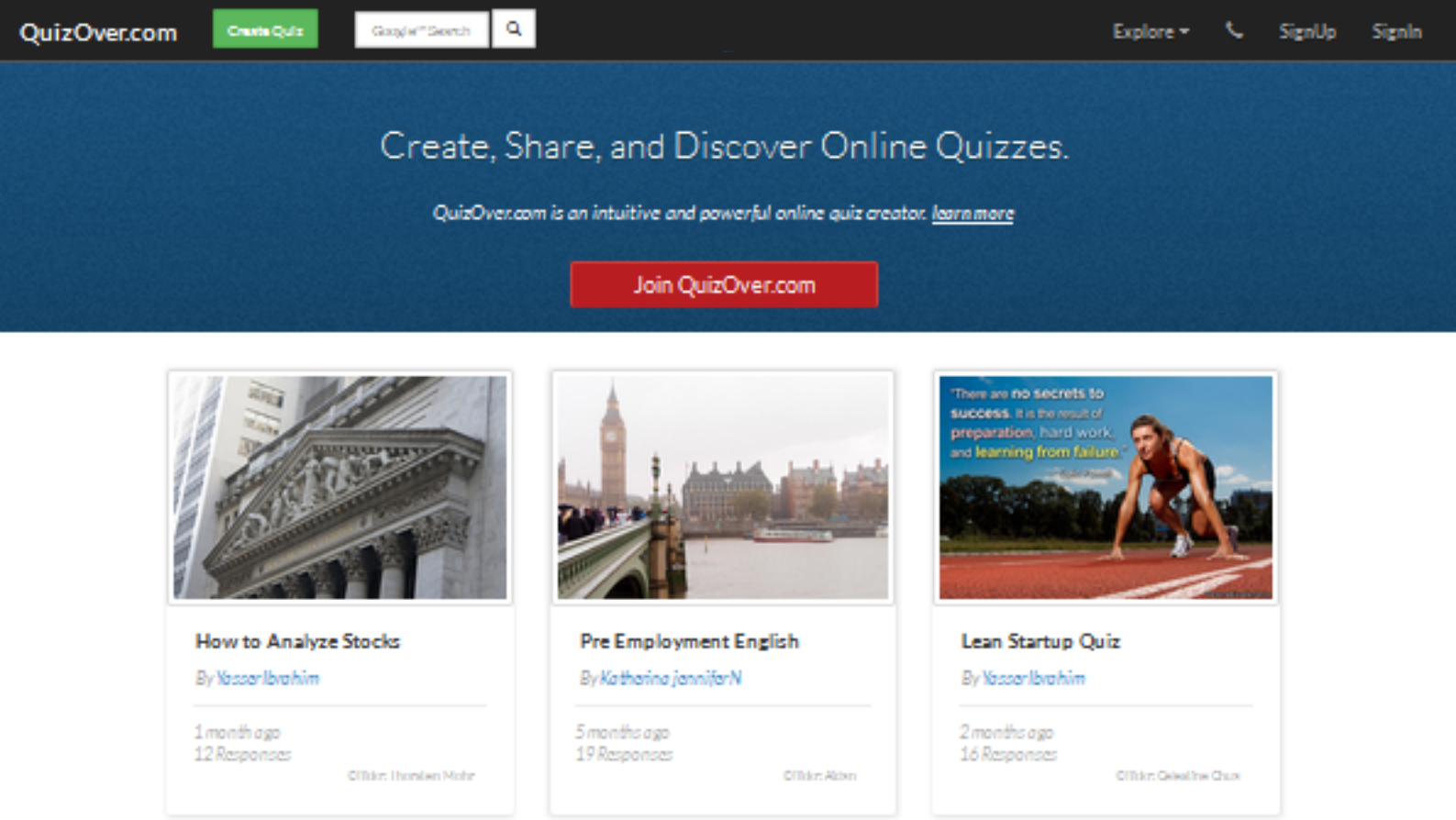

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4. Chapter: Sensory and Motor Systems

1. Sensory and Motor Systems Questions

4.1.1. (6 pt) The receptive field of a photoreceptor can be defined in ter...

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(6 pt) The receptive field of a photoreceptor can be defined in terms of color and position of an object in space.

For these various cells in the ascending auditory pathway, describe in a few words what characteristics define their receptive fields:

saccular hair cell

cochlear inner hair cell

spiral ganglion neuron

lateral superior olive neuron

medial superior olive neuron

primary auditory cortex neuron

- saccular hair cell: direction of acceleration (or gravity)
  cochlear inner hair cell: auditory frequency
  spiral ganglion neuron: auditory frequency (and intensity)
  lateral superior olive neuron: loudness difference between the two ears
  medial superior olive neuron: arrival time difference between the two ears
  primary auditory cortex neuron: frequencies and duration of sound;

4.1.2. (5 pt) Circle all the following that are true about the retina.

Author: David Corey

(5 pt) Circle all the following that are true about the retina.

Please choose all the answers that apply:

- On average, more rods than cones converge onto a single bipolar cell.
- The photoreceptors are nurtured by blood vessels that enter the eye via the optic nerve.
- ON-bipolar cells increase their rate of firing action potentials in response to light.
- The glutamatergic synapses between photoreceptors and OFF-bipolar cells are excitatory.
- Horizontal cells mediate surround inhibition by synapsing onto surrounding ganglion cells.

Check the answer of this question online at QuizOver.com:
Question: 5 pt Circle all the following that are true by Dr. David Corey @MIT

Flashcards:
http://www.quizover.com/flashcards/5-pt-circle-all-the-following-that-are-true-by-dr-david-corey-mit?pdf=3044

Interactive Question:
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4.1.3. Reponds best to input from both eyes

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(4 pt) When making extracellular recordings from single cells in the cat visual system, in the style of Hubel and Wiesel, you will find cells with different properties depending on where your electrode is in the brain.

Check all the boxes appropriate to indicate which cell types could have the properties listed on the left.

Reponds best to input from both eyes

Please choose all the answers that apply:

- Parvocellular LGN cell
- Magnocellular LGN cell
- Simple cortical cell
- Complex cortical cell

Check the answer of this question online at QuizOver.com:
Question: Reponds best to input from both eyes 4 pt When making extracellular

Flashcards:
http://www.quizover.com/flashcards/reponds-best-to-input-from-both-eyes-4-pt-when-making-extracellular?pdf=3044

Interactive Question:
http://www.quizover.com/question/reponds-best-to-input-from-both-eyes-4-pt-when-making-extracellular?pdf=3044

4.1.4. responds best to inputs from one eye only

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(4 pt) When making extracellular recordings from single cells in the cat visual system, in the style of Hubel and Wiesel, you will find cells with different properties depending on where your electrode is in the brain.

Check all the boxes appropriate to indicate which cell types could have the properties listed on the left.

responds best to inputs from one eye only

Please choose all the answers that apply:

- Parvocellular LGN cell
- Magnocellular LGN cell
- Simple cortical cell
- Complex cortical cell

4.1.5. receptive field is ON-center/OFF-surround

Author: David Corey

(4 pt) When making extracellular recordings from single cells in the cat visual system, in the style of Hubel and Wiesel, you will find cells with different properties depending on where your electrode is in the brain.

Check all the boxes appropriate to indicate which cell types could have the properties listed on the left.

receptive field is ON-center/OFF-surround

Please choose all the answers that apply:

- Parvocellular LGN cell
- Magnocellular LGN cell
- Simple cortical cell
- Complex cortical cell

4.1.6. responds best to oriented stimuli (bar at an angle)

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(4 pt) When making extracellular recordings from single cells in the cat visual system, in the style of Hubel and Wiesel, you will find cells with different properties depending on where your electrode is in the brain.

Check all the boxes appropriate to indicate which cell types could have the properties listed on the left.

responds best to oriented stimuli (bar at an angle)

Please choose all the answers that apply:

- Parvocellular LGN cell
- Magnocellular LGN cell
- Simple cortical cell
- Complex cortical cell

4.1.7. (6 pt) Indicate all the following that are true about the cerebellum:

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(6 pt) Indicate all the following that are true about the cerebellum:

Please choose all the answers that apply:

- Across the different functional areas of the cerebellum, the cortical structure is remarkably similar.
- Phylogenetically speaking, the fastigial nucleus is the oldest part of the cerebellum.
- The spinocerebellum consists of the vermis and intermediate zones, plus their deep output nuclei.
- The interposed nuclei affect distal motor control on the same side of the body.
- Most of the input to the most lateral parts of the cerebellar hemispheres comes directly from the cerebral cortex.
- The leading theory on how the cerebellum operates is that complex spikes provide an "error signal" used to modify parallel fiber input through long-term depression of the parallel fiber-Purkinje cell synapse.

4.1.8. (4 pt) Describe one pharmacological treatment and one surgical trea...

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(4 pt) Describe one pharmacological treatment and one surgical treatment for Parkinsonism.

What are they and how are they thought to work?

- Pharm treatments should center on dopamine levels
  L-Dopa, MAOIs, or DopaR agonists acting to relieve the loss of dopaminergic transmission.
  Surgical treatments I see as being either deep brain stimulation or a pallidotomy to relieve the overactivity of the basal ganglia's indirect pathway.