



Jerusalem Science Contest 5784

Neuroscience

Test 6

Form – A

Answer Key

- 1) Select the cognitive function:
 - a) Feeling pain
 - b) Fine finger movement
 - c) Taking a multiple-choice test**
 - d) Riding a bicycle

- 2) What was a result of H.M.'s surgery?
 - a) Paralysis of his hands
 - b) He could not form new memories**
 - c) He could not retrieve very old memories
 - d) More frequent and severe seizures

- 3) Which statement most specifically describes network processing?
 - a) Requires connections across multiple brain regions**
 - b) Confined to one cerebral hemisphere
 - c) Involves sensory input, such as touch or vision
 - d) Occurs primarily in the spinal cord

- 4) Select the true statement regarding short-term memory:
 - a) Its capacity is unlimited
 - b) Occurs in prefrontal cortex**
 - c) It requires very high expenditure of energy
 - d) Occurs predominantly during sleep

- 5) Which is a form of long-term memory?
 - a) Episodic memory**
 - b) Visuospatial scratchpad
 - c) Working memory
 - d) Random access memory

6) Which is the correct sequence of events regarding long-term memory?

- a) Retrieval, consolidation, storage, encoding
- b) Storage, encoding, consolidation, retrieval
- c) Encoding, consolidation, storage, retrieval
- d) *Encoding, storage, consolidation, retrieval***

7) Which statement is NOT correct regarding synaptic plasticity?

- a) It changes the structure of the synapse.
- b) It alters neurotransmitter receptors.
- c) *It is irreversible.***
- d) It is necessary for forgetting.

8) Which is most consistent with dementia?

- a) Loss of interest in football
- b) Difficulty following complicated directions
- c) Low IQ score
- d) *Repeatedly asking the same simple question at short intervals***

9) What is the neurophysiologic basis of memory?

- a) Complex reflexes
- b) Localized processing
- c) *Strengthening of synapses***
- d) Birth of new neurons

10) Which brain structure is fundamental to short-term memory.

- a) Hippocampus
- b) Amygdala
- c) Cerebellum
- d) *Prefrontal cortex***

11) Which statement is true regarding the brain?

- a) Uses a binary neural code
- b) The absolute number of items stored in memory is strictly limited
- c) *Able to process information in parallel***
- d) Calculates fractions faster than a desktop computer

12) What has been learned from the sea slug, *Aplysia californica*?

- a) Gross motor coordination
- b) Basic color vision processing
- c) Emotional responsiveness
- d) *Molecular mechanisms of learning***

- 13) Which of the following is true regarding long-term potentiation (LTP)?
- a) Takes months to develop to a useful level
 - b) Is independent of neurotransmitter receptors
 - c) Is the basis of memory encoding**
 - d) Primes the brain to respond to a stimulus faster in the future
- 14) Which function relies on distributed processing (involves multiple regions of the brain)?
- a) Sensitivity to a bright light
 - b) Hearing single tones
 - c) Knee jerk reflex
 - d) Motor coordination**
- 15) Which describes procedural memory?
- a) Limited to sensory processing
 - b) A form of short-term memory
 - c) Required to drive a car**
 - d) H.M. could not use this form of memory
- 16) How many times does the Hebrew word מוח, with the meaning of “brain”, appear in the Torah?
- a) 0**
 - b) 1
 - c) 8
 - d) 600
- 17) What bodily organ(s) does the Torah associate with the functions of cognition and emotion?
- a) The brain and heart
 - b) The heart and kidneys**
 - c) The brain, heart, and kidneys
 - d) The heart
- 18) Were the Talmudic Sages aware that thought happens in the brain?
- a) Yes**
 - b) No
 - c) They have a dispute about it.
 - d) We do not know.
- 19) Which of the following approaches is NOT a valid one, according to Jewish tradition, to explain why the Torah attributes intellectual functioning to organs other than the brain?
- a) “The Torah speaks in the language of people.”
 - b) Deep and important lessons are being conveyed by the Torah by its use of wording.
 - c) The Torah is wrong, and science is right.**
 - d) The Torah is referring to broad concepts, and not specifically to actual anatomical organs.

20) What is one reason for why the Torah uses the word ראש when it refers to a leader?

- a) The word “Rosh” is a homonym, and it happens to mean leader as well as the anatomical head.
- b) To teach that a Jewish leader should always use his head.
- c) To teach that a Jewish leader should not let his power get to his head.
- d) *Just like the head (brain) wields control over the rest of the body, the leader has control over his constituents.***