1.1 Biological psychology: evidence and transfer

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

KEY WORDS sensation • response criterion

Objective

Distinguish sensation, perception and psychophysics; Relate neural communication and brain systems to behaviour; Explain physiological bases of sleep, motivation and emotion. Original practice and authored marking guidance.

1 Key knowledge and worked examples

sensation : Reception of sensory stimulation. **response criterion** : The threshold for reporting that a signal is present.

A biological explanation needs a path from a physical process to the observed behaviour. Receptors change stimulus energy into neural signals; connected brain systems process those signals. An association in an image cannot tell us whether activity causes, follows or merely accompanies the task. Sleep also depends on both a roughly daily circadian rhythm and pressure that builds during wakefulness. Motivation and emotion involve interacting neural, endocrine and environmental processes. A single brain area or hormone is rarely a complete explanation. Detailed methods are in SP.1, NE.1 and HB.1.

Signal detection: four outcomes separate sensitivity from bias

	Signal present	Signal absent
Respond yes	Hit	False alarm
Respond no	Miss	Correct rejection

Worked case. In a fictional alarm task, a bonus for reporting alarms raises hits from 60/100 to 80/100 and false alarms from 10/100 to 30/100. Does this establish improved sensitivity?

Hit rate rises from 60% to 80%, but false-alarm rate also rises from 10% to 30%. A more liberal response criterion can produce both changes. Hit rate alone cannot establish improved sensitivity; compare separation of signal and noise using both rates and a suitable model. Neither the bonus nor these illustrative counts identifies a neural cause.

2 Practice

2.1 Reporting a sound when no sound was presented is a: [1]

A. hit B. false alarm C. correct rejection

2.2 A neuron sends an electrical signal along its: [1]

A. axon B. questionnaire C. retina only

2.3 Revisit the worked case. State one conclusion its evidence supports and one stronger conclusion it does not support. Explain the difference. [2]

3 Exam-style questions

3.1 A participant sleeps little before a memory scan. Recall falls and one region is less active. Give two competing explanations and a design improvement. Give the interpretation, supporting reasoning, a relevant alternative or limitation, and an appropriate check. [4]

Solutions

2.1 Answer: B. It is a positive response on a noise-only trial. The other options do not satisfy the stated defining conditions.

2.2 Answer: A. Axons conduct action potentials toward terminals. Compare the exact process, design or evidence, rather than an associated keyword.

2.3 Use the worked case evidence to support a bounded claim and explain why a causal, universal or stronger claim needs additional evidence. The claim must fit the specific design and observed process.

3.1 Reduced sleep could affect memory processing, or stress/effort could affect both recall and activity. Compare ethically approved sleep conditions with standardized tasks and measured confounders; randomize condition order where suitable. Even then, a regional association does not establish that the region alone stores memories. Award B1 each (authored) for the interpretation, its reasoning, a relevant limitation/alternative and an appropriate check, up to four points. Accept a different justified answer satisfying these demands.