

Marking Guide for Biological Psychology Examination Paper

January 2013

This is a two-hour short-answer examination paper containing 20 questions. You should attempt to answer 10 questions in total.

This paper consists of **THREE** sections

SECTION A questions are worth 5 marks each. You must answer three questions from this section (15 marks in total)

SECTION B questions are worth 10 marks each. You must answer four questions from this section (40 marks in total)

SECTION C questions are worth 15 marks each. You must answer three questions from this section (45 marks in total)

ALL of your answers should be written in your examination booklet, **NOT** on this question paper.

Please clearly indicate on the front of your examination booklet the question number of each question attempted.

Section A Answer three questions from this section

1. Briefly explain the functions of the sub-divisions of the peripheral nervous system (PNS).

5 marks

Somatic afferent/efferent; Autonomic afferent/efferent to sympathetic and parasympathetic

What are the five major classes of anxiety disorders?

2. Generalised; Phobic; Panic; OCD; PTSD

5 marks

3. What influences the velocity of axonal conduction?

Myelination and diameter of axon.

5 marks

4. Briefly explain the duplexity theory of vision.

Rods and cones, higher density of cones at fovea provide higher vision acuity, photopic vision of cones and scotopic vision of rods.

5 marks

5. What are the similarities and differences between somatosensory pain and neuropathic pain.

Neuropathic severe chronic in absence of stimulus, somatosensory picked up by sensation in free nerve endings

5 marks

6. What is Kluver-Bucy Syndrome?

Anterior temporal lobe damage (amygdala in humans) leads to reduced inhibition and inappropriate behaviour.

5 marks

Section B Answer four questions from this section

- 7** Compare and contrast x-ray Computed Tomography (CT) with functional Magnetic Resonance Imaging (fMRI) as techniques for studying the brain.

CT structure of brain, creates x-ray scan of one horizontal section of brain – 8/9 sections per patient.

10 marks

fMRI provides structure and function – BOLD signal of blood in brain, good/better spatial resolution, 3D images of entire brain.

- 8** What are the primary storage areas of human memory and why may it have been that the brain evolved in this way?

Different locations for different types of information: inferotemporal cortex for visual information; amygdala for emotionally significant memories, prefrontal cortex for working memory, cerebellum for sensorimotor skills.

10 marks

Important to answer second part – why? Linked to other brain facets such as amygdala being important for emotion, and also as a protection to prevent devastating effects of damage to one particular area (some memory items will be damaged but others preserved)

- 9** Explain how lateral inhibition assists us in our perception of edges

Often seen through the use of mach bands; Ommatidia receptors fire whilst others don't at when viewing an edge because of the light contrast; this can lead to greater lateral inhibition by the receptors than exists in the actual intensity of the edge.

10 marks

- 10** Briefly explain hierarchical organisation and how damage at specific levels could impact upon either hearing or vision

General hierarchical organisation; receptors to thalamus, to primary and secondary sensory cortexes, to association cortex – also links within cortex (parallel not just serial transmission).

10 marks

In audition, auditory nerve (from cochlea) to hindbrain/midbrain/forebrain structures.

In vision optic nerves (from visual field) to optic chiasm, LGN, PVC

- 11** Explain how drug tolerance and drug sensitisation work upon the brain.

Dose-response curves; dose has less effect or higher dose needed for same effect. Sensitisation works in the other direction. Can lead to cross-tolerance to other drugs. Can be metabolic/functional (psychoactive drugs); contingency can play a role in tolerance.

10 marks

- 12** How is the brain damaged by cerebrovascular disorders?

Stroke/hemorrhage/Ischemia/ basics of how they happen (clots/bleeds etc. Main issue – is apoptosis cell death and the release of cytokines at infarct site.

10 marks

- 13** Briefly explain how the membrane resting potential is changed to activate an action potential.

Temporal/Spatial summation to move potential from -70mV

10 marks

14 What effect does stress have on immune function?

Acute stressors leading to improvement of immune function (eustress), Chronic stressors harming (distress); Short/Long-term cytokine release. Effect of glucocorticoids.

10 marks

Section C Answer **three** questions from this section

15 Explain, giving specific examples of test items, why a Common Neuropsychological Test Battery is of use when examining patients with suspected neurological disorders.

Wide-ranging variety of tests to ascertain neuropsychological functioning; IQ (e.g., WAIS), Memory (e.g., digit span), Language (token test) Language Lateralisation (dichotic listening/sodium amytal)

15 marks

Answer MUST explain at least two examples of specific tests to some extent to score higher marks)

16 Briefly evaluate the evidence for adult neurogenesis.

Neurogenesis to be defined, and set out why it is an issue of interest in adults as opposed to overall (e.g, why focus on adults and not children – must show an appreciation that this is a different case). Must then focus on the evidence arguing neurogenesis – e.g., Kornack & Rakic, West et al.. Must cover either neural stem cells or enriched environments and the evidence from these, and conclude based upon the evidence.

15 marks

- 17** Briefly describe the case of amnesia in patient H. M., and explain what findings from the study of H. M. suggest regarding the biological structure of human memory.

HM damage to medial temporal lobes (Hippocampus, amygdale, etc.) – anterograde amnesia leading to poor STM to LTM transfer. Tests of HM should focus on research evidence (e.g., Milner) exploring digit span and, crucially, the issue regarding the mirror-maze task which shows differences in implicit/explicit transfer. Comment on what this suggests about memory for higher marks.

15 marks

- 18** Briefly evaluate the evidence for a 'gate theory' of pain.

Explain Melzack & Wall's gate theory with info on descending pain control theory. MUST include the evidence for and against gate theory which suggests that it is not as simple as gate theory suggests.

15 marks

- 19** Briefly describe the set-point theory of hunger and eating and evaluate the evidence for and against it.

Explain set-point theory and how it should lead to homeostasis – evaluate with evidence (or highlight study limitations regarding failures). Better answers will bring in alternative theories such as positive-incentive theory.

15 marks

- 20** Briefly evaluate the evidence for genetic and neurodevelopmental causal factors of schizophrenia.

Genetics – need to focus on concordance rates 10% familial rate, 45% in MZ twins). Raise issue of <100% and what this suggests. Comment on failure to find specific genes for higher marks and

15 marks

report study (Hall et al.); genetic susceptibility for neurodevelopmental disorder for higher marks; discuss dopamine theory and limitations. Good answers will draw these all together in evaluation.