

## VCE Psychology Unit 3

### Written Examination

### Suggested Solutions

#### SECTION A – MULTIPLE-CHOICE QUESTIONS

1	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
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40	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D

**Question 1 C**

The peripheral nervous system (PNS) is a network of nerves outside of the central nervous system (CNS). Its major function is to convey both sensory and motor messages to and from the brain via the spinal cord. The brain (part of the CNS) initiates a conscious response to sensory stimuli as well as registering that the body is under threat; interneurons are only found in the CNS.

**Question 2 A**

The soma initiates an action potential, which will then be conveyed along the axon towards the axon terminal. The axon itself is surrounded by the myelin sheath, which enhances transmission.

**Question 3 B**

Parkinson's disease is a neurodegenerative disorder that affects the functioning of the CNS due to a lack of the neurotransmitter dopamine. Dopamine provides input to key motor areas of the brain, resulting in a variety of motor and non-motor symptoms.

**Question 4 C**

Parkinson's disease is caused by the degeneration of dopamine-producing neurons in the substantia nigra, resulting in a lack of input to key motor areas of the brain.

**Question 5 C**

In the lock-and-key process of neural transmission, if an inhibitory neurotransmitter such as GABA will act as a 'key'. It will bind with its complementary shaped receptor on the postsynaptic cell, the 'lock', and reduce the likelihood of a postsynaptic cell from firing. This provides a calming influence on central nervous system activity.

**Question 6 D**

When Laura first started to feel anxious about the thought of being homeless she was most likely experiencing distress, as she was experiencing a negative psychological response to a stressor.

**Question 7 C**

When Laura started to feel stressed about the thought of being homeless she was most likely experiencing countershock during the alarm reaction, as her body responded with activation of the fight-flight-freeze response via the sympathetic nervous system. This would have led to a rapid increase in Laura's resistance to the stressor.

**Question 8 B**

When Laura developed the symptoms of a cold she was most likely experiencing the resistance stage; her body was showing early signs of illness but she was still able to maintain a level of functioning in her role as a secondary-school teacher. Maintaining a high level of resistance to the stressor via the release of cortisol into the bloodstream would have helped provide Laura with the energy required to maintain her level of daily functioning.

**Question 9 D**

When Laura was contemplating being homeless in thirty days, she had made a primary appraisal that the stressor was a significant threat, as it would negatively effect both her and her child. She subsequently made a secondary appraisal, after which she called the home rental agencies.

**Question 10     A**

Laura had demonstrated the use of context-specific effectiveness in accepting the live-in supervisor position by adapting to the situational demands of her stressor and thus finding an appropriate means of addressing the source of her stress.

**Question 11     B**

Cortisol suppresses immune system activity as part of the overall process of targeting bodily resources that enable the body to sustain the necessary energy required to resist a stressor.

**Question 12     D**

The somatic nervous system has both a sensory and a motor function in terms of the spinal reflex, whilst the spinal cord contains the interneurons that integrate the sensory and motor information that both process and initiate the necessary response to harmful stimuli.

**Question 13     B**

The autonomic nervous system regulates visceral muscle activity as these muscles are constantly controlling the activity of vital organs and glands required for survival. The somatic nervous system activates skeletal muscle activity, specifically a voluntary action (movement) in response to a conscious command from the brain.

**Question 14     A**

GABA is stored in the vesicles in the axon terminal and is released into the synapse via action potential.

**Question 15     A**

The hippocampus is largely responsible for the retrieval of the contextual details of the memory of Prith's near-drowning incident. The amygdala, hypothalamus and cerebellum do not retrieve these contextual details.

**Question 16     B**

The amygdala is the fear centre of the brain and is responsible for triggering the response, firstly by sending a distress signal to the hypothalamus, which in turn activates the sympathetic nervous system to activate the fight-flight-freeze stress response when Prith goes near to a surf beach.

**Question 17     D**

The adrenaline released during the fearful event would have led to a release of noradrenaline, which would have activated the amygdala to encode the fear intensity experienced when Prith was drowning.

**Question 18     A**

The brain is responsible for Prith's conscious processing and behavioural response of protesting the antecedent (being informed of a planned holiday at Anglesea). Other branches of the nervous system would not be responsible for conscious processing.

**Question 19     C**

Prith's ability to play water polo indicates that the fear he experiences when he is exposed to surf beaches is a form of stimulus discrimination, as his fear (the conditioned response) is only triggered by the ocean (the conditioned stimulus) and not similar stimuli such as the pool for water polo games.

**Question 20 D**

A strength of the Lazarus and Folkman Transactional Model of Stress and Coping is that it identifies the role of psychological determinants in the evaluation of stress. Limitations of the model include: the lack of experimental evidence, as it is too difficult to test under controlled conditions; that it is not a linear model, as there is a degree of overlap between the primary and secondary appraisals, and; it fails to highlight the role of the physiological response to stress.

**Question 21 C**

Long-term depression (LTD) can most aptly be explained by the repeated low frequency input from a presynaptic neuron to a postsynaptic neuron, causing the weakening of a memory trace over time. Synaptic pruning is a by-product of LTD, but it fails to address the depotentiation of activity at the receptor sites.

**Question 22 B**

Leah's association between commenting on her connection's posts and the number of comments that she received was learned via operant conditioning, as her behaviour directly operated on the environment (via her commenting behaviour) and she has learned through the consequences applied, here being her receiving comments (positive reinforcement).

**Question 23 A**

In terms of the three-phase model of operant conditioning, while Leah conducted her personal experiment, one of her connections posting something on social media acted as an antecedent, which was the precursor that lead to her behaviour of commenting on the post.

**Question 24 B**

The excitement that Leah experienced when she received numerous comments from a post is a form of eustress – a positive psychological response to a stressor that increased activity in her sympathetic nervous system as reflected by an increase in arousal.

**Question 25 D**

Leah's initial reduction in the amount of material she posted on social media due to a lack of comments from her connections was due to the absence of a desirable consequence (positive reinforcement), and thus her social media activity was reduced due to a lack of incentive. She was not being punished as she did not have a desirable stimulus removed or an undesirable stimulus added as a result of her behaviour.

**Question 26 B**

Leah's behaviour of commenting on her connection's social media posts has in this case been positively reinforced, as a stimulus has been added. Receiving her own comments would reinforce Leah's social media actions (commenting on the posts made by her connections).

**Question 27 A**

In terms of the serial position effect, the results expected for the patient would reflect both a primacy and a recency effect, effectively a superior recall of the earlier and latter words on the list.

**Question 28     A**

The patient would most likely use maintenance rehearsal by subvocally repeating the words as they entered short-term memory (STM) without the opportunity to link the words to material in long-term memory (LTM) via elaborative rehearsal. Context-dependent and state-dependent cues could only be applied if there was a delayed form of retrieval.

**Question 29     B**

The psychologist in this case was collecting primary (original) data that is quantitative in nature (the percentage of each of the ordered words that was retrieved from memory).

**Question 30     C**

An advantage of the use of a case study is that the researcher can gain an in-depth understanding of the patient's condition. **A** relates to an experiment and **B** relates to an observational study.

**Question 31     C**

Anterograde amnesia is generally symptomatic of damage to the hippocampus, which is the section of the brain that is largely responsible for the consolidation of material from STM to LTM and retrieval back to STM.

**Question 32     D**

It is during the reconstruction of memory from LTM back into STM that a memory is fallible due to source confusion. Malena may falsely integrate aspects of the memory of the incident with other material stored in her LTM in order to generate a coherent and episodic reconstruction of the event and thus her memory may lack accuracy.

**Question 33     B**

Based on the consequences of her coach's actions, Malena has learned that violence and intimidation in junior sport is inappropriate via social learning. She has observed her coach's behaviour and the consequences applied to her coach's actions, and thus has learned vicariously (indirectly).

**Question 34     D**

During the tribunal hearing, Malena was shown video footage of the incident, which triggered a highly detailed and vivid recall of her memory of the incident. This is an example of a flashbulb memory, which is a photographic-like memory brought back into conscious awareness via the cue of, in this case, watching the footage.

**Question 35     A**

Malena's internal state in terms of the distress she experienced during the encoding process was matched by her internal state when she viewed the footage of the incident, and thus the video footage served as a retrieval cue for the memory of the incident from her LTM into her conscious STM.

**Question 36     C**

The use of elaborative rehearsal would link the words to existing material in LTM and provide additional cues during retrieval from LTM to STM.

**Question 37     B**

Non-random allocation of the participants to the two groups was used in this experiment, as the use of birth dates did not give the sample of participants an equal chance of being allocated to either group.

**Question 38     C**

The standard deviation of the number of words retrieved by each of the two groups represents a measure of how far the scores are from the mean, and thus provides an indicator of the consistency of the scores.

**Question 39     D**

The variations in the rooms in this case (the lighting and noise levels during the rehearsal phase of the experiment) represents an extraneous variable, as it is a variable other than the independent variable (IV) that may affect the dependent variable (DV).

**Question 40     C**

The rehearsal of the words during the exposure time to the material initially occurred when the words entered STM, which actively processes the words that have been attended to from STM.

**SECTION B****Question 1** (7 marks)

- a. When GABA is released from a presynaptic terminal into the synapse, it acts as a 'key' by binding to its complimentary shaped receptor on the postsynaptic cell, which acts as a 'lock'. 1 mark  
 Due to the inhibitory effect of GABA, the postsynaptic cell becomes less likely to fire, which has a calming effect on the central nervous system. 1 mark
- b. i. Dendrites contain the receptors, which bind with their complementary shaped neurotransmitters. 1 mark  
 ii. Axons conduct a neural impulse away from the cell body towards the axon terminals. 1 mark  
 iii. The myelin sheath surrounds, protects and insulates the axon and enhances the transmission of the neural impulse from the soma to the axon terminal. 1 mark

**Question 2** (10 marks)

- a. The neutral stimulus (NS) was the white rat, which upon presentation to Little Albert did not trigger a fear response. 1 mark  
 The unconditioned stimulus (UCS) was the loud clang. 1 mark  
 The UCS triggered a fear/startled response; this was the unconditioned response (UCR). 1 mark
- b. The key neurohormone involved is adrenaline. 1 mark  
 Adrenaline that is released into the bloodstream triggers the release of noradrenaline, which activates the amygdala to consolidate the fear intensity associated with the white rat (NS) and the loud clang (UCS), via the repetition of the pairing of the two stimuli. 1 mark
- c. The repeated pairing of the white rat (NS) closely followed by the loud clang (UCS) resulted in high-frequency stimulation of the postsynaptic neurons, which strengthened the neural pathways in the fear centres of Little Albert's brain. 1 mark

**Question 3** (5 marks)

Hormone 1: During the countershock phase of the **alarm** reaction, **adrenaline** is released into the bloodstream via the activation of the sympathetic nervous system. 1 mark

Adrenaline activates the fight-flight-freeze response, which arouses and mobilises the body for action in response to the stressor. 1 mark

Hormone 2: **Cortisol** is initially released in during the **countershock** phase of the alarm reaction and, if the stressor is unresolved, additional cortisol is released during the resistance stage. 1 mark

Cortisol is released to further energise the body, and repair some of the damage to the body sustained during the alarm stage. 1 mark

If the stressor is left unresolved during the resistance stage, the sustained levels of cortisol in the bloodstream weakens the immune system, leading to the individual entering the **exhaustion** stage and thus being highly vulnerable to developing a stress-related illness. 1 mark

*Note: Each of the hormones must be correctly aligned with all three of the stages of the GAS to be awarded full marks.*

**Question 4** (7 marks)

- a.** Krystal has experienced a life event, 1 mark  
 as it is a significant event that requires her to adapt to the demands of the stressor. 1 mark  
 In this case, Krystal’s discharge from the army was a distressing event, forcing  
 her to adapt by seeking an alternative profession in order to meet her  
 financial obligations. 1 mark
- b.** Given Krystal has made a primary appraisal that her discharge is a significant event,  
 this has required a secondary appraisal 1 mark  
 in which she has evaluated her coping resources and a potential reappraisal  
 of the stressor (once she became aware of the option to have a discussion with  
 the careers counsellor). 1 mark
- c.** Krystal has found a match between the stress of her discharge and an appropriate  
 coping strategy; 1 mark  
 in this case, seeking advice from a careers councilor that resulted in finding  
 an alternative career path in order to meet her financial obligations. 1 mark

**Question 5** (11 marks)

- a.** A cross-sectional study is used to compare different (independent) groups  
 in society, which 1 mark  
 enables an efficient method of comparison of the results of testing  
 the two groups; 1 mark  
 in this case the results of the elderly group were tested against the results  
 of the young group in terms of the speed of spinal reflexes. 1 mark
- b.** Using readily available participants, such as volunteers accessed via an advertisement,  
 provides a more time-effective (and cost-effective) method of obtaining a sample  
 of participants in comparison to random sampling. 1 mark  
1 mark
- c.** Validity refers to a determination of the degree of accuracy of a testing method;  
 in this case, how accurately the timing mechanism measures the speed  
 of the spinal reflex. 1 mark  
1 mark
- d.** The knee-jerk response is an involuntary response 1 mark  
 that is triggered by the spinal cord independently of the brain. 1 mark
- e.** The motor neuron conveys efferent messages 1 mark  
 to the leg muscles that trigger the movement of the leg in response  
 to the sensory stimuli. 1 mark  
1 mark



**Question 6 (10 marks)****Operant conditioning**

Initially a parent could observe Jarvis negotiate the pedestrian crossing and use positive reinforcement. In terms of the three-phase model of operant conditioning, the change in the pace of the signal from a slow beep to a faster beep could act as an antecedent. Jarvis could then be encouraged to cross the road (the behaviour) and then be rewarded (the consequence). The use of positive reinforcement for desirable behaviour would be intended to strengthen his use of stimulus discrimination by only responding to the fast beeping signal.

**Classical conditioning**

Before conditioning, the slow-beeping signal that initially acted as a NS would have not triggered a startled response, and the loud sound of a car tooting at Jarvis would act as an UCS, which would reflexively elicit a startled response (UCR). During conditioning, Jarvis would have a few experiences where he has heard the sound of the slow beeping signal (NS) and was then exposed to a series of loud car toots from angry/concerned drivers (UCS) that startled Jarvis (UCR). After conditioning, the sound of the slow-beeping signal at the crossing will act as a conditioned stimulus (CS). This will cause Jarvis to tense up in fear of being tooted by angry drivers (CR) and thus result in the avoidant behaviour of crossing the road at the wrong time.

**The multi-store model and the methods of retrieval**

Jarvis's sensory memory would initially register the sound of the beeping noise and then, once he attended to the sound of it, it would be actively processed in his STM. This would then lead to Jarvis recalling the rule for the pedestrian crossing, which is stored in his LTM (a slow beeping noise meaning 'don't walk' versus a fast beeping noise meaning 'walk'), to be retrieved back into his STM for use at the crossing. Jarvis's ability to retrieve the pedestrian crossing rules is a form of recall as he had an absence of cues to help him retrieve the rules when he could hear the crossing signal.

10 marks

**Marking guide***Very high (9–10 marks)*

The student has provided a highly detailed explanation of how:

- classically conditioned principles are applied to the scenario including the use of the elements NS, UCS, UCR, CS and CR across the three stages of conditioning (before conditioning, during conditioning and after conditioning) along with the use of stimulus discrimination.
- operantly conditioned principles are applied to the scenario including the use of the elements of the three-phase model of operant conditioning and the use of positive reinforcement.
- all three memory stores (sensory memory, STM and LTM) are applied to the scenario and the application of recall is used as the method of retrieval for the crossing rules.

*High (7–8 marks)*

The student has provided a detailed explanation of:

- classically conditioned principles are applied to the scenario including the use of the elements NS, UCS, UCR, CS and CR across the three stages of conditioning (before conditioning, during conditioning and after conditioning) along with the use of stimulus discrimination.
- operantly conditioned principles are applied to the scenario including the use of the elements of the three-phase model of operant conditioning and the use of positive reinforcement.
- all three memory stores (sensory memory, STM and LTM) are applied to the scenario and the application of recall is used as the method of retrieval for the crossing rules.

*Medium (5–6 marks)*

The student has provided a limited explanation of:

- classically conditioned principles are applied to the scenario including the use of the elements NS, UCS, UCR, CS and CR across the three stages of conditioning (before conditioning, during conditioning and after conditioning) along with the use of stimulus discrimination.
- operantly conditioned principles are applied to the scenario including the use of the elements of the three-phase model of operant conditioning and the use of positive reinforcement.
- all three memory stores (sensory memory, STM and LTM) are applied to the scenario and the application of recall is used as the method of retrieval for the crossing rules.

*Low (3–4 marks)*

The student has addressed only some of the following:

- classically conditioned principles are applied to the scenario including the use of the elements NS, UCS, UCR, CS and CR across the three stages of conditioning (before conditioning, during conditioning and after conditioning) along with the use of stimulus discrimination.
- operantly conditioned principles are applied to the scenario including the use of the elements of the three-phase model of operant conditioning and the use of positive reinforcement.
- all three memory stores (sensory memory, STM and LTM) are applied to the scenario and the application of recall is used as the method of retrieval for the crossing rules.

*Very low (0–2 marks)*

The student has addressed only one, or none, of the following:

- classically conditioned principles are applied to the scenario including the use of the elements NS, UCS, UCR, CS and CR across the three stages of conditioning (before conditioning, during conditioning and after conditioning) along with the use of stimulus discrimination.
- operantly conditioned principles are applied to the scenario including the use of the elements of the three-phase model of operant conditioning and the use of positive reinforcement.
- all three memory stores (sensory memory, STM and LTM) are applied to the scenario and the application of recall is used as the method of retrieval for the crossing rules.