

VCE Psychology Unit 3

Written Examination

Suggested Solutions

SECTION A – MULTIPLE-CHOICE QUESTIONS

1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D
21	A	B	C	D
22	A	B	C	D
23	A	B	C	D
24	A	B	C	D
25	A	B	C	D
26	A	B	C	D
27	A	B	C	D
28	A	B	C	D
29	A	B	C	D
30	A	B	C	D
31	A	B	C	D
32	A	B	C	D
33	A	B	C	D
34	A	B	C	D
35	A	B	C	D
36	A	B	C	D
37	A	B	C	D
38	A	B	C	D
39	A	B	C	D
40	A	B	C	D

Question 1 C

The nervous system is comprised of a network of specialised cells called neurons that coordinate the actions of an animal and transmit signals between different parts of its body.

Question 2 D

When the threat was first registered, a signal was sent to the brain (to the amygdala, which then would have sent a distress signal to the hypothalamus). This then activated the SNS and led to the activation of the fight-flight-freeze response.

Question 3 D

In terms of the Selye's GAS, Jennie's SNS would have been initially activated during the alarm stage when she experienced countershock (after a brief period of shock); this would have resulted in the release of adrenalin and the activation of the fight-flight-freeze response.

Question 4 A

The initial shock phase of Jennie's response would have lowered her level of resistance to the stressor, as her body has acted as if it was injured during her 'freeze' response. **B** and **D** would have occurred during the countershock stage of Selye's GAS, when the SNS was activated.

Question 5 B

The amygdala would have played a key role in mediating and encoding the fear intensity Jennie experienced as a result of the collision with the jet ski. The hypothalamus would have activated the SNS during the stress response, but would not have played a role in the memory of the event. The hippocampus would have played a key role in encoding the contextual details of the incident (the 'where' and 'when').

Question 6 B

Jennie's recall of the collision when she views Port Phillip Bay is an example of a flashbulb memory, as the context cue of the bay has triggered a vivid recall of the emotionally arousing event (the collision).

Question 7 D

While the amygdala is responsible for encoding the fear intensity of the collision, the hippocampus is responsible for encoding the contextual and explicit details of the event itself.

Question 8 A

Viewing Port Phillip Bay has acted as a context-dependent cue in Jennie recalling her memory back into her STM, which forms her conscious awareness.

Question 9 B

Parkinson's disease demonstrates the effects of a nervous system disorder. The degeneration of the dopamine-producing neurons in the substantia nigra results in a lack of motor input to the brain structures in the basal ganglia that are responsible for the control of movement.

Question 10 A

Parkinson's disease initially affects the areas of the brain that are responsible for the control of movement; thus victims may experience symptoms such as tremors, rigidity of the muscles, speech impairment or postural difficulties.

Question 11 B

The experiment will use an independent groups design, as participants will be randomly allocated to either a control or experimental condition. This will be in order to provide a comparison of the changes in the severity of their motor symptoms as a result of the drugs versus the placebo.

Question 12 B

The use of the placebo in this case serves as a single-blind procedure, as participants are unaware until the conclusion of the experiment as to whether they are part of the control (placebo) group or the experimental (medication) group.

Question 13 D

During the debriefing process at the conclusion of the experiment, researchers are required to tell the participants whether they were part of the placebo or experimental groups. They are also required to disclose the results and ensure that there were no negative consequences experienced by the participants involved in the experiment.

Question 14 A

GABA neurotransmitters have an inhibitory effect on postsynaptic receptors. Thus, when the GABA binds with GABA receptors it will result in an influx of negatively charged ions permeating the postsynaptic cell membrane, which makes the postsynaptic neuron less likely to fire.

Question 15 C

An avoidant coping strategy is most likely to be used by a stressed-out student following a secondary appraisal (according to the Lazarus and Folkman Transactional Model of Stress and Coping) in which the student has evaluated their coping resources and deemed that they are not well equipped to deal with the demands of a stressor. They will therefore direct their energy away from the source of the stressor.

Question 16 A

The influence of punishment on a child by an adult, either directly or indirectly, is least applicable to classical conditioning, as the acquisition of behaviour requires the repeated pairing of two unrelated stimuli. Punishment is an application of operant conditioning that also can apply to the vicarious (indirect) learning that can occur via social learning theory.

Question 17 C

Lilli's response is an example of a spinal reflex, which occurs independently of the brain as a protective mechanism for the body.

Question 18 D

After the somatic nervous system has conveyed the afferent signal to the spinal cord (in the central nervous system, or CNS), the CNS is responsible for processing, integrating and coordinating the response (independently of the brain in this case).

Question 19 A

The somatic nervous system is responsible for conveying the afferent information to the spinal cord. The spinal cord (CNS) will then integrate sensory and motor information and coordinate a response of swiping the bug away from her leg.

Question 20 D

The axon is responsible for conducting an action potential (neural impulse) from the leg to the spinal cord. The soma is responsible for initiating the action potential and the myelin enhances the transmission of the signal.

Question 21 B

Melanie's source of stress is a daily pressure in terms of the demands of her teaching role at the new school, which over time can have a cumulative effect and increase her vulnerability to the development of a stress-related condition.

Question 22 C

Melanie has experienced a negative psychological response to a stressor – distress.

Question 23 D

Cortisol is a stress hormone that initially would have provided Melanie with more energy to cope with the demands of her new teaching role. However, it suppresses activity in the immune system, which over time increases her vulnerability to the development of an illness – in this case a stress-related condition.

Question 24 B

In terms of Selye's GAS, Melanie would have first showed signs of illness, such as a sore throat, during the resistance stage as her body tries to adapt to the demands of the new teaching role.

Question 25 C

LTP is not applicable to changes that occur in sensory memory, which is the entry point for incoming memories that are registered and held in their original state for a brief period of time in memory subsystems called sensory registers. LTP occurs as a result of a repeated stimulation of a neural connection and the increased responsiveness of the postsynaptic neuron to the presynaptic neuron that occurs when both procedural and semantic memories are revisited.

Question 26 D

Adrenaline can best be described as a neurohormone that upon release is absorbed into the bloodstream before travelling to a target cell or neuron.

Question 27 C

Explicit memories, particularly episodic memories, typically need to be reconstructed when retrieved from LTM backing into STM for conscious recall.

Question 28 B

The second stage of observational learning, retention, requires the learner to form a mental representation of the modelled behaviour. Initially (during the attention stage), the observers must actively observe distinctive features of the model's behaviour. Reproduction involves the capability of replicating the behaviour. Motivation is the desire to perform the observed behaviour in the future.

Question 29 D

For the Watson and Rayner 'Little Albert' experiment, during the acquisition stage of the conditioning the loud clang sound produced by the hammer striking the steel bar occurred a fraction of a second after the white rat was presented (in order for the association between the white rat and loud clang to be made).

Question 30 C

In terms of classical conditioning, the unconditioned response in Anna's case is the mild level of pain experienced as a result of the injection.

Question 31 A

In terms of classical conditioning, the neutral stimulus in Anna's case (prior to conditioning) is Anna being asked to count backwards prior to the injection, which after being repeatedly paired with the unconditioned stimulus (delivery of the injection) becomes a conditioned stimulus.

Question 32 D

In terms of classical conditioning, the conditioned response in Anna's case is flinching as she states the third number in her count.

Question 33 C

In terms of the three-phase model of operant conditioning, from Anna's point of view the antecedent is being informed by the nurse that she needs an insulin injection due to her low blood glucose levels. This results in the behaviour – Anna being compliant in counting backwards/receiving the injection, which in turn results in the consequence – receiving the injection from the nurse/receiving the chewing gum as a reward.

Question 34 A

The method of allocation to the two groups was non-random, as this method (their seating position) did not give each student an equal chance of being allocated to either group.

Question 35 C

The experiment was intended to test the serial position effect, which would require a measurement of the percentage of participants that recalled each word based on the ordered positioning of the words (the operationalised dependent variable).

Question 36 C

For both groups of participants, the words would first be rehearsed whilst they were in STM. Some of these words, particularly the earlier words, could have been subsequently transferred to LTM.

Question 37 B

The delayed recall group experienced a primacy effect but no recency effect; this is most likely due to the limitations of STM, which can only retain material that is not rehearsed for up to 30 seconds. The one-minute delay eliminated the likelihood that students could use maintenance rehearsal to retain the words for any longer than the normal duration of STM.

Question 38 B

The savings score calculation simply provides an indication of the amount of time saved in relearning material and thus reflects the existence of a partial memory trace. In this case, Shanella has saved 60% of the time taken to relearn how to operate her webcam.

Question 39 B

Shanella's inability to operate her webcam a year after first learning to can best be explained by LTD which has caused a weakening of postsynaptic responses (or depotentiation) due to a lack of revisitation of the memory. LTD is a result of repeated low-intensity activation input from the presynaptic to the postsynaptic neuron (in comparison to the input during the learning/acquisition process).

Question 40 A

The memory of the sequence of steps required to operate her webcam that need to be explicitly (consciously) recalled are an example of semantic memories. An episodic memory is an autobiographical memory involving time and place. The other two options are examples of implicit memories that require no conscious recall.

SECTION B**Question 1** (4 marks)

The sensory receptors in Kerry's feet detected the tension from the shoes. Sensory neurons in the somatic nervous system (part of the PNS) then relayed an afferent signal towards the spinal cord. 1 mark

The spinal cord relayed the sensory signal to the brain (both the spinal cord and the brain are part of the CNS) for processing. 1 mark

The brain then initiated a voluntary response and an efferent signal was sent via the spinal cord. 1 mark

The efferent signal was conveyed by motor neurons in order to initiate the necessary movement in the skeletal muscles of his arm (part of the somatic nervous system) to loosen the shoelaces. 1 mark

Note: Each point must identify the correct component/subdivision of the nervous system.

Question 2 (6 marks)

a. Due to the build-up of amyloid and tau in the brain, there is a rapid destruction of acetylcholine-transmitting neurons. 1 mark

This results in significantly reduced levels of acetylcholine, which is a key neurotransmitter involved in memory. 1 mark

b. The medication will act as a 'key' by mimicking the effects of the acetylcholine (which is deficient for patients such as Kathy). It is able to do this due to the similarity of shape/molecular structure. 1 mark

Thus, the medication will bind with acetylcholine receptors, which act as the locks, thereby reducing or improving the cognitive effects of Alzheimer's disease. 1 mark

Question 3 (10 marks)

a. Zach has experienced a positive psychological response (eustress) to the news of his ATAR. 1 mark
An example is his excitement that his score will enable him to study his desired university course, such as a Bachelor of Education. 1 mark

Zelda has experienced a negative psychological response (distress) to the news of her ATAR. 1 mark
An example is her anxiety that her score will not be high enough to study her desired university course, such as a Bachelor of Science. 1 mark

b. Both eustress and distress are forms of stress that have a psychological trigger. 1 mark
They both will cause an increase in arousal via activation of the SNS. 1 mark

c. Zach: primary appraisal of benign-positive 1 mark

As Zach is pleased with his result, it will not be a significant source of ongoing stress. 1 mark

Zelda: primary appraisal of significant threat (or harm) 1 mark

As Zelda is stressed about the impact of her score on her future, it may be a significant source of ongoing stress. 1 mark

Question 4 (15 marks)

- a.** Antecedent: The referee calls a foul (or not). 1 mark
Behaviour: A player/coach/parent abuses the referee. 1 mark
Consequence: The player/coach/parent is ejected from the stadium. 1 mark
- b.** If, following the 2019 winter season, there is some abuse directed towards the referee without any consequences (no ejection), 1 mark
then the compliant behaviour of players, coaches and parents may cease. 1 mark
- c.** Validity refers to how accurately the assessment tool measures what it is supposed to. 1 mark
The use of self-reporting by the referees is a highly subjective process and thus the measure used would potentially reflect a low level of validity. 1 mark
- d.** The two means represent the average self-reported scores from the referees across the two seasons. 1 mark
The means provide a useful summary measure of central tendency, which enables an easy form of comparison between the referee ratings of the level of abuse across the two seasons. 1 mark
- e.** Operationalised IV: whether the basketball season was before or immediately after the implementation of the zero-tolerance of abuse policy was communicated to parents, players and coaches 1 mark
Operationalised DV: the self-reported scores out of 50 for level of abuse directed towards the referees 1 mark
- f.** repeated-measures design 1 mark
It would be more effective than alternative research designs (such as independent groups) in controlling the effects of participant-related variables, as all referees would be involved in both conditions of the experiment (both before and after the zero-tolerance message to the stakeholders). 1 mark
The participant-related variables in this case could include elements such as the level of experience of the referees, their age or their self-efficacy. 1 mark
- g.** It would be impractical to regulate the two conditions of the research investigation in a manner that they would occur equally as often. An example of this would be to only expose half the league to the zero-tolerance policy for one season while the other half is not exposed, and then swapping conditions at the change of seasons. 1 mark

Question 5 (5 marks)**a.** *Any three of:*

- The body needs to adapt to the demands of the stressor and the raised levels of neurohormones (adrenaline and cortisol) that were released during the alarm stage. The resistance stage is an adaptive stage.
- Additional cortisol is released into the bloodstream to further energise the body for a longer period and to repair some of the damage to the body; this is experienced during the alarm stage.
- The release of cortisol enables the body to sustain a high level of resistance.
- Due to the high levels of cortisol in the bloodstream (during the resistance stage), the immune system activity is suppressed/weakened. Thus, a person may show some early symptoms of (minor) illness such as headaches as the body's resistance to other (subsequent) stressors is weakened.

3 marks

b. Mary is directing her energy towards the source of the problem.

1 mark

In this case, Mary might try contacting a neurologist to generate a more current and potentially more comprehensive prognosis so that she can best manage his recovery.

1 mark

Question 6 (10 marks)

Almost immediately following the crash, adrenaline would have been released via the adrenal gland as part of the fight-flight-freeze response. This would have triggered the release of noradrenaline, which would have activated the emotional part of Emily's brain – the amygdala. The presence of the adrenaline strengthens signals sent from the amygdala to the nearby hippocampus to encode the details of the crash as important, which in turn strengthens the consolidation of the memory of the crash.

The amygdala is responsible for processing, mediating and consolidating emotionally arousing memories or responses, particularly fear. The amygdala is largely responsible for the formation of flashbulb memories. The damage to Bessie's amygdala would have diminished her ability to both consolidate and consequentially recall the emotionality of the plane crash, particularly in comparison to her twin Emily. She will still be able to recall contextual details of the crash, such as the 'where' and 'when', but she would be less likely to experience the same level of emotionality in her recall of the crash compared to her sister, who has an intact amygdala.

A flashbulb memory is a highly vivid and detailed snapshot of an event, which occurs when we unexpectedly experience a highly emotionally arousing event – in this case, Emily's recall of emotional details of the crash. These memories will most likely be recalled in terms of the details of where Emily was and what she was doing at the time immediately following the crash; thus a cue, such as seeing Moorabbin airport, will trigger a photographic-like recall of the event many years later as the memory ignites her consciousness like a flashbulb. Despite these memories being highly detailed and recalled with confidence, they are not always recalled with a high degree of accuracy.

A leading question is a question that suggests the answer or contains the information the examiner is looking for. The memory retrieval can be influenced by the use of leading questions, as information from two different sources – the details from the crash and the details from the leading question – can be integrated during the reconstruction of a distorted memory containing false information.

10 marks

Standard	Marks	Marking grid
very high	9–10	<p>The student has provided:</p> <ul style="list-style-type: none"> • a thorough, accurate and detailed explanation of at least one key neurohormone and both brain structures involved in memory • the impact of damage to the amygdala on Bessie’s memory • a detailed description of a flashbulb memory that clearly relates to the scenario • a thorough explanation of the impact of a leading question on the reconstruction of the memory of the plane crash.
high	7–8	<p>The student has provided:</p> <ul style="list-style-type: none"> • an accurate and detailed explanation of at least one key neurohormone and one or both brain structures involved in memory • the impact of damage to the amygdala on Bessie’s memory • an accurate description of a flashbulb memory that clearly relates to the scenario • an accurate explanation of the impact of a leading question on the reconstruction of the memory of the plane crash.
medium	5–6	<p>The student has provided:</p> <ul style="list-style-type: none"> • a limited explanation of at least one key neurohormone and one or both brain structures involved in memory • the impact of damage to the amygdala on Bessie’s memory • a limited explanation of a flashbulb memory that relates to the scenario • an accurate explanation of the impact of a leading question on the reconstruction of the memory of the plane crash.
low	3–4	<p>The student has provided only two of:</p> <ul style="list-style-type: none"> • a limited explanation of at least one key neurohormone and one or both brain structures involved in memory • the impact of damage to the amygdala on Bessie’s memory • a limited explanation of a flashbulb memory that relates to the scenario • an accurate explanation of the impact of a leading question on the reconstruction of the memory of the plane crash
very low	0–2	The student has only addressed some of the criteria of the question.