

Trial Examination 2015

VCE Psychology Units 3&4

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
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57	A	B	C	D
58	A	B	C	D
59	A	B	C	D
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61	A	B	C	D
62	A	B	C	D
63	A	B	C	D
64	A	B	C	D
65	A	B	C	D

SECTION A: MULTIPLE-CHOICE QUESTIONS**Question 1 D**

A variable-interval schedule of reinforcement is most resistant to extinction due to the unpredictability of the reinforcer's timing. When reinforcement is no longer provided, the learner takes longer than a fixed or continuous schedule to make a new association between the behaviour and a lack of reinforcer.

Question 2 C

Implicit memories are actions or skills that are performed without conscious awareness, such as the leg motions, posturing and handle gripping of an experienced bike rider commuting to work. The other three options all require conscious retrieval.

Question 3 B

The sympathetic nervous system is capable of a rapid response when the body is threatened, in this case, by an oncoming car. Activation of the HPA axis, and the release of the stress hormone cortisol, occur in ongoing stressors that require a sustained allostatic response to deal with the stressor.

Question 4 D

Sleep inertia is experienced if woken during slow-wave sleep (stages 3 and 4 of NREM sleep), thus Sophie's father will need a few minutes to orient himself.

Question 5 B

Token economies use the principles of operant conditioning by reinforcing desired behaviour with tokens that are accumulated by the learner and ultimately traded for a reward. The consequences that follow the desired response determine the likelihood of the behaviour being repeated.

Question 6 D

Zahara is learning language skills during a **sensitive** period of early childhood, when her brain is most receptive to the development of language skills. This is an example of **experience-expectant** learning, as the speech areas in her brain expect to be exposed to language during childhood.

Question 7 B

The axon terminal buttons on the presynaptic neuron are capable of releasing additional neurotransmitters as a result of long-term potentiation (LTP), as Zahara's brain strengthens neural pathways in the language areas of her brain.

Question 8 C

The best way for Zahara to encode the meaning of new words is through semantic processing. This is a deep form of processing that allows her to link new words to existing words in her long-term memory via elaborative rehearsal.

Question 9 D

Eustress tends to be a short-term positive psychological response that results in physiological changes triggered by the sympathetic nervous system based on an individual's appraisal of a situation. The body does not discern between eustress and distress.

Question 10 C

A mental illness diagnosis can be made using a discrete or dimensional classification system for adults or children, and can be either short-term (clinical disorders like an anxiety disorder that can be successfully treated) or permanent (an intellectual disability).

Question 11 A

Repeated measures would be impractical in this case, given that students' sleeping patterns would be difficult to manipulate due to the constraints stipulated by the ethics committee. Participants could be matched on pre-existing sleeping habits, as well as characteristics, such as their level of part-time employment or exercise habits, in order to reduce participant-related variables.

Question 12 A

The use of volunteers is a form of convenience sampling, as not all first-year university students would have sighted the advertisements on the pillars located around the Student Union building.

Question 13 B

The dependent variable in this case would be stress levels.

Question 14 B

According to the restorative theory of sleep, NREM sleep is largely responsible for physiological restoration (thus a lack of NREM sleep could explain excessive fatigue), whereas REM sleep is largely responsible for cognitive and psychological restoration.

Question 15 D

Participants who on weekends stayed out late and slept in the following morning had difficulty going to sleep on weeknights, due to a delay in the release of melatonin. Melatonin induces sleepiness and can be delayed due to an interruption to the circadian rhythm caused by irregular sleep patterns.

Question 16 B

The loss of memory of events prior to the surgery is a form of retrograde amnesia. This is caused by a disruption to the neural processes in the brain, which prevents the formation of a neural trace.

Question 17 D

The failure to recall events leading up to the treatment can be best explained by a failure to consolidate these details, given the lack of time to fortify the neural trace.

Question 18 B

The failure to recall events leading to the treatment is most likely attributable to a disruption to the hippocampus, which plays a key role in the formation of declarative memories.

Question 19 C

A dimensional approach to the classification of a mental condition evaluates the severity of symptoms and is less likely to lead to the labelling of mental illnesses, such as depression, as opposed to the three other discrete approaches identified.

Question 20 B

If an ethics committee deems that the potential risks of ETC to participants could outweigh its benefits in terms of the findings being in breach of the beneficence ethical principle, then it is likely that they will reject the research proposal.

Question 21 A

The *p*-value is an inferential statistic, as it enables researchers to make conclusions based on the statistical significance of data, as opposed to the other three options, which are all descriptive statistics.

Question 22 A

A relaxed state is typically depicted by alpha brain waves as detected by an EEG.

Question 23 D

An alcohol-induced state is an altered state of consciousness because it acts as a depressant, thus slowing nervous system activity.

Question 24 B

When sleeping, adults generally spend the most time in a light sleep, which is NREM stages 1 and 2.

Question 25 A

A newborn typically spends approximately 50% of their sleeping time in REM. This is theoretically due to the rapid developmental plasticity of the brain that occurs during this stage of life.

Question 26 A

Sprouting of the dendrites of the postsynaptic neuron is a feature of adaptive plasticity that enables the brain to change as a result of everyday experience throughout the lifespan.

Question 27 A

The amygdala is the brain's fear centre. It generates activity in the hypothalamus to trigger physiological changes in the body to aid Zachary in dealing with the threat of drowning/a shark attack.

Question 28 C

Adrenaline would have been released by the sympathetic nervous system almost simultaneously with his entry to the water. The release of cortisol is triggered later for sustained stressors.

Question 29 C

When Zachary arrived safely at the shore, he was feeling relieved, but short of breath and drained, due to the short-term effects of the fight-flight response. Allostatic load and overload are a result of chronic, ongoing stress.

Question 30 D

The parasympathetic nervous system would have been first activated when the threat had passed as Zachary reached the shore and felt safe, thus switching off the fight-flight response and commencing the gradual process of returning him back to a homeostatic state.

Question 31 D

Zachary learned to remove heavily weighted clothes vicariously through observing the behaviour of his friend and noting the consequences, for example, being able to swim to safety, which is the social learning theory.

Question 32 C

According to the semantic network theory, information is stored in long-term memory in a hierarchical format through interconnected nodes.

Question 33 B

According to the decay theory of forgetting, the regular revisitation of memories helps maintain a strong neural trace of memories over time.

Question 34 C

Procedural memory is relatively unaffected by age, as opposed to declarative memory (semantic and episodic memories).

Question 35 D

According to the Baddeley and Hitch model of working memory, the episodic buffer is responsible for integrating information from the slave systems and long-term memory. The central executive is responsible for suppressing irrelevant information, the phonological loop is responsible for briefly storing verbal information, and the visuo-spatial sketchpad uses mental imagery to enable mental navigation of an area.

Question 36 B

The latter words of a serial list could only be held for approximately twenty seconds (without rehearsal) due to the limited duration of short-term memory. A delay in this recall would eliminate the recency effect.

Question 37 A

Sleep-deprived taxi drivers would experience perceptual distortions in terms of a higher sensitivity to pain in comparison to when they maintained normal sleep patterns.

Question 38 B

The brain-wave patterns of sleep-deprived drivers would resemble those of a light NREM sleep.

Question 39 A

The frontal lobe is largely responsible for attention.

Question 40 A

The primary cortex in each lobe of the cerebral cortex has a sensory function, except for the frontal lobe, which contains the primary motor cortex and is responsible for voluntary movement.

Question 41 A

The sound of a lawnmower prior to the accident was the neutral stimulus, as it would not have elicited a response (prior to acquisition).

Question 42 C

The excruciating pain Jan experienced as a result of the accident was the unconditioned response, as it was reflexively elicited by the unconditioned stimulus (the lawnmower severing Jan's toes).

Question 43 B

Jan's mother's suggestion of buying her a new bicycle if she would mow the lawn is a form of positive reinforcement, which is a type of operant conditioning.

Question 44 C

Aversion therapy is used to extinguish maladaptive addictions and leads to avoidance behaviour. As such, it is ineffective in overcoming avoidance of stimuli, such as lawnmowing.

Question 45 B

Thorndike's law of effect is associated with trial-and-error learning. Behaviour that is followed by a desirable consequence is more likely to be repeated. Behaviour that is followed by an undesirable consequence is less likely to be repeated.

Question 46 D

Chunking increases the capacity of short-term memory. A ten-digit mobile phone number can be 'chunked' into three groups consisting of four, three and three digits, thus reducing the space each chunk takes up in the limited capacity of short-term memory.

Question 47 A

On the second overnight stay, Trisha's inability to remember the new number plate was most likely a result of retrieval failure. This is because she lacked the necessary cues when trying to recall the licence plate number when completing the registration form.

Question 48 D

On the first overnight stay, Trisha's inability to remember the new number plate is most likely a result of proactive interference. Her old car's number plate interfered with her ability to recall the new number plate, due to stimulus similarity.

Question 49 A

Trisha's difficulty remembering the number plate when filling in the registration form can be best explained by **recall** having a **low** level of sensitivity of retention.

Question 50 C

The use of token economies as a form of behavioural modification utilises a continuous schedule of reinforcement for the desired behaviour (each time the table is cleared) and a partial schedule of reinforcement (fixed-ratio) to trade accumulated tokens for a reward.

Question 51 D

The ICD-10 has a wider scope than the DSM-5 as it covers both physiological and psychological illness, whereas the DSM-5 only covers psychological illness. Both are categorical approaches that can lead to the stigmatisation of patients as a result of being labelled with a mental condition. The DSM-5 provides a more detailed background of mental conditions than the ICD-10.

Question 52 B

Biofeedback aims to help patients gain control over physiological responses triggered by stress (like heart rate) that are controlled by their autonomic nervous system.

Question 53 C

The left cerebral hemisphere specialises in analytical skills, such as the evaluation of cost savings. The other three options are all predominately controlled by the right cerebral hemisphere.

Question 54 D

Verbal information is processed primarily in the left cerebral hemisphere. Visual information, movement and sensory input follow contralateral processes, that is, they are processed in the opposite side of the body to which they are detected/initiated.

Question 55 C

Maddie's behaviour is an example of stimulus discrimination, as she only exhibits the behaviour (nose ring removal) when she sees Mr Harrington. Her behaviour is based on the potential consequences (detention), which involves operant conditioning.

Question 56 A

Pictures flashed to the left visual field would be initially processed by the primary visual cortex in the right occipital lobe.

Question 57 D

When words were flashed to both the left and right visual fields, it would be expected that the patient could name the words flashed to both fields – each would detect the words. The words detected in the right cerebral hemisphere could be conveyed to the left cerebral hemisphere via the corpus callosum, enabling the speech areas of the brain to name both words.

Question 58 C

The somatic nervous system is responsible for conveying afferent information (electrochemical energy) to the brain for further processing.

Question 59 C

The inability to replicate demonstrated behaviour due to physical limitations (lack of balance) refers to reproduction, which is the third stage of observational learning.

Question 60 B

The no-harm ethical principle dictates that researchers are required to terminate the experiment immediately when they observe that participants are experiencing distress, as was the case with Albert during the conditioning phase of the experiment.

Question 61 B

The response (dangerous conduct to the head) resulted in a cost (three-week ban) and, as such, is a form of negative punishment (response cost).

Question 62 C

Serial recall requires the students to not only recall details about the prime ministers, but also their chronological order; for example, Edmund Barton before Alfred Deakin.

Question 63 D

The central executive directs the students' attention to key features of the material they are studying.

Question 64 A

The frontal lobe is largely responsible for attention and higher-order cognitive functionality.

Question 65 C

The use of continuous reinforcement (such as giving one mark for each correct response) will enable the teacher to achieve the most accurate ranking.

SECTION B – SHORT ANSWER QUESTIONS

Question 1 (3 marks)

- Sathya could use elaborative rehearsal to help her store the words in long-term memory.
- Creating a story using the five words aids the organisation of these words in long-term memory.

For example:

After falling off a **train** into a **river** in the shadows of **skyscrapers**, **crowds** gathered around, creating an almighty **noise**.

3 marks

1 mark for explaining narrative chaining's use of elaborate rehearsal or semantic storage

1 mark for explaining the use of a story

1 mark for an example including all five words

Question 2 (2 marks)

Whilst completing the ERA, Brent would be experiencing focused attention (a normal waking consciousness) and thus his content would be limited to the task at hand. When he drifted into a daydream, which is an altered state of consciousness, the content of his mind would be less limited, as he may have indulged in fantasy.

2 marks

Question 3 (5 marks)

- a. Evangeline would have experienced a traumatic event such as nearly drowning after her boat capsized. Consequently, this memory was unconsciously blocked from her conscious awareness.

2 marks

- b. Evangeline would need to establish a fear hierarchy of approximations of her conditioned stimulus (CS) and then rank these in terms of the level of the fear they evoke; for example, being exposed to a picture of the ocean, through to swimming in a lake. Evangeline would be exposed to successive levels of her fear hierarchy, starting at the bottom, until her conditioned response (CR) was reduced to an adaptive level. Eventually her CR, or fear response, would be extinguished when she was exposed to open water, the CS.

3 marks

1 mark for describing the application of fear hierarchy

1 mark for identifying the CS and CR

1 mark for discussing the extinction process

Question 4 (4 marks)

- **Wernicke's aphasia test:** Vern's doctor could read out a brief passage to determine if Vern could comprehend the speech.
- **Broca's aphasia test:** Vern's doctor could ask him to articulate the words of the national anthem to see if he has any difficulties with his speech production.

4 marks

1 mark for identifying each type of aphasia

1 mark for each suitable test explanation

Question 5 (2 marks)

Any two of:

- Xander needs more sleep than his father.
- Xander will have a higher proportion of REM sleep and a lower proportion of NREM sleep than his father.
- Xander will go to sleep earlier due to his earlier release of melatonin than his father.

2 marks

Question 6 (6 marks)

a. *Any three of:*

- Allostatic load refers to the cumulative cost to the body of chronic stress, in this case due to Neale's difficulties sleeping, work challenges and loneliness.
- Allostatic load can occur due to continuous activation of the fight-flight response, resulting in excessive energy consumption during times of high stress.
- The immune system will work less effectively, as stress hormones continue to be released whilst the body is under stress.
- Allostatic load has likely made Neale more vulnerable to illness.

3 marks

b. Neale could appraise his situation as harmful, a threat or a challenge (not benign-positive or insignificant given the scenario presents a significant appraisal).

- **harmful:** loss of companionship, life-partner
- **threat:** to well-being, health
- **challenge:** for example, to explore new avenues, such as completing further study

2 marks

1 mark for identifying harm/threat/challenge

1 mark for linking response to scenario

c. *Any one of:*

- avoiding (escape avoidance)
- distancing himself from the emotion
- acceptance
- minimising
- denial
- disclaiming
- seeking emotional support from a partner
- meditation/relaxation
- physical exercise
- selective attention
- alcohol
- venting anger

1 mark

Question 7 (3 marks)

- The **sensory** neurons would detect the pain messages via sensory receptors in the skin.
- **Interneurons** in the spinal cord would convey the afferent messages to the brain for further processing.
- **Motor** neurons would convey efferent messages to the hand, enabling the fine-motor control required to remove the splinter with the tweezers.

3 marks

Question 8 (4 marks)

Imogen has been positively reinforced. The nagging behaviour has been rewarded with an ice cream and thus strengthened. Alison has been negatively reinforced. The aversive nagging has been removed by providing the ice cream and thus the provision of ice creams has been potentially strengthened for future episodes of nagging.

4 marks

Question 9 (2 marks)

Reflexes are generally simple and rapid responses, such as an eye blink to protect the eye from dust.

Behaviours learnt through maturation are more complex behaviours that are sequential, like a young child over time progressing from rolling, to crawling, to standing, to walking.

2 marks

*1 mark for each suitable example***Question 10 (2 marks)**

- **Helpful:** In the short term, cortisol aids in the metabolism of fats, proteins and carbohydrates, and increases glucose levels in the blood, providing additional energy for muscles and thus increasing an individual's chance of survival when under threat.
- **Harmful:** In the long term, cortisol suppresses the immune system and can lead to a decline in the body's overall level of functioning, making the individual more vulnerable to illness.

2 marks

Question 11 (3 marks)

- **Biological factors:** the use of medication
- **Psychological factors:** developing a more resilient personality, coping strategies
- **Social factors:** the use of support networks

3 marks

Question 12 (3 marks)

- a. Spatial neglect is caused by damage to the association areas in the right parietal lobe.

1 mark

- b. Ask the patient to draw an image either from memory or by reproducing an image that is presented to them.

If they neglect features on the left side of their image, then that would be symptomatic of a patient who suffers from spatial neglect.

2 marks

Question 13 (2 marks)

Split-brain patients generally view stimuli in their central vision, thus stimuli enters both the left and right visual fields. This means that both cerebral hemispheres independently process visual stimuli, thus the left cerebral hemisphere is able to verbalise stimuli that the patient has viewed.

2 marks

Question 14 (4 marks)**Nature of the response:**

- classical conditioning: involuntary; Pavlov's dog reflexively salivated to the sound of the bell (post-conditioning)
- operant conditioning: voluntary; Skinner's rats learned to press the lever in order to receive food

Role of the learner:

- classical conditioning: passive; through repeated pairing of the NS (bell) and UCS (food), the dog's autonomic nervous system eventually triggered a CR (salivation) to the CS (bell)
- operant conditioning: active; Skinner's rats were positively reinforced with food when they pressed the lever (in the Skinner Box). In time the rats associated lever pressing with food (via their central nervous system).

4 marks

Question 15 (2 marks)

In the first twenty minutes, the rate of forgetting will be **rapid**. It will then slow to a **moderate** rate of forgetting for the next few hours. After a day, the rate of forgetting will be **minor**, or **plateau**.

2 marks

1 mark for identifying an adjective that describes the rate of forgetting
1 mark for identifying an adjective that describes how the rate has changed over time
Note: This question asks about changes in the rate of forgetting. Simply stating the percentage of material forgotten does not address the question.

Question 16 (2 marks)

State-dependent cues have triggered memories of the pain Don felt previously, by providing a match between his **physiological** state present when the memory of the pain from the skateboarding accident was **encoded/formed**. This **physiological** state triggered the retrieval of the pain of the skateboarding accident.

2 marks

Question 17 (2 marks)

- **Operant conditioning:** The consequences are applied directly to the learner; for example, a driver being fined for speeding in a school zone and then checking their speed when entering subsequent school zones to avoid future fines.
- **Observational learning:** The consequences are applied indirectly to the learner; for example, seeing a driver in another car receive a fine for speeding in a school zone, and then carefully checking speed when entering subsequent speed zones to avoid a fine.

2 marks

Question 18 (3 marks)

- a. A case study is an in-depth study of an individual or group. 1 mark
- b. Video monitoring uses infrared cameras to monitor participants' movements whilst they are asleep. 1 mark
- c. A case study provides no inferential statistics. No statistical conclusions can be made based on the data generated (as opposed to an experiment). 1 mark

Question 19 (2 marks)

Using the first letter of each of the four components of working memory, Wally could substitute these into a four-word phrase, such as 'very polite Eskimos clap' (very = visuo-spatial, polite = phonological, Eskimos = episodic, clap = central).

2 marks

*1 mark for explanation**1 mark for an appropriate example*

Note: Award the mark if students use an eight-letter acrostic with letters from each component of working memory (V, S, P, L, E, B, C, E).

Question 20 (2 marks)

Alzheimer's disease starts in the hippocampus. Amyloid plaque between the neurons and neurofibrillary tangles within the neurons result in damaged connections, which triggers the early symptoms of the disease, such as memory loss.

2 marks

*1 mark for reference to the hippocampus**1 mark for reference to plaque, or tangles, or damaged neural connections***Question 21 (2 marks)**

Evie has used maintenance rehearsal to keep the phone number in short-term memory. Her inability to link it to material in long-term memory meant that as soon as she stopped rehearsing, it disappeared from short-term memory.

2 marks

SECTION C – RESEARCH SCENARIO**Question 1 (2 marks)**

The use of meditation for VCE students will reduce stress levels.

2 marks

1 mark for the IV/DV (meditation/stress levels)

1 mark for population (VCE students)

Question 2 (2 marks)

- The non-meditation group acted as a control group.
- They served as a baseline measure of comparison between the results of the experimental group (meditation group) and the non-experimental group (non-meditation group) to determine the level of significance, in terms of the reduction in stress levels, for the meditation group versus the non-meditation group.

2 marks

Question 3 (1 mark)

Any one of:

- the participants are readily available
- it is cost/time-effective

1 mark

Question 4 (10 marks)**Procedure:**

- A convenience sample of 40 readily available VCE students (24 male and 16 female) from Deepdene Secondary College volunteered to participate. Deepdene College was chosen because of its proximity to the researcher's office.
- Prior to the experiment, students completed a brief questionnaire which evaluated their attitudes towards stress.
- Participants were then matched into pairs according to their gender and results from the questionnaire.
- All students were required to complete a 101-question stress-inventory test at school during a pastoral period on the first day of term three.
- A coin flip for each of the 20 pairs of participants determined whether the students were allocated to the meditation or non-meditation groups.
- The 20 members of the meditation group were required to complete a 30-minute meditation session after school on Mondays, Wednesdays and Thursdays over a four-week period.
- The non-meditation group was required to avoid any meditation sessions during this period.
- At the end of the four-week period, all participants completed the stress-inventory test to determine any changes in their stress-level scores.

Discussion:

- The results of the experiment were significant, as there was 0.7% probability that the results were due to chance, thus the hypothesis was supported. The implications of the findings are that meditation reduces the stress levels of VCE students.
- The use of the matched-participants research design controlled some participant-related variables, but variables such as the general health of participants over the four-week period, along with uncontrollable psychosocial stressors – which could be looming SACs – may have affected the reliability of the results.

- A placebo effect was a possible extraneous variable, given the expectations of the two groups may have affected the results. The meditation group may have responded more favourably to the stress-inventory questions than the non-meditation group.
- The use of convenience sampling means that the results are unlikely to be generalised to the wider population beyond Deepdene Secondary College, as no attempt was made to use a sample that was more representative of the population of VCE students throughout Victoria.

10 marks

Marking grid*Very high (9–10 marks)*

- *detailed discussion of sampling procedures*
- *detailed explanation and evaluation of procedure and research design employed*
- *accurate and detailed conclusion and implications*
- *detailed explanation of the suitability of a generalisation*

High (7–8 marks)

- *thorough discussion of sampling procedures*
- *thorough explanation and evaluation of procedure and research design employed*
- *accurate and thorough conclusion and implications*
- *detailed explanation of the suitability of a generalisation*

Medium (5–6 marks)

- *some discussion of sampling procedures*
- *some explanation and evaluation of procedure and research design employed*
- *conclusion and implications provided*
- *some explanation of the suitability of a generalisation*

Low (3–4 marks)

- *limited discussion of sampling procedures*
- *limited explanation and evaluation of procedure and research design employed*
- *incomplete conclusion and implication*
- *limited explanation of the suitability of a generalisation*

Very low (0–2 marks)

- *limited, if any, discussion of sampling procedures*
- *limited, if any, explanation and evaluation of procedure and research design employed*
- *inaccurate/limited conclusion and implications*
- *limited, if any, explanation of the suitability of a generalisation*