Neap

Trial Examination 2023

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
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 D

D is correct. First, Min's sensory receptors in the ear detected the movement of a nearby bug. The somatic nervous system conveyed sensory messages to the spinal cord, which integrated sensory and motor signals that resulted in a motor response. The motor response was conveyed by the somatic nervous system to the muscles in the arm, which triggered the movement. The brain then received a delayed message, which triggered a conscious response to check for anything in the ear.

A, **B** and **C** are incorrect. The somatic nervous system needs to detect and convey the sensory information about the object from the brain to the central nervous system (the spinal cord in this case) so that the information is processed, and a response coordinated.

Question 2 B

B is correct. The level of resistance to a chronic stressor rapidly rises during the alarm reaction countershock substage. The body then tries to adapt to the ongoing demands of the chronic stressor by sustaining a high level of resistance during the resistance stage. Eventually, due to depletion of the immune system, the level of resistance starts to decline before the exhaustion stage is entered.

A is incorrect. The level of resistance remains low during the exhaustion stage, which can lead to major illness, but it first starts to decline during the resistance stage.

C and **D** are incorrect. When the body is in shock, resistance is low, but when the body enters countershock, the level of resistance rapidly rises as the sympathetic nervous system responds to the initial demands of the stressor.

Question 3 B

B is correct. Serotonin is a neuromodulator. It regulates the neurons in the area of the brain that influences responses to sensory information. A lack of serotonin can potentially prevent inhibitory behaviour, which could be the reason why Finn responds to situations with aggression and a lack of impulse control.

A is incorrect. Gamma-amino butyric acid (GABA) is an inhibitory neurotransmitter that counteracts the excitatory effects of glutamate. Low levels of GABA have been linked to anxiety, not impulsive and aggressive behaviour.

C is incorrect. Dopamine is a neuromodulator that plays a key role in motivation and movement.

D is incorrect. Glutamate is the major excitatory neurotransmitter in the brain that plays a key role in memory and learning.

Question 4 A

A is correct. The gut–brain axis (GBA) is a bidirectional system. The microbiota in the gut plays an important role in producing key neurotransmitters that regulate brain activity and mental health.

B is incorrect. The peripheral nervous system detects external stressors and relays this information to the central nervous system, which processes the information and coordinates a response.

C is incorrect. The endocrine system regulates the immune system.

D is incorrect. The hypothalamus triggers the flight-or-fight-or-freeze response, which stimulates the sympathetic nervous system.

Question 5 C

C is correct. A correlational study explores the strength and direction of the relationship between two variables without any experimenter influence. In this case, the relationship was between stress levels and absenteeism.

A is incorrect. Fieldwork would have involved observing and interacting with teachers at their workplace, which was not done in this study.

B is incorrect. A case study is an in-depth study of a group that is undertaken to gain rich insights into the behaviour of people in a natural setting. Instead, this investigation explored the strength of a relationship between variables.

D is incorrect. A controlled experiment would have required the researchers to manipulate an independent variable under controlled conditions to see how this would affect a dependent variable; no variables were manipulated in this study.

Question 6 A

A is correct. The mode is the most frequently occurring value in a set of data.

B is incorrect. The mean is the average value of a set of data.

C is incorrect. The median is the middle value in a sorted set of data.

D is incorrect. The standard deviation is a measure of the variability of values in a set of data.

Question 7 A

A is correct. Given that the study was not a controlled experiment, a control group would not have been required. A stratified sample ensures that each stratum (for example, males and females from different age groups) is proportionally represented in the sample.

B is incorrect. All scientific investigations require ethical consideration to ensure that the wellbeing of participants is prioritised.

C is incorrect. A stratified sample requires the identification of sample size in order to determine the size of each strata group.

D is incorrect. Classification of staff into different strata is a necessity of stratified sampling in order to determine the proportions of staff in each stratum.

Question 8 D

D is correct. Reproducibility refers to the closeness of agreement between the results of measurements of the same quantity and under different conditions. In this case, the researchers wish to test the same quantity (the relationship between stress levels of teachers and absenteeism) under different conditions (a different school and different teachers).

A is incorrect. Accuracy refers to how close a measurement is to the true value (in this case, the subjective rating of teachers' stress levels).

B is incorrect. Precision refers to how closely a set of measurements from a sample agree with each other.

C is incorrect. Repeatability refers to the closeness of agreement of results from repeated testing under the same conditions.

Question 9 A

A is correct. Uncertainty refers to variation that cannot be completely controlled, and all measures have a degree of uncertainty. When measuring psychological constructs such as stress levels, there are always sources of variation that cannot be controlled, leading to uncertainty. This should be considered when making conclusions from the results of a study.

B is incorrect. Random errors are unpredictable variations and affect the precision of measurements.

C is incorrect. Personal errors relate to mistakes, miscalculations or observer errors made by experimenters.

D is incorrect. Systematic errors are consistent errors, often due to the flaws in the equipment or investigation design, that affect the accuracy of measurements.

Question 10 A

A is correct. The suprachiasmatic nucleus is particularly sensitive to blue light. Late evening exposure to blue light – for example, from phones and computer screens – can signal the pineal gland to suppress the release of the sleep-inducing hormone melatonin, which can delay the onset of sleep.

B is incorrect. The release of melatonin advances, not delays, the onset of sleep.

C and **D** are incorrect. Early morning exposure to blue or red light has minimal impact on the sleep-wake cycle as the suprachiasmatic nucleus is exposed to natural light from the sun, which helps to trigger wakefulness.

Question 11 B

B is correct. The itchiness is an unconditioned response that was triggered from the unconditioned stimulus (the sunscreen being applied to Josie's skin).

A and **D** are incorrect. The tantrums and avoidance of the beach are conscious responses; an unconditioned response is involuntary.

C is incorrect. The application of sunscreen to Josie's skin is the unconditioned stimulus that triggered the itchiness.

Question 12 B

B is correct. The sight of the sunscreen reflexively triggered Josie's anxiety. This is because the sight of the sunscreen (neutral stimulus) was repeatedly paired with the application of sunscreen to Josie's body (unconditioned stimulus), which subsequently triggered the itchiness (unconditioned response). Josie therefore associated the sight of the sunscreen with the resultant itchiness.

A is incorrect. The itchiness is the unconditioned response.

C is incorrect. Being asked to go to the beach did not trigger any involuntary responses that are essential for classically conditioned behaviour.

D is incorrect. The application of sunscreen is the unconditioned stimulus.

Question 13 C

C is correct. The three-phase process of operant conditioning consists of antecedent, behaviour and consequence. For Josie, avoiding getting sunburnt is the consequence of not going to the beach.

A is incorrect. Feeling itchy is classically conditioned behaviour.

B is incorrect. Throwing tantrums are the behaviour in the three-phase process of operant conditioning.

D is incorrect. Being asked to go to the beach is the antecedent that triggers the tantrums.

Question 14 B

B is correct. Josie's desired behaviour of wearing the sun protective clothing was strengthened (reinforced) through the removal (negative) of the threat of wearing sunscreen.

A is incorrect. Josie did not gain any desirable (positive) stimulus by wearing the sun protective clothing.

C is incorrect. Josie's behaviour of wearing the sun protective clothing operated on the environment (operant conditioning); it was not a result of an involuntary association between two stimuli (classical conditioning).

D is incorrect. Josie's learning occurred directly through forming an association with the behaviour (wearing the sun protective clothing) and the consequences (avoiding getting sunburned) as opposed to an indirect learning process.

Question 15 C

C is correct. A patient who has aphantasia is unable to visualise imagery. An essential feature of the method of loci is to visualise items that need to be remembered at a familiar landmark during the encoding and retrieval processes.

A and **B** are incorrect. Acrostics and acronyms use letters; they do not require visualisation. In acrostics, the first letters of selected words represent items to be remembered. In acronyms, the first letters of the items to be remembered are used in a single, often made-up, word.

D is incorrect. Numbers can be remembered through rehearsal and without visualisation.

Question 16 C

C is correct. First Nations peoples use songlines to incorporate information about landmarks, flora and fauna on a journey. This information could be passed down through successive generations to enable the learning and memorisation of navigational routes.

A and **B** are incorrect. Songlines are not traditionally used for the memorisation of words or numbers.

D is incorrect. This option describes the method of loci, not songlines.

Question 17 D

D is correct. Observational learning requires an individual to see the behaviour demonstrated by another individual in order to strengthen their association between the observed behaviour and a desirable consequence. In operant conditioning, the learner is more likely to repeat the desired behaviour in the future if it has been reinforced as opposed to being punished.

A and **B** are incorrect. Operant conditioning is a behaviourist form of learning and does not emphasise the cognitive aspects of learning such as the attention, retention and motivation required to learn and replicate modelled behaviour.

C is incorrect. Reproduction refers to the ability to replicate modelled behaviour; this does not feature in operant conditioning.

Question 18 B

B is correct. Pruning is a regulatory process that eliminates dendrites in the synaptic pathways that have not been activated recently. This enables new connections to be formed so that new learning can occur in a more efficient manner.

A and **D** are incorrect. Axons conduct neural impulses, and the soma is the control centre of a neuron. Each neuron has a single axon and a single soma, and thus these structures cannot be pruned.

C is incorrect. Neurotransmitters are the electrochemical messages that are passed from a presynaptic neuron to a postsynaptic neuron during a synaptic transmission. Given that they are in a chemical form, they cannot be pruned.

Question 19 B

B is correct. If a stressor is primarily appraised as a challenge, this requires a secondary appraisal to evaluate the coping resources needed to meet the demands of the stressor. A sustained level of energy is required to grow and adapt to the demands of a challenging stressor.

A is incorrect. If a stressor is primarily appraised as irrelevant, then no coping resources are required.

C is incorrect. If a stressor is primarily appraised as benign-positive, then it will only have a short-term effect on the individual and thus no coping resources are required.

D is incorrect. The evaluation of coping resources occurs during the secondary appraisal.

Question 20 C

C is correct. According to the Atkinson-Shiffrin multi-store model of memory, stored information in long-term memory is retrieved via a cue. The material is retrieved into short-term memory, which actively works on the material in a conscious manner.

A, **B** and **D** are incorrect. Sensory memory is the entry point for new information. If the information is attended to, then it will be transferred to short-term memory for active processing. Sensory memory is not involved in the retrieval of information.

Question 21 B

B is correct. The data is generated directly from the experiment and collected by the researchers (primary), and the rating scales are numerical (quantitative).

A is incorrect. Qualitative data is non-numerical; for example, written statements in response to interview questions.

C and **D** are incorrect. Secondary data is data that has been collected by a third party in a previous investigation, and then used by a researcher.

Question 22 D

D is correct. Non-maleficence is an ethical concept that would have required the researchers to acknowledge that the participants would experience a level of discomfort when exposed to the phobic stimuli, and ensure that the benefits gained from the study (for example, the potential extinction of the participants' phobias) outweighed the level of harm from the workshops.

A is incorrect. Justice refers to the equal consideration of different groups in the community, which is not relevant to this scenario.

B is incorrect. Respect relates to ensuring that participants feel empowered and protected, including having the ability to make decisions relating to their involvement in the study.

C is incorrect. Integrity refers to the honest reporting of data and findings from an experiment, which has not been referred to in this scenario.

Question 23 B

B is correct. Random errors are unpredictable variations and affect the precision of measurements. As the participants' responses were subjective, there was a high possibility of random errors being introduced; for example, if a participant had only recently been exposed to their phobic stimuli, their rating may have been impacted by their anxious state.

A is incorrect. Outliers are results that vary greatly from the majority of the results of an investigation.

C is incorrect. Personal errors relate to mistakes, miscalculations or observer errors made by experimenters.

D is incorrect. Systematic errors are consistent errors that affect the accuracy of measurements, and are often due to equipment or investigation design flaws.

Question 24 D

D is correct. The potential impact of other types of treatment is a variable other than the independent variable (systematic desensitisation) that could have affected the dependent variable (the reduction in phobia severity). Therefore, the possibility of other treatments could have been an extraneous variable.

A, **B** and **C** are incorrect. The sample size, gender bias and a lack of other phobia types would not have been extraneous variables as they would not have directly affected the dependent variable. They could, however, have decreased the external validity of the data.

Question 25 D

D is correct. Systematic desensitisation addresses the psychological association between a phobic stimulus and fear by using a clinical (therapeutic) setting to extinguish the phobia systematically.

A is incorrect. A biological form of treatment focuses on physiological processes only; for example, using benzodiazepines to affect gamma-amino butyric acid (GABA) levels in the brain.

B is incorrect. A biopsychosocial treatment would combine biological (for example, benzodiazepines), psychological (for example, systematic desensitisation) and social (for example, psychoeducation) forms of treatment.

C is incorrect. Psychoeducation is a social form of treatment that targets the families/supporters of a patient.

Question 26 A

A is correct. Young children require more sleep than the other three age groups shown. Consequently, their circadian rhythm triggers an earlier onset of sleep through the release of melatonin in the early evening.

B is incorrect. Adolescents experience a shift forward in the body clock, which delays the release of melatonin.

C and **D** are incorrect. Adults require less sleep than young children, and thus they experience a later release of melatonin to induce sleep.

Question 27 B

B is correct. Electroencephalography (EEG) can detect, amplify and record the electrical activity of the brain during sleep episodes. An EEG can record the reduction in brain activity as an individual falls into a deeper non-rapid eye movement (NREM) sleep, enabling researchers to determine the duration of each stage of NREM sleep.

A is incorrect. Electro-oculography (EOG) detects, amplifies and records the electrical activity of the eye muscles that regulate sleep. During NREM sleep, an EOG detects slow rolling eye movements that do not vary significantly between the different stages of NREM sleep.

C is incorrect. A sleep diary is used by a sleeper to record activities when they are awake and thus provides no data regarding the duration of sleep stages.

D is incorrect. Video monitoring uses infrared cameras to record the movements of a sleeper but cannot detect variations in the stages of an individual's NREM sleep.

Question 28 C

C is correct. Breaks in concentration are not zeitgebers and occur naturally during the day. They do not provide cues that impact the suprachiasmatic nucleus and the timing of the sleep-wake cycle.

A and **B** are incorrect. Physical exercise and eating patterns are zeitgebers. The timings of these activities are external cues that influence the suprachiasmatic nucleus and the timing of sleep.

D is incorrect. Light is a zeitgeber and exposure to daylight signals the suprachiasmatic nucleus to continue to suppress melatonin and maintain a wakeful state.

Question 29 A

A is correct. The effects of Vida's early shift work disrupted her circadian rhythm as she was required to wake up three hours before her normal wake-up time; thus her body clock was out of sync with her work requirements.

B and **C** are incorrect. Delayed Sleep Phase Syndrome (DSPS) and Advanced Sleep Phase Disorder (ASPD) refer to changes in the natural onset of sleep. Given that Vida was still falling asleep at her usual bedtime of 11:30 pm, the onset of her sleep-phase had not changed.

D is incorrect. Ultradian rhythms are recurrent biological processes that occur throughout a 24-hour cycle such as the NREM and rapid eye movement (REM) sleep cycles. Vida's sleep cycles were not affected by her earlier wake-up time, she was just experiencing fewer of these cycles.

Question 30 D

D is correct. Clumsiness is physically observable and thus can be classified as a behavioural symptom of sleep deprivation.

A is incorrect. Affective symptoms are emotional changes such as feeling depressed or moody.

B is incorrect. The term ultradian refers to recurrent biological processes such as the NREM and REM sleep cycles.

C is incorrect. Cognitive symptoms relate to mental processes such as attentiveness and decision-making.

Question 31 B

B is correct. Being awake for 20 hours has a similar effect on cognition as a blood alcohol concentration level between 0.05 and 0.10.

A is incorrect. Sleep deprivation of a period of less than 17 hours would have similar effects as a blood alcohol concentration of just under 0.05.

C and **D** are incorrect. A blood alcohol concentration of over 0.4 would most likely be fatal.

Question 32 A

A is correct. Magnus is experiencing a stress response (flight-or-fight-or-freeze) to a threat (a snake).

B is incorrect. Anxiety would be reflected by apprehension and worry about a future event such as exposure to a threat, and Magnus only worries about snakes when he encounters them.

C is incorrect. A phobia is a persistent and irrational fear of a specific stimulus. Magnus's fear does not rise to the level of a phobia as it does not impair his quality of life or daily functioning.

D is incorrect. Resilience is reflected by the ability to cope and adapt to daily stressors. This scenario describes his immediate response to a threat rather than his behaviour and mindset over a longer period of time.

Question 33 D

D is correct. Magnus experiences a freeze response to an acute (short-term) stressor.

A is incorrect. A spinal reflex is a sudden involuntary movement in response to a harmful stimulus. Instead, Magnus experiences a flight-or-fight-or-freeze response to a fear-evoking stimulus.

B is incorrect. An unconditioned response is a natural response to an unconditioned stimulus. Magnus's freeze response is a conditioned response as it is a result of past encounters with snakes.

C is incorrect. Cortisol levels rise in response to a chronic (long-term), not acute, stressor.

Question 34 B

B is correct. Magnus shows a high level of functioning and experiences a normal stress response to a threatening stimulus; thus he would be classified as being mentally healthy.

A is incorrect. A mental disorder would be indicated by a disabling level of impairment in daily functioning. Magnus does not show signs of impairment which is reflected by his ability to leave his house and ride his bike to school despite the threat of snakes.

C and **D** are incorrect. A mental health problem would be indicated by a temporary impairment in daily functioning. Magnus does not show signs of such an impairment.

Question 35 A

A is correct. Leo is having difficulty coping and adapting to his phobia of snakes, which are the key facets of resilient behaviour. This is affecting Leo's mental wellbeing, which can be seen in his concern for his future.

B is incorrect. Leo's academic success shows a level of functioning.

C and **D** are incorrect. Leo's interactions with his friends and his ability to regulate his emotional responses demonstrate social and emotional wellbeing.

Question 36 B

B is correct. Leo's phobia is being perpetuated through negative reinforcement as the changes made in his social life have removed the threat of exposure to snakes and thus continue to strengthen his behaviour.

A is incorrect. Precipitation relates to the development of a phobia rather than the maintenance of a phobia.

C is incorrect. Long-term potentiation relates to the strengthening of the neural pathways responsible for the precipitation of a phobia rather than the maintenance of a phobia.

D is incorrect. Leo's avoidance of going outside of his house does not help his wellbeing and thus cannot be classified as a protective factor.

Question 37 C

C is correct. If people are pressured or coerced into participating in a study, this breaches voluntary participation.

A is incorrect. Debriefing is undertaken at the end of a study in which participants are informed about the nature of the study, the results and the use of any deception.

B is incorrect. Non-maleficence is an ethical concept, not a guideline, and involves researchers being proactive in ensuring that any potential harm to participants in a study is minimised and outweighed by the benefits from the study.

D is incorrect. Deception is used in psychological research only if necessary, and must be detailed during debriefing. It is used to reduce the extraneous effect of expectations impacting the results.

Question 38 D

D is correct. Mavis's experiences with the alpacas represent the specific environmental trigger that resulted in the conditioning of her phobia.

A is incorrect. A cognitive bias involves faulty judgements. For example, a cognitive bias would be Mavis forming a memory bias that the alpacas chased her and tried to bite her, when in reality they were only aggressive towards her when she approached them.

B and **C** are incorrect. The farm functioned as the neutral stimulus (before conditioning) and the conditioned stimulus (after conditioning) due to the repeated pairing of the encounters with the alpacas (unconditioned stimulus).

Question 39 B

B is correct, and **A** and **C** are incorrect. Benzodiazepines are rapidly synthesised and metabolised by the body and thus only have a short-acting inhibitory effect on the brain. The drugs mimic the effects of GABA on the GABA receptors of postsynaptic neurons that are part of the network of fear pathways in the brain.

D is incorrect. Benzodiazepines target the GABA receptors, not the axon terminals. The GABA axon terminals are where GABA neurotransmitters are stored and released.

Question 40 C

C is correct. Self-determination is integral to First Nations peoples having agency over the decision-making that affects their lives, which enhances their wellbeing.

A is incorrect. Resilience refers to the ability to cope and adapt to stressors that impact people's lives.

B is incorrect. Cultural continuity refers to the ability to preserve cultural traditions throughout successive generations.

D is incorrect. The social and emotional wellbeing of an individual relates to their ability to maintain meaningful connections with other people and manage their emotions.

SECTION B

Question 1 (9 marks)

a. The gut–brain axis (GBA) refers to the bidirectional link between the central nervous system and enteric nervous system. 1 mark

From the appraisal of the stress, Percy's brain would have sent a message to the adrenal gland to release more cortisol in order to help Percy's body deal with the demands of the stressor. 1 mark

This in turn would have triggered a change in the gut microbiota, which would have had an adverse impact on Percy's responsiveness to the stress. 1 mark

b. Cortisol is a stress hormone that would have played a major role in Percy's body's response to stress by increasing glucose levels in the bloodstream, enhancing his brain's use of glucose and increasing the availability of substances that repair tissue to enable him to best respond to the initial demands of the stressor. 1 mark

In terms of Selye's General Adaptation Syndrome, after Percy was initially stressed about his financial pressures, a high level of cortisol would have continued to be released into his bloodstream during the resistance stage. This is because his body was trying to adapt to the demands of the financial pressures by maintaining a high level of resistance. 1 mark

The high levels of cortisol eventually depleted Percy's immune system as he entered a stage of exhaustion, resulting in the development of a stress-related illness. 1 mark

c. A secondary appraisal would have involved an evaluation of the coping resources required to deal with the financial pressures. 1 mark

During Percy's time off work, he demonstrated an approach coping strategy by employing context-specific effectiveness to deal specifically with the demands and situational determinants of the stressor. 1 mark

By considering selling part of his business, Percy addressed the situational determinants of his debt and therefore reduced the demands of his stressor by reducing the pressure to generate the funds required to pay off part of his debt. 1 mark

Question 2 (9 marks)

a. Integrity refers to how an investigation should be dedicated to searching for knowledge and understanding. It also requires researchers to report their findings and information sources honestly so that they aid public knowledge and can be examined closely. 1 mark

In the investigation, the researchers would have ensured that they reported all of their findings in relation to the development of the brain over the early part of the lifespan regardless of whether it supported any literature reviews undertaken prior to the investigation. 1 mark

b. Many of the neuronal pathways responsible for infant behaviour and memories are no longer accessed during childhood. 1 mark

Long-term depression is a consequence of weakened input from presynaptic neurons to the postsynaptic neurons that are responsible for infant behaviours. These postsynaptic neurons fail to fire, which weakens the synaptic connections over time, helping the brain with long-term potentiation of modified learning. 1 mark

Consequently, the neuronal connections for these behaviours are synaptically pruned to make way for new connections for newly learned skills and concepts. 1 mark

c. The hippocampus is responsible for the encoding and retrieval of explicit memory *(memories that are consciously recalled)* 1 mark
such as consolidating concepts learned at school; for example, formulas. 1 mark

The basal ganglia is responsible for the encoding of implicit memory *(memories that are not consciously recalled)*, 1 mark
such as the habitual, physical movements that an adolescent might learn for sport or playing a musical instrument. 1 mark

Note: Other appropriate examples relating to adolescent memory are also acceptable.

Question 3 (3 marks)

A written culture typically approaches learning as a process that is distinct from everyday living and involves traditional teacher and learner roles/relationships. 1 mark

By contrast, First Nations communities' methods of learning combine learning processes with everyday living. These are interwoven in a multimodal system that connects people with one another and with Country 1 mark
that is passed down from generation to generation instead of requiring formal instruction. 1 mark

Question 4 (12 marks)

a. A literature review involves the collection and analysis of secondary data; in Bala's case, the data would include past research on ASPD. 1 mark

This would provide Bala with the necessary background information to help her plan her investigation into bright light therapy in order to generate primary data. 1 mark

b. ASPD is a circadian rhythm disorder 1 mark
in which the timing of sleep is pushed forward and the consequential wakening is out of synchronisation with desired sleep-wake cycles. 1 mark

c. Sleep hygiene refers to the practices employed during wakefulness that impact the ability to fall asleep at a desirable time. This includes the consistency of sleep-wake times, the timing of exposure to blue light, and exercise and eating times. 1 mark

Zeitgebers are environmental cues that affect the sleep-wake cycle, such as light and temperature. 1 mark

If individuals are exposed to large meals early in the morning and blue light late in the evening, and darkness and a lack of meals in the late afternoon and early evening, this could trigger an early onset of sleep. 1 mark

d. *Any two of:*

- moodiness
- irritability
- difficulty regulating emotions
- a depressed state

2 marks

e.

Independent variable	exposure/non-exposure to bright light therapy
Dependent variable	self-reported levels of sleep deprivation
Controlled variable	timing of the experiment (*the same time of year and the same duration*)

3 marks

1 mark for each variable identified.

Question 5 (7 marks)

a. Jan's sensory memory could still register raw sensory stimuli such as speech. The details that she attends to would be transferred to her short-term memory, which would process some of these details. 1 mark

Due to the loss of key neurotransmitters (*for example, acetylcholine*) and the degeneration of brain tissue in the hippocampus, Jan would have more difficulty with consciously processing material. 1 mark

This would impair her encoding of the material into long-term memory; consequently, her ability to both store and retrieve autobiographical memories from her long-term memory would be compromised. 1 mark

b. Semantic memory is responsible for remembering details of past events, such as the names of the day, the date of an event and the people who were with Jan. 1 mark

Episodic memory is responsible for remembering contextual details such as time and place. 1 mark

c. Jan's Alzheimer's disease may be contributing to her anxiety due to her worrying about what she may have forgotten or why she is experiencing confusion. 1 mark

Jan may also feel concerned about her long-term future and the possible progression of her Alzheimer's disease, thus worsening her anxiety. 1 mark

Question 6 (10 marks)

a. Sleep is subjectively experienced and therefore it is difficult to measure objectively. 1 mark

Quantitative techniques such as EEGs, EMGs, EOGs, and video monitoring can only measure the physiological experience of sleep, not psychological experiences such as the quality of sleep. 1 mark

b. An EMG detects, amplifies and records the level of electrical activity of the muscles during sleep in a sleep laboratory. 1 mark

An EMG would record a relatively low level of electrical activity in the muscles during REM sleep (due to REM paralysis) and a relatively higher level of electrical activity during NREM sleep. 1 mark

c. Internal validity refers to how effectively a tool or technique measures what it is intended to measure. 1 mark

For example, any one of:

- An EEG detects the brain's electrical activity through the scalp over the entire brain region. It may lack validity because the technique may not provide a valid measure of the brain waves that are indicative of the different stages of sleep.
- An EMG may lack validity because the technique may not provide a valid measure of the electrical activity of the muscles during the different stages of sleep due to excessive movements that could affect the location of the electrodes attached to the muscles.
- Video monitoring may lack validity because periods of inactivity may be misinterpreted as periods of REM sleep.

1 mark

Note: Accept other appropriate responses.

d. *Any two of:*

- NREM stage 2 sleep occurs in every cycle, whereas NREM stage 3 sleep tends to occur in the early cycles only.
- NREM stage 2 sleep is characterised by a relatively high level of brain activity, whereas NREM stage 3 sleep is characterised by a relatively low level of brain activity.
- There is a higher level of physiological activity during NREM stage 2 sleep and a lower level of physiological activity during NREM stage 3 sleep.
- NREM stage 2 sleep is a lighter sleep/the sleeper is more easily woken during the NREM stage 2 sleep, whereas NREM stage 3 sleep is a deeper sleep/the sleeper is less likely to be woken during the NREM stage 3 sleep.

4 marks
2 marks for each distinction provided.

Question 7 (8 marks)

a. Fieldwork involves observing and interacting with different groups in order to observe behaviour and phenomena in a natural setting. 1 mark

The researcher could spend time integrating with First Nations communities and talking to Elders about their approach to maintaining wellbeing. 1 mark

b. First Nations communities' approach to social and emotional wellbeing is a multidimensional framework of connections to a variety of elements that interact and change over an individual's lifespan; wellbeing is not viewed in isolation but rather holistically. 1 mark

These elements include connection to country, culture, community, family and kinship, body, the mind and emotions, spirituality and ancestors. 1 mark

c. Cultural determinants such as cultural continuity and self-determination are integral to the wellbeing of First Nations peoples. First Nations cultures place emphasis on cultural continuity and the need to preserve traditions and pass these on to successive generations. 1 mark

First Nations self-determination ensures their agency in terms of active involvement in the decision-making processes that affect their lives. 1 mark

d. The mental wellbeing continuum approach describes mental wellbeing as an experience that fluctuates over time, differs between people and has no exact barriers between classifications. 1 mark

This approach enables the wellbeing of an individual to be placed on a continuum according to their degree of social and emotional wellbeing and level of functioning amongst other factors. 1 mark

Question 8 (6 marks)

a. The somatic nervous system should detect the sensory input of the tap from the hammer. 1 mark

The somatic nervous system is also involved in the movement of the skeletal muscles in the leg that triggers the kicking motion. 1 mark

The spinal cord is involved in the integration of the sensory and motor impulses and is responsible for initiating the movement of the knee. 1 mark

b. Dopamine is a neuromodulator that plays a key role in regulating the activity of the reward pathways in the brain. 1 mark

When Helena is thirsty and exposed to water, her brain increases its level of dopamine. 1 mark

This dopamine surge modulates activity in the reward centres of the brain, which triggers Helena's urge to drink the water. 1 mark

Question 9 (6 marks)

a. The neural pathways in the fear centres of Rip's brain were repeatedly activated because of his repeated exposure to the threatening dog. 1 mark

The neural activity in Rip's fear pathways involved a high-frequency input from the presynaptic cells that formed connections with the corresponding postsynaptic cells, and led to the strengthening of these pathways over time. This precipitated the development of Rip's phobia of dogs. 1 mark 1 mark

b. Cognitive behavioural therapy (CBT) would start with a cognitive appraisal of the triggers of Rip's fear response to dogs and identify his thoughts and feelings about dogs. 1 mark

The next step in CBT would include a process of cognitively restructuring the thought processes that are triggered when he sees or thinks about a dog. This could involve reflecting on evidence gained from past interactions or simulated exposure to dogs. Over time, Rip would no longer see dogs as a threatening stimuli. 1 mark

Rip would then be in a position to modify his behaviour by employing learned relaxation strategies when required and engaging in more adaptive and functional behaviour. 1 mark

Question 10 (10 marks)

A biopsychosocial approach explores the interaction between biological, psychological and social factors that enhance wellbeing. First, the 65 paramedics will need to be exposed to a series of interviews to generate qualitative data about their lifestyle and existing factors relating to the maintenance of their wellbeing. Additionally, they will need to be asked questions that use a rating scale to generate quantitative data related to levels of stress and anxiety about their workplace conditions. These measures would serve as baseline indicators. The paramedics would then need to be educated about the biopsychosocial factors that can enhance their wellbeing and, where required, be provided with access to these resources.

In terms of biological factors, this would include being educated about the importance of nutrition intake and hydration for wellbeing. This could incorporate learning about the benefits of specific foods for a balanced diet that promotes wellbeing and learning about the importance of abstaining from certain foods and beverages such as highly processed foods and alcohol. The paramedics could also be educated about the importance of good sleep hygiene, including establishing a consistent routine that will enable them to gain the restorative benefits of a good night's sleep and how to manage the effects of night shifts.

In terms of psychological factors, the paramedics could be taught cognitive behavioural strategies. This would start with an examination of their thought processes about work, then identification of stress and anxiety triggers, and subsequently learning about the values of cognitive restructuring. This would teach the paramedics to be mindful of not purely focusing on worst-case scenarios, modify their existing behaviour and implement strategies that will enhance their wellbeing, such as exercise.

In terms of social factors, the paramedics could be advised to reach out and access support networks, such as friends and family, that can help them deal with the pressures of their work and achieve a better work–life balance. Following this education and provision of resources, the paramedics could be interviewed once again and complete the same rating scales so that comparative data can be obtained.

Despite being time-consuming to establish, the use of a stratified sample as part of the research methodology will ideally ensure that the sample is proportionally representative of the genders, ages and cultural differences of the population of paramedics. This will enable the implications of the findings to be more applicable to the entire population. The use of a within-subjects design will eliminate the extraneous and potentially confounding variable of participant-related differences that would appear in a between-subjects design. Furthermore, it is appropriate to employ baseline testing to generate qualitative and quantitative data that enables comparison with the data generated from ratings scales and interviews, following exposure to the education and provision of the biopsychosocial approach. This will allow the researchers to draw conclusions about the experimental findings and then draw implications that can be applied to the wider population of paramedics. The use of qualitative data from interview responses will form insights from the paramedics and provide richly detailed information about the effects of workplace stressors on the paramedics' wellbeing. This data will also provide information about the benefits of using biopsychosocial approaches to enhance wellbeing. The qualitative information would be difficult to summarise and thus would be more effective when combined with quantitative measures. The results from rating scales (for example, a rating out of 5 of the level of anxiety felt just prior to a shift) can be summarised using measures of central tendency, such as a mean, and analysed to determine the level of significance.

Marking guide

Very high (9–10 marks)

The student has:

- provided a detailed and accurate explanation of a biopsychosocial approach as well as specific biopsychosocial strategies and how these can be used to enhance wellbeing
- demonstrated higher order thinking skills in their evaluation of the methodology in terms of the use of stratified sampling, the use of a within-subjects design, and the collection of qualitative and quantitative data.

High (7–8 marks)

The student has:

- provided an accurate explanation of a biopsychosocial approach as well as specific biopsychosocial strategies and how these can be used to enhance wellbeing
- provided an accurate evaluation of the methodology in terms of the use of stratified sampling, the use of a within-subjects design, and the collection of qualitative and quantitative data.

Medium (5–6 marks)

The student has:

- provided an adequate explanation of a biopsychosocial approach as well as specific biopsychosocial strategies and how these can be used to enhance wellbeing
- provided an adequate evaluation of the methodology in terms of the use of stratified sampling, the use of a within-subjects design, and the collection of the qualitative and quantitative data.

Low (3–4 marks)

The student has:

- provided a limited explanation of a biopsychosocial approach as well as specific biopsychosocial strategies and how these can be used to enhance wellbeing
- provided a limited evaluation of the methodology in terms of the use of stratified sampling, the use of a within-subjects design, and the collection of qualitative and quantitative data OR provided an adequate evaluation that fails to address some aspects of the methodology.

Very low (0–2 marks)

The student has:

- provided a limited explanation of at least one of a biopsychosocial approach or specific biopsychosocial strategies and how these can be used to enhance wellbeing
- attempted to provide an evaluation of the methodology but failed to accurately address the majority of the use of stratified sampling, the use of a within-subjects design, the collection of qualitative and quantitative data.