

2023 VCE Psychology Units 3 and 4 Trial Examination ANSWERS



Kilbaha Education

Quality educational content

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Answer Summary

Q1	C	Q21	B
Q2	A	Q22	D
Q3	B	Q23	A
Q4	D	Q24	C
Q5	B	Q25	B
Q6	C	Q26	A
Q7	D	Q27	C
Q8	D	Q28	A
Q9	D	Q29	D
Q10	A	Q30	C
Q11	B	Q31	A
Q12	B	Q32	C
Q13	A	Q33	B
Q14	C	Q34	C
Q15	D	Q35	D
Q16	A	Q36	D
Q17	A	Q37	B
Q18	C	Q38	A
Q19	B	Q39	C
Q20	C	Q40	B

Count: A 10 B 10 C 11 D 9

Question 1 Answer = C

The spinal reflex is an automatic response that bypasses the brain and is controlled by the spinal cord, which is part of the central nervous system. It does not involve the brain or the autonomic nervous system

Study design reference: the roles of different subdivisions of the central and peripheral nervous systems in responding to, and processing and coordinating with, sensory stimuli received by the body to enable conscious and unconscious responses, including spinal reflexes

Question 2 Answer = A

Coping flexibility refers to the ability to adjust one's coping strategies to meet the demands of different stressors and situations. It involves recognising when one's usual coping strategies are not effective and being able to adapt and use alternative strategies that are more appropriate for the particular stressor or situation. Coping flexibility is associated with better psychological and physical health outcomes, as it allows individuals to better manage stress and adapt to changing circumstances.

Study design reference

use of strategies (approach and avoidance) for coping with stress and improving mental wellbeing, including context-specific effectiveness and coping flexibility

Question 3 Answer = B

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realise their abilities, learn well and work well, and contribute to their community.

Study design reference

use of strategies (approach and avoidance) for coping with stress and improving mental wellbeing, including context-specific effectiveness and coping flexibility

Question 4 Answer = D

When Warren sees a spider he is likely to experience the fight-flight-freeze response associated with his fear. This will likely result in decreased salivation, dilated pupils, increased adrenaline levels and increase muscle tension

Study design reference

internal and external stressors causing psychological and physiological stress responses, including the flight-or-fight-or-freeze response in acute stress and the role of cortisol in chronic stress

Question 5 Answer = B

In classical conditioning, the unconditioned stimulus (UCS) is a stimulus that naturally and automatically triggers a response without prior learning. The conditioned stimulus (CS), on the other hand, is a previously neutral stimulus that, after being repeatedly paired with the unconditioned stimulus, eventually elicits a conditioned response (CR) similar to the unconditioned response (UCR) to the unconditioned stimulus.

In this example, the unconditioned stimulus is the spiders, which naturally triggers the unconditioned response of fear. The conditioned stimulus is the roses, which originally had no effect on Warren but eventually came to elicit a fear response through repeated pairing with the roses.

Question 6 Answer = C

In classical conditioning, the neutral stimulus (NS) is a stimulus that initially does not elicit any relevant response or reflex (roses). The unconditioned response (UCR) (fear) is a natural and automatic reaction that occurs in response to an unconditioned stimulus (UCS) (spiders).

Question 7 Answer = D

In classical conditioning, the conditioned stimulus (CS) is a previously neutral stimulus (roses) that, after being paired with an unconditioned stimulus (UCS) (spiders), elicits a learned response known as the conditioned response (CR) (fear). The conditioned response is a response that is elicited by the conditioned stimulus, but it is not a natural or automatic response like the unconditioned response.

Study design reference for Questions 5-7: behaviourist approaches to learning, as illustrated by classical conditioning as a three-phase process (before conditioning, during conditioning and after conditioning) that results in the involuntary association between a neutral stimulus and unconditioned stimulus to produce a conditioned response, and operant conditioning as a three-phase process (antecedent, behaviour and consequence) involving reinforcement (positive and negative) and punishment (positive and negative)

Question 8 Answer = D

Sprouting and rerouting are two ways in which the connections between neurons are modified - together they are involved in optimising the strength and efficiency of neural pathways in the brain.

Study design reference

synaptic plasticity – resulting from long-term potentiation and long-term depression, which together act to modify connections between neurons (sprouting, rerouting and pruning) – as the fundamental mechanism of memory formation that leads to learning

Question 9 Answer = D

While cognitive appraisal is an essential aspect of the transactional model of stress and coping, its overreliance on this construct has been criticised as limiting its explanatory power.

Option A is incorrect because the transactional model does account for the impact of social support on coping strategies, with Lazarus and Folkman emphasising the importance of social support as a coping resource.

Option B is incorrect because the transactional model recognizes the role of personality traits in shaping coping responses, with Lazarus and Folkman arguing that coping strategies are influenced by individual differences in appraisal styles and coping resources.

Option C is incorrect because the transactional model does not exclusively focus on problem-focused coping strategies, but rather emphasises the importance of both problem-focused and emotion-focused coping strategies in dealing with stress.

Study design reference

the explanatory power of Richard Lazarus and Susan Folkman's Transactional Model of Stress and Coping to explain stress as a psychological process (primary and secondary appraisal only)

Question 10 Answer = A

Vicarious reinforcement is a key concept in social cognitive learning. Social cognitive theory emphasises that people can learn through observation and modelling of others' behaviour, and that the consequences (reinforcements or punishments) of the observed behaviour for others can affect the observer's likelihood of performing that behaviour in the future. This process of learning through observing the consequences of others' behaviour is known as vicarious reinforcement.

B and C are incorrect as classical and operant conditioning are behaviourist approaches

Study design reference: social-cognitive approaches to learning, as illustrated by observational learning as a process involving attention, retention, reproduction, motivation and reinforcement

Question 11 Answer = B

An acrostic is a mnemonic device that can help people remember information by using the first letter of each word to form a phrase or sentence. In this case, the words (Racoons Are Crazy Mean Critters) stand for Rice, Avocado, Crab Meat, Cucumber in that order.

Question 12 Answer = B

An acrostic is an effective tool for remembering the order of ingredients because elaborative rehearsal adds meaning and enhances encoding of the explicit memory.

Question 13 Answer = A

An acronym is a mnemonic device that can help people remember information by using the first letter of each word to form a pronounceable word. In this case, the words (RACC) letters stand for Rice, Avocado, Crab meat, Cucumber, in that order.

One of the other sushi chefs told Liam that he found acronyms to be a more effective way to remember the order of the ingredients.

Study design reference for Questions 11-13

the use of mnemonics (acronyms, acrostics and the method of loci) by written cultures to increase the encoding, storage and retrieval of information as compared with the use of mnemonics such as sung narrative used by oral cultures, including Aboriginal peoples' use of songlines

Question 14 Answer = C

The three processes of memory are encoding, storage and retrieval

Study design reference

the explanatory power of the Atkinson-Shiffrin multi-store model of memory in the encoding, storage and retrieval of stored information in sensory, short-term and long-term memory stores

Question 15 Answer = D

The hippocampus is a brain structure located in the medial temporal lobe that is critical for the formation of explicit, declarative memories, such as facts and events. It plays a key role in consolidating these memories from short-term to long-term storage.

The amygdala is a small, almond-shaped structure located within the medial temporal lobes of the brain that plays a critical role in the processing and regulation of emotions, particularly fear and anxiety. It is involved in the formation of implicit emotional memories, which are often formed through classical conditioning and involve the association of emotionally significant stimuli with particular contexts or events.

Study design reference

the roles of the hippocampus, amygdala, neocortex, basal ganglia and cerebellum in long-term implicit and explicit memories

Question 16 Answer = A

Post-mortem studies of brain lesions in people with Alzheimer's disease show high levels of neurofibrillary tangles within neurons.

Alzheimer's disease is also characterised by high levels of tau protein, not low levels and atrophy of the hippocampus rather than the basal ganglia. Option D is incorrect because increased levels of serotonin are not a typical finding in post-mortem studies of Alzheimer's disease.

Study design reference

the role of episodic and semantic memory in retrieving autobiographical events and in constructing possible imagined futures, including evidence from brain imaging and post-mortem studies of brain lesions in people with Alzheimer's disease and aphantasia as an example of individual differences in the experience of mental imagery

Question 17 Answer = A

Glutamate acts as an excitatory neurotransmitter enabling synaptic plasticity, underpinning learning and memory.

Study design reference

the role of neurotransmitters in the transmission of neural information across a neural synapse to produce excitatory effects (as with glutamate) or inhibitory effects (as with gamma-amino butyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity

Question 18 Answer = C

Neuromodulators have a widespread and long-lasting modulatory effect on neural activity

Study design reference

the role of neurotransmitters in the transmission of neural information across a neural synapse to produce excitatory effects (as with glutamate) or inhibitory effects (as with gamma-amino butyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity

Question 19 Answer = B

In primary appraisal a person evaluates their situation.

Question 20 Answer = C

In secondary appraisal a person evaluates whether or not they have the resources for coping.

Study design reference for 19 & 20

the explanatory power of Richard Lazarus and Susan Folkman's Transactional Model of Stress and Coping to explain stress as a psychological process (primary and secondary appraisal only)

Question 21 Answer = B

Auditory information, such as Abedi's mum talking, is initially received by the echoic sensory memory. In order for him to become consciously aware of the words, Abedi must pay attention to them so they can enter his short term memory.

Question 22 Answer = D

Rehearsal assists in increasing the limited duration (12-18 seconds) of short term memory and can also result in information being consolidated into long-term memory. In order for Abedi to remember the number of people for dinner he would either need to keep the information in his short term memory or consolidate it into long-term memory so that he could retrieve it back into short term memory when he was setting the table.

Question 23 Answer = A

To access previously stored information it must be retrieved from long-term-memory.

Study design reference for 21-23

the explanatory power of the Atkinson-Shiffrin multi-store model of memory in the encoding, storage and retrieval of stored information in sensory, short-term and long-term memory stores

Question 24 Answer = C

Aboriginal peoples' songlines are multimodal and contain complex information about navigation, landscape and the environment.

Study design reference

the use of mnemonics (acronyms, acrostics and the method of loci) by written cultures to increase the encoding, storage and retrieval of information as compared with the use of mnemonics such as sung narrative used by oral cultures, including Aboriginal peoples' use of songlines

Question 25 Answer = B

Sleep is described as a psychological construct, this means that it cannot be directly observed or measured.

Question 26 Answer = A

A person first enters NREM 1 when they first fall asleep.

Question 27 Answer = C

REM sleep is associated with dreaming and it increases in duration as the night/sleep episode progresses. The sleeper is virtually paralysed during REM sleep which means that there is very little to no electrical activity of the muscles in the body that would show on an EMG. NREM 3 is the deepest stage of sleep.

Study design reference for questions 25 -27

sleep as a psychological construct that is broadly categorised as a naturally occurring altered state of consciousness and is further categorised into REM and NREM sleep, and the measurement of physiological responses associated with sleep, through electroencephalography (EEG), electromyography (EMG), electro-oculography (EOG), sleep diaries and video monitoring

Question 28 Answer = A

Reproducibility in research refers to the closeness of the agreement between the results of measurements of the same quantity being measured, carried out under changed conditions of measurement.

Study design reference

Key Science Skills - Analyse and evaluate data and investigation methods

Question 29 Answer = D

A strength of applying a biopsychosocial approach to maintaining mental wellbeing is that it emphasises that biological, psychological and social factors all interact together to influence it.

Study design reference

the application of a biopsychosocial approach to maintaining mental wellbeing, with reference to protective factors including adequate nutritional intake and hydration and sleep (biological), cognitive behavioural strategies and mindfulness meditation (psychological) and support from family, friends and community that is authentic and energising (social)

Question 30 Answer = C

The social and emotional wellbeing (SEWB) framework for wellbeing that encapsulates all elements of being (body, mind and emotions, family and kinship, community, culture, country, spirituality and ancestors) for Aboriginal and Torres Strait Islander people. Songlines is not an explicit dimension in the framework but is rather related to other elements such as culture.

Study design reference

ways of considering mental wellbeing, including levels of functioning; resilience, as the ability to cope with and manage change and uncertainty; and social and emotional wellbeing (SEWB), as a multidimensional and holistic framework for wellbeing that encapsulates all elements of being (body, mind and emotions, family and kinship, community, culture, country, spirituality and ancestors) for Aboriginal and Torres Strait Islander people

Question 31 Answer = A

Al is experiencing a phobia as he has a persistent and intense fear of flying, which has an impact on his daily functioning.

Study design reference

mental wellbeing as a continuum, with an individual's mental wellbeing influenced by the interaction of internal and external factors and fluctuating over time, as illustrated by variations for individuals experiencing stress, anxiety and phobia

Question 32 Answer = C

The repeated associations that Al is making between flying and negative experiences has likely strengthened his dislike of flying through long-term potentiation.

Question 33 Answer = B

Prior to an international flight, Al's doctor would be most likely to suggest he tries regulating his autonomic nervous system by learning slow, deep breathing techniques - this an application of the biological evidence-based intervention known as breathing retraining.

A and D are incorrect as short-acting anti-anxiety benzodiazepine agents (GABA agonists) are used in the management of phobic anxiety

B is incorrect as psychoeducation for family and friends is a social intervention.

Study design reference for questions 32 and 33

evidence-based interventions and their use for specific phobia, with reference to the use of short-acting anti-anxiety benzodiazepine agents (GABA agonists) in the management of phobic anxiety and breathing retraining (biological); the use of cognitive behavioural therapy (CBT) and systematic desensitisation as psychotherapeutic treatments of phobia (psychological); and psychoeducation for families/supporters with reference to challenging unrealistic or anxious thoughts and not encouraging avoidance behaviours (social)

Question 34 Answer = C

Correlations involve variables that have not been manipulated or controlled to describe the relationships/associations that exist between variables - correlational studies can be used to identify which factors may be of greater importance and to make predictions.

Question 35 Answer = D

A strength of conducting qualitative interviews is that they provide rich and detailed data from the participants' own words and expressions, which can reveal their underlying feelings and motivations. They usually gather subjective data.

Study design reference for questions 34 and 35

Key science skills

- determine appropriate investigation methodology: case study; classification and identification; controlled experiment (within subjects, between subjects, mixed design); correlational study; fieldwork; literature review; modelling; product, process or system development; simulation
 - evaluate investigation methods and possible sources of error or uncertainty, and suggest improvements to increase validity and to reduce uncertainty
-

Question 36 Answer = D

Adequate sleep is considered to be a biological protective factor for mental wellbeing.

Study design reference

the application of a biopsychosocial approach to maintaining mental wellbeing, with reference to protective factors including adequate nutritional intake and hydration and sleep (biological), cognitive behavioural strategies and mindfulness meditation (psychological) and support from family, friends and community that is authentic and energising (social)

Question 37 Answer = B

Self determination refers to people having control over their own lives, this can be achieved through supporting Aboriginal and Torres Strait Islander communities to make decisions about their own social, cultural and economic needs. It is integral for the maintenance of wellbeing in Aboriginal and Torres Strait Islander peoples.

C is incorrect as it is too broad for the concept described in the question.

Question 38 Answer = A

Cultural continuity as a determinant of wellbeing emphasises the importance of the passing down and practice of cultural knowledge and traditions from one generation to another.

Study design reference for questions 37 and 38

cultural determinants, including cultural continuity and self-determination, as integral for the maintenance of wellbeing in Aboriginal and Torres Strait Islander peoples

Question 39 Answer = C

Mindfulness meditation involves focusing one's mind on the present moment.

Question 40 Answer = B

An alternative psychological approach to reducing stress and enhancing mental wellbeing that Ranjini could use are cognitive behavioural strategies.

Study design reference for questions 39 and 40

the application of a biopsychosocial approach to maintaining mental wellbeing, with reference to protective factors including adequate nutritional intake and hydration and sleep (biological), cognitive behavioural strategies and mindfulness meditation (psychological) and support from family, friends and community that is authentic and energising (social)

**END OF SECTION A
ANSWERS**

Question 1a (5 marks)

- Somatic nervous system
- Sensory neurons in the Sam's eyes would detect the visual information of the video game and send the information to the brain
- The brain would process this information (as a voluntary, conscious response) and decide which buttons need to be pressed on the controller and then
- send a motor neural message via motor/efferent neurons to
- the (skeletal) muscles in Sam's hand/arm to press the buttons

Study design reference: the roles of different subdivisions of the central and peripheral nervous systems in responding to, and processing and coordinating with, sensory stimuli received by the body to enable conscious and unconscious responses, including spinal reflexes

Question 1b (3 marks)

- Sam's increased heart rate is triggered by the **fight-flight-freeze response**
- which indicates the **activation of the sympathetic division** of the autonomic nervous system,.
- This response involves the release of stress hormones, such as **adrenaline**, which stimulate the heart to beat faster, **preparing his body** for heightened physical and mental activity.

Study design reference: internal and external stressors causing psychological and physiological stress responses, including the flight-or-fight-or-freeze response in acute stress and the role of cortisol in chronic stress

Question 1c (2 marks)

- Long-term potentiation is the long-lasting (experience-dependent) strengthening of neural pathways associated with using the controller and playing the video game
- These pathways are repeatedly coactivated whenever Liane practises playing enabling LTP to occur

Study design reference: synaptic plasticity – resulting from long-term potentiation and long-term depression, which together act to modify connections between neurons (sprouting, rerouting and pruning) – as the fundamental mechanism of memory formation that leads to learning

Question 1d (1 mark)

- Implicit procedural memory

Study design reference: the roles of the hippocampus, amygdala, neocortex, basal ganglia and cerebellum in long-term implicit and explicit memories

Question 1e i (3 marks)

- Antecedent: Homework
- Behaviour: Completing homework before due date
- Consequence: Extra game time

Question 1e ii (1 mark)

- Positive reinforcement

Study design reference: behaviourist approaches to learning, as illustrated by classical conditioning as a three-phase process (before conditioning, during conditioning and after conditioning) that results in the involuntary association between a neutral stimulus and unconditioned stimulus to produce a conditioned response, and operant conditioning as a three-phase process (antecedent, behaviour and consequence) involving reinforcement (positive and negative) and punishment (positive and negative)

Question 2a (3 marks)

Research hypothesis should include

- the accurate IV (which includes both eating at least 470g of fruit and vegetables daily AND consuming less than 230g of fruit and vegetables daily)
- the correct identification of an accurate dependent variable (DV) (stress levels - this was not operationalised (the way it was measured was not specified) in the information provided however as the question states “possible” a student may have chosen to state how stress could be measured - this was NOT necessary)
- a clear direction – 470g+ = lower stress

Study design reference: Key science skill - formulate hypotheses to focus investigations

Question 2b (3 marks)

Any one of:

- Within subjects:
 - Ensures that the results of the experiment are more likely due to the manipulation of the independent variable than any differences between participants that would occur if they were in separate groups.
 - ie. it is more likely to be measuring how stress levels are affected by the amount of fruit and veg intake rather than individual participant differences such as their job, family circumstances,
 - Good for real-world settings and phenomena,
 - ie it is good for measuring the impact of diet on stress because stress levels could be measured before a change in diet and after the same participants increase their fruit and veg intake
- Between subjects
 - May be less time-consuming than within-subjects design as different participants can complete the different conditions simultaneously and procedures do not need to be repeated.
 - ie. may be less time-consuming than within subjects because the researchers can be measuring and comparing two groups (less / more fruit & veg) at the same time
 - Does not create order effects.
 - ie. there won't be carry over/longer lasting effects on stress from consuming less/more fruit and veg to the other condition, as would be the case with a within subjects design
- Mixed design
 - Allows experimenters to compare results both across experimental conditions and across individuals/participants/ groups over time.
 - ie. this would allow experimenters to compare the effects on stress of different amounts of fruit and veg consumption over time

Study design reference: Key science skills

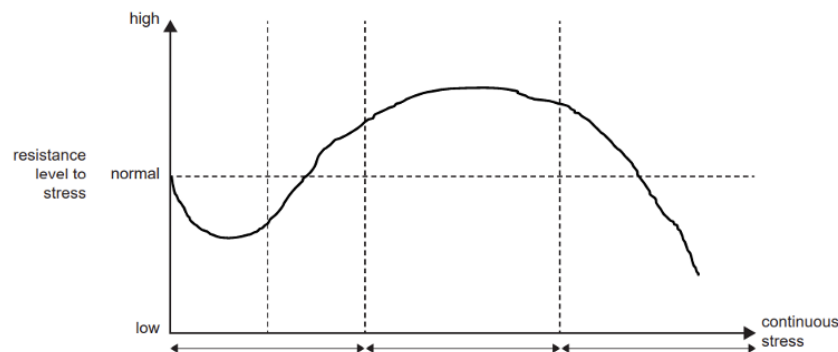
- determine appropriate investigation methodology: case study; classification and identification; controlled experiment (within subjects, between subjects, mixed design); correlational study; fieldwork; literature review; modelling; product, process or system development; simulation
 - evaluate investigation methods and possible sources of error or uncertainty, and suggest improvements to increase validity and to reduce uncertainty
-

Question 2c i (1 mark)

- Chronic stress

Study design reference: internal and external stressors causing psychological and physiological stress responses, including the flight-or-fight-or-freeze response in acute stress and the role of cortisol in chronic stress

Question 2c ii (1 mark)



Graph must:

- indicate a dip in the normal levels of resistance to stress in the ‘alarm/shock’ stage,
- a rise in resistance level in the ‘resistance’ stage and
- another dip in resistance level in the ‘exhaustion’ stage (lower than in the alarm stage).
- Start at the ‘normal’/origin line
- Show the level of resistance increases above normal BEFORE the graph entered stage 2, resistance

The graph is adapted from the 2021 VCAA exam report.

<https://www.vcaa.vic.edu.au/assessment/vceassessment/past-examinations/Pages/psychology.aspx>

Question 2c iii (3 marks)

- This is explained by the **exhaustion stage** of GAS (when a person’s resistance levels to stress drops below normal)
- Long term/Chronic stress results in **physiological resources** having been **depleted**
- as systems had been operating at an elevated rate, for example a person’s heart can be weakened by the elevated heart rate for an extended period of time

The following is an example of a high-scoring response.

A person with long-term, unmanaged stress is likely to experience the exhaustion stage of the GAS model. A person’s heart has been operating at a higher rate as their body tries to resist the stressor, this has resulted in weakening of the heart (wear and tear on his heart) and it has become damaged leading to heart disease.

Study design reference: the explanatory power of Hans Selye’s General Adaptation Syndrome as a biological model of stress, including alarm reaction (shock/counter shock), resistance and exhaustion

Question 2d (2 marks)

- Physiological measures include:
 - Heart rate
 - Cortisol levels
- Psychological measures include:
 - Self reports such as stress rating scales

Study design reference: internal and external stressors causing psychological and physiological stress responses, including the flight-or-fight-or-freeze response in acute stress and the role of cortisol in chronic stress

Key science skill - design and conduct investigations; select and use methods appropriate to the investigation, including consideration of sampling technique (random and stratified) and size to achieve representativeness, and consideration of equipment and procedures, taking into account potential sources of error and uncertainty; determine the type and amount of qualitative and/or quantitative data to be generated or collated

Question 2e i (1 mark)

Vagus nerve

Question 2e ii (1 mark)

Afferent / sensory

Question 2e iii (4 marks)

- The GBA is the bidirectional connection between the gut and the brain through the enteric and central nervous systems
- This means that the health of our gut microbiota (the microorganisms that live in our gut) can influence our brain and psychological processes
- A healthy diet, consisting of a range of fruit and veg, has been found to increase the diversity of our microbiota
- This in turn results in better gut health and the associated decrease in stress as seen by The findings which “revealed people who ate at least 470 grams of fruit and vegetables daily had 10 per cent lower stress levels than those who consumed less than 230 grams”

Study design reference: the gut–brain axis (GBA) as an area of emerging research, with reference to the interaction of gut microbiota with stress and the nervous system in the control of psychological processes and behaviour

Question 3 (2 marks)

- Observational learning focuses on the relationship between a model and the learner
- whereas the process of learning for Aboriginal and Torres Strait Islander peoples is deeply embedded in a system of relationships/not just a learner/teacher relationship. (Relationships between concepts, learner and teacher, individuals, families, and communities, between all of the above and Country.)

Study design references:

- social-cognitive approaches to learning, as illustrated by observational learning as a process involving attention, retention, reproduction, motivation and reinforcement
 - approaches to learning that situate the learner within a system, as illustrated by Aboriginal and Torres Strait Islander ways of knowing where learning is viewed as being embedded in relationships where the learner is part of a multimodal system of knowledge patterned on Country
-

Question 4a (1 mark)

Hippocampus

Question 4b (4 marks)

- Possible imagined futures are hypothetical experiences and situations that an individual has the ability to create and conceptualise in their mind
- Episodic and semantic memory are also involved in constructing possible imagined futures
- As the hippocampus plays a role in retrieving episodic memories
- Marjorie, with AD, would be likely have an impaired ability to create a possible imagined future of being at the beach with a response that is more semantic (factual) in nature / less episodic (personal) in nature

Student design reference:

- the role of episodic and semantic memory in retrieving autobiographical events and in constructing possible imagined futures, including evidence from brain imaging and post-mortem studies of brain lesions in people with Alzheimer's disease and aphasia as an example of individual differences in the experience of mental imagery
 - the roles of the hippocampus, amygdala, neocortex, basal ganglia and cerebellum in long-term implicit and explicit memories
-

Question 5a (2 marks)

- Within subjects design
- where all 10 participants experience all levels of the IV/all experimental conditions - partial sleep deprivation and total sleep deprivation

Study design reference: Key science skills

- determine appropriate investigation methodology: case study; classification and identification; controlled experiment (within subjects, between subjects, mixed design); correlational study; fieldwork; literature review; modelling; product, process or system development; simulation
-

Question 5b (2 marks)

- The standard deviations measure of the variability of a set of scores or values within a group, indicating how narrowly or broadly they deviate from the mean.
- SDs of 3.1 and 2.7 indicate that there was a similar spread of scores from each of the means for both the partial sleep deprivation and total sleep deprivation groups

Study design reference: Key science skill - process quantitative data using appropriate mathematical relationships and units, including calculations of percentages, percentage change and measures of central tendencies (mean, median, mode), and demonstrate an understanding of standard deviation as a measure of variability

Question 5c (2 marks)

- The independent variable was sleep deprivation
- Elijah manipulated it by having one condition where the participants were partially sleep deprived (with 4 hours of sleep the previous night) and one condition where they were totally sleep deprived before doing the memory test

Question 5d (2 marks)

- Elijah's teacher is suggesting this so that there is a control group in the study
- This will act as a baseline for comparison and allow Elijah to determine the effect of sleep deprivation on memory

Study design reference: Key science skill - identify independent, dependent and controlled variables in controlled experiments

Question 5e (2 marks)

- Personal error
- The experiment should be repeated correctly / Elijah should use the correct list to calculate the participants' scores (Personal errors should not be included in reporting and analysis of data)

Study design reference: Key science skill - identify and analyse experimental data qualitatively, applying where appropriate concepts of: accuracy, precision, repeatability, reproducibility and validity; errors; and certainty in data, including effects of sample size on the quality of data obtained

Question 5f (3 marks)

- On the day when the participants had only 4 hours of sleep, they recalled an average of 12.2 words. However, when they had a total sleep deprivation, the average number of words recalled was only 6.1.
- Based on these results, it can be suggested that Elijah's findings were consistent with his likely prediction that greater sleep deprivation would have a greater negative impact on memory functioning
- as sleep deprivation is associated with the cognitive effect of impaired memory

Study design reference:

- Key science skill - predict possible outcomes of investigations
 - Key science skill - evaluate data to determine the degree to which the evidence supports or refutes the initial prediction or hypothesis
 - the effects of partial sleep deprivation (inadequate sleep either in quantity or quality) on a person's affective, behavioural and cognitive functioning, and the affective and cognitive effects of one night of full sleep deprivation as a comparison to blood alcohol concentration readings of 0.05 and 0.10
-

Question 6a (2 marks)

Either one of:

- One cognitive bias that Kareem might be exhibiting is catastrophic thinking.
- This bias involves the tendency to perceive situations as much worse or more dangerous than they actually are. In Kareem's case, he may have a heightened fear of heights due to his catastrophic thinking, constantly imagining worst-case scenarios such as falling and breaking a leg. This leads to an overestimation of the potential risks associated with heights, further perpetuating his phobia.
- Kareem may exhibit a memory bias.
- This bias involves selectively recalling and focusing on information that reinforces existing beliefs or fears. In the context of his phobia, Kareem is more likely to remember and recall instances or stories of accidents or negative experiences related to heights, while downplaying or forgetting instances where heights were experienced without any harm. This selective memory bias reinforces his belief that heights are inherently dangerous, further perpetuating his phobia.

Study design reference:

the relative influences of factors that contribute to the development of specific phobia, with reference to gamma-amino butyric acid (GABA) dysfunction and long-term potentiation (biological); behavioural models involving precipitation by classical conditioning and perpetuation by operant conditioning, and cognitive biases including memory bias and catastrophic thinking (psychological); and specific environmental triggers and stigma around seeking treatment (social)

Question 6b (5 marks)

Either one of

- **Systematic desensitisation**
- **1. Learning a relaxation technique:** Kareem would begin by learning and practicing a relaxation technique such as deep breathing, progressive muscle relaxation, or guided imagery. This step aims to help him achieve a state of calm and relaxation.
- **2. Development of a fear hierarchy:** Kareem and his therapist would work together to create a fear hierarchy, which is a list of situations or stimuli related to heights ranked from least (eg a picture of a tall building) to most anxiety-provoking (eg standing on top of a high-rise building)
- **3. Gradual/systematic exposure to increasingly fearful stimuli paired with practicing the relaxation technique:** Starting from the least anxiety-inducing item on the fear hierarchy, Kareem would be exposed to each item while practising the relaxation technique. For example, he might begin by looking at pictures or videos of heights while maintaining relaxation. As he becomes relaxed, he would progress to more challenging tasks such as visiting a low-level balcony or taking an elevator to an upper floor.
- **4. Continuation of the process until the most feared stimulus can be exposed without producing the fear response:** Kareem would continue to work through the fear hierarchy, gradually exposing himself to increasingly fear-provoking situations. With repeated practice and exposure, he would continue to apply the relaxation techniques and experience reduced anxiety responses. The goal is to reach a point where Kareem can confront the most feared stimulus, such as standing on a high-rise building, without experiencing an overwhelming fear response.

OR

- **Cognitive behavioural therapy**
- A psychologist can help Elijah **identify the maladaptive thoughts**, such as his catastrophic thinking/worst case scenario thinking in relating to heights,
- and encourage him to change his thinking/ **replace these thoughts** by considering more likely scenarios that could occur when confronted with heights
- **As he changes his thoughts, Elijah's maladaptive behaviours will likely also change**
- such as no longer avoiding heights

Study design reference: evidence-based interventions and their use for specific phobia, with reference to the use of short-acting anti-anxiety benzodiazepine agents (GABA agonists) in the management of phobic anxiety and breathing retraining (biological); the use of cognitive behavioural therapy (CBT) and systematic desensitisation as psychotherapeutic treatments of phobia (psychological); and psychoeducation for families/supporters with reference to challenging unrealistic or anxious thoughts and not encouraging avoidance behaviours (social)

Question 7a (4 marks)

Any two of:

- Sleep Duration: Sophia is likely to sleep about 16 hours a day to meet their high demands for sleep.
- Sleep is crucial for their growth, development, and overall well-being. The extended sleep duration allows Sophia to replenish their energy reserves and support rapid brain development during this critical stage of life.
- REM and NREM Sleep: Sophia is likely to have an equal distribution of approximately 50% REM sleep and 50% NREM sleep.
- This balance is essential for Sophia's cognitive and neurological development, as well as physical development. REM sleep, characterised by rapid eye movements, is linked to brain maturation, memory consolidation, and learning. NREM sleep, on the other hand, is associated with physical growth and restoration.
- Multiple Sleep Blocks: Sophia is likely to tend to sleep in multiple blocks of time and wake up frequently due to her unique sleep-wake cycles and feeding needs.
- This pattern is adaptive to their small stomach capacity and high metabolic demands. By waking up periodically, newborns can obtain frequent feedings to support their growth and meet their nutritional requirements.

Study design reference: differences in, and explanations for, the demands for sleep across the lifespan, with reference to total amount of sleep and changes in a typical pattern of sleep (proportion of REM and NREM)

Question 7b (3 marks)

- EEG
- This will detect, amplify and record the electrical activity of the brain, in the form of brain waves
- It will show lower levels of electrical activity (lower frequency/higher amplitude brainwaves) when someone is in deep sleep/NREM 3 which indicates better quality sleep

Other possible answers: EOG, EMG

Study design reference: sleep as a psychological construct that is broadly categorised as a naturally occurring altered state of consciousness and is further categorised into REM and NREM sleep, and the measurement of physiological responses associated with sleep, through electroencephalography (EEG), electromyography (EMG), electro-oculography (EOG), sleep diaries and video monitoring

Question 7c (2 marks)

- 6-8 hours of sleep per night
- 20% REM / 80% of sleep spent in NREM

Study design reference: differences in, and explanations for, the demands for sleep across the lifespan, with reference to total amount of sleep and changes in a typical pattern of sleep (proportion of REM and NREM)

Question 8 (10 marks)

Responses are marked holistically using the following criteria:

- identification and explanation of appropriate psychological terminology in novel and unfamiliar contexts
- analysis and discussion of relevant psychological information, ideas and/or concepts and the connections between them
- analysis and evaluation of data, and/or scientific methodologies and methods, and/or models, and/or theories
- construction of evidence-based arguments and/or drawing of conclusions and/or discussion of implications and findings

Responses are eligible for at least five marks if they refer to:

- delayed sleep phase syndrome [DSPS]
- the involvement of internal biological mechanisms for the regulation of sleep-wake patterns
- possible treatment
- possible strategies

Study design reference:

- regulation of sleep-wake patterns by internal biological mechanisms, with reference to circadian rhythm, ultradian rhythms of REM and NREM Stages 1–3, the suprachiasmatic nucleus and melatonin
 - changes to a person's sleep-wake cycle that cause circadian rhythm sleep disorders (Delayed Sleep Phase Syndrome [DSPS], Advanced Sleep Phase Disorder [ASPD] and shift work) and the treatments of circadian rhythm sleep disorders through bright light therapy
 - improving sleep hygiene and adaptation to zeitgebers to improve sleep-wake patterns and mental wellbeing, with reference to daylight and blue light, temperature, and eating and drinking patterns
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Sample answer:

Understanding Delayed Sleep Phase Syndrome (DSPS): A Guide to Better Sleep

This pamphlet aims to provide you with essential information about Delayed Sleep Phase Syndrome (DSPS), a sleep disorder that affects your sleep-wake schedule. By understanding the involvement of internal biological mechanisms, possible treatments, and strategies to improve your sleep, you can take proactive steps towards achieving better sleep and overall well-being.

Understanding DSPS:

1. Sleep-Wake Regulation: Your sleep-wake patterns are regulated by an internal biological clock known as the circadian rhythm. In DSPS, there is a misalignment between your circadian rhythm and the desired sleep schedule, causing a delay in the timing of sleep.
2. Involvement of Internal Biological Mechanisms: The suprachiasmatic nucleus (SCN) in your brain plays a crucial role in regulating your circadian rhythm. It receives light signals from the environment, which helps synchronise your sleep-wake cycle. Melatonin, a hormone released by the pineal gland, also plays a role in promoting sleep.

Symptoms of DSPS:

- Difficulty falling asleep at a "normal" bedtime.
- Strong urge to stay awake until the early hours of the morning.
- Difficulty waking up early in the morning, often leading to fatigue and poor performance during the day.

Treatment and Strategies for Better Sleep:

1. Bright Light Therapy: Exposing yourself to bright light, particularly in the morning, can help shift your circadian rhythm earlier. Light boxes or dawn simulators can be used to mimic natural daylight and regulate your sleep-wake cycle.
2. Sleep Hygiene: Implementing good sleep habits can significantly improve your sleep quality. This includes maintaining a consistent sleep schedule, creating a conducive sleep environment that is cool and free of distractions, avoiding stimulating activities before bed, and practising relaxation techniques.
3. Adaptation to Zeitgebers: Incorporating external cues, such as meal times, exercise, and social activities, into your daily routine can help regulate your circadian rhythm and promote better sleep.

Understanding DSPS and its impact on your sleep-wake schedule is the first step towards improving your sleep and overall well-being. By utilising treatment options such as bright light therapy, practising good sleep hygiene and adapting to external cues you can take control of your sleep and establish a healthier sleep routine. Remember, it is important to consult with your healthcare provider for an accurate diagnosis and personalised treatment plan.

**End of 2023 Kilbaha VCE Psychology Units 3 and 4 Trial Examination
Suggested Answers**

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