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Unit 3 Trial Exam 2023 – Assessment Guide

Section A

VCAA Key Knowledge

Question

Answer guide

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-aminobutyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity

Question 1

Which of the following is accurate about the role of glutamate in neural communication?

- A. glutamate is the only excitatory neurotransmitter in the central nervous system
- B. glutamate makes the pre-synaptic neuron more likely to fire
- C. as more glutamate is released, the synaptic connection is strengthened
- D. glutamate is an antagonist which makes the post-synaptic neuron less likely to fire

C *Glutamate plays a key role in long-term potentiation, strengthening synaptic connections.*

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-aminobutyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity

Question 2

Which of the following about neuromodulators is false?

- A. they influence the activity of other neurotransmitters
- B. dopamine and serotonin are neuromodulators
- C. they exert their influence over a shorter time period than neurotransmitters
- D. they do not release their chemical message into a single synapse

C *Neuromodulators exert their influence over a longer time than neurotransmitters. All other items are true.*

Use the following information to answer Questions 3 and 4.

Gabe loves to watch horror movies; however, afterwards, it always takes him some time to calm down as he feels 'jittery.'

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 3

Which division of the autonomic nervous system is dominant after the movie as Gabe is calming down?

- A. parasympathetic nervous system
- B. sympathetic nervous system
- C. somatic nervous system
- D. central nervous system

A *Calming the body down after a high level of arousal is the role of the parasympathetic nervous system.*

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 4

During the horror movie, which of the following are most likely to be occurring in Gabe's body?

- A. release of glucose from the liver, contracting pupils and increased sweating
- B. decreased salivation, increased heart rate and relaxation of bronchioles
- C. increased digestion, relaxation of bladder, increased breathing rate
- D. intestines relax, adrenaline released, gall bladder releases bile

B These are correct for sympathetic activation. A is incorrect as pupils dilate. C is incorrect as digestion will decrease. D is incorrect as the gall bladder will inhibit the release of bile.

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-aminobutyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity

Question 5

Which of the following is true about serotonin?

- A. it only has an excitatory effect on the post-synaptic neuron
- B. too much serotonin is problematic, but insufficient serotonin will not lead to any issues
- C. serotonin plays important roles in mood and sleep
- D. a lack of serotonin is the cause of motor issues in Parkinson's disease

C The processes modulated by serotonin include mood, appetite, memory, sleep and attention, among others. It has both inhibitory and excitatory effects as a neuromodulator. The right balance of serotonin is needed, as insufficient serotonin may lead to issues such as depression. It is a lack of dopamine that leads to motor symptoms in Parkinson's disease.

Use the following information to answer Questions 6 and 7.

Mason was once able to recite the periodic table of elements easily but has not used chemistry knowledge in years. When he tries to help his younger sister with her chemistry work, he finds that he cannot remember much.

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 6

Which of the following neural processes are most likely to be involved in Mason's forgetting?

	Synaptic strength	Change in connections
A.	long-term potentiation	sprouting
B.	long-term depression	rerouting
C.	long-term potentiation	proliferation
D.	long-term depression	pruning

D Both long-term depression and pruning are likely to take place in a situation where information is forgotten as these indicate a weakening/loss of that neural pathway.

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 7

Mason and his sister turn the first letters of the first nine elements into a silly, nonsensical word (HHeliBeBCNOF) to help to remember the elements. What technique have they used?

- A. method of loci
- B. an acronym
- C. an acrostic
- D. maintenance rehearsal

B Turning the first letter of each word into a pronounceable syllable/word results in an acronym.

Use the following information to answer Questions 8 and 9.

Mai reaches out for the light switch in the dark. Once her fingers find the switch, she turns it on.

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 8

Which divisions of the nervous system are involved in turning the switch on?

- A. the autonomic and semantic nervous systems
- B. the somatic and central nervous systems
- C. the parasympathetic nervous system and the spinal cord
- D. the sympathetic nervous system and the brain

B Voluntary movement, like reaching out to turn a switch on, involves the somatic and central nervous systems.

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 9

Which of the following describes the neuronal activity that occurs as soon as Mai's sensory receptors detect the sensation of the switch moving to its 'on' position?

- A. motor neurons detect the message while interneurons relay the message to the brain
- B. sensory neurons relay the message to the brain
- C. efferent neurons relay the message to sensory receptors
- D. afferent neurons relay the message to skeletal muscles

B Once the sensory receptors detect the sensation of the light switch, the sensory information will travel via sensory neurons to the brain.

Use the following information to answer Questions 10 – 12.

Ramon is feeling under pressure as he is very busy at work and his mother needs additional care after having recently broken her wrist. Ramon has been struggling to finish his work in time to leave and visit his mother to cook her dinner and ensure that she has what she needs. Adding to his stress is his worry that his work is not good enough and that he is a bad son.

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 10

Ramon is very tired during the day, especially after several nights of poor sleep. This fatigue could be considered to be a

- A. primary appraisal.
- B. secondary appraisal.
- C. psychological stress response.
- D. physiological stress response.

D Poor sleep/fatigue is best described as a physiological stress response.

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

Question 11

Ramon organises for his mother to have a meal delivery service, allowing his mother to eat on time without Ramon having to leave work early. He can then visit and make sure his mother has all that she needs. This is an example of

- A. context-specific effectiveness.
- B. shock to the stressor.
- C. avoidance coping.
- D. eustress.

A *Finding a way of coping that is a good fit for the problem that is causing the stress demonstrates context-specific effectiveness.*

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 12

Which of the following appropriately describes the sources of stress for Ramon?

	Internal stressor	External stressor
A.	tasks at work	needing to cook
B.	worry about his work	caring for his mother
C.	guilt for being a bad son	help from other family members
D.	worry about his mother	worry about being a good employee

B *Worry about work is internal, as it is a thought process. Caring for his mother is external, as it is a responsibility external to the person.*

Use the following information to answer Questions 13 – 15.

Eric has an upcoming work trip to Sydney where he must present a progress update on a big project that he has been working on.

During a weekend indoor soccer match, he slipped and broke his ankle. Eric is now very worried about how he will manage to fly up to Sydney with his crutches and whether he will perform well in his presentation.

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 13

Which of the following is a primary appraisal that Eric might make about doing the presentation after he breaks his ankle?

- A. it is stressful and a threat as he is worried about whether he will perform well
- B. it is a loss as he has already hurt his chances at presenting well
- C. it is a challenge and harm/loss as there is the opportunity to prove what he can do
- D. it is benign-positive as he does not necessarily need to stand for the presentation

A *Eric is worried about the future impact of his injury on his work; therefore, a threat is the most likely appraisal.*

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 14

Which is the most likely secondary appraisal for Eric?

- A. that he should use avoidance strategies
- B. that he has the resources to cope
- C. that he does not have the resources to cope
- D. that he should use approach strategies

C *Eric is concerned about managing with crutches and his ability to complete the presentation, suggesting that he believes that he does not have the resources to cope.*

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

Question 15

Eric phones the airline and ensures that they can help him with his bags and getting on and off the plane. He also emails a colleague in Sydney to ask them to help set up the presentation. Eric is demonstrating

- A. approach strategies.
- B. avoidance strategies.
- C. emotion focused coping.
- D. repression.

A *Eric has taken action to deal directly with the problems of how he will manage flying and deliver the presentation.*

Use the following information to answer Questions 16 and 17.

Hannah, who is four, attended her older sister's basketball match. She does not like loud noises and flinches every time the whistle blows. Since then, Hannah dislikes basketballs and flinches every time her sister walks into the room holding her basketball.

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 16

Which of the following statements most correctly summarises the acquisition phase for Hannah's learnt response?

- A. the repeated presentation of the loud whistle just before the basketball has led to flinching
- B. the repeated presentation of the basketball immediately followed by the loud whistle has led to flinching
- C. the repeated association of her sister and the basketball has led to flinching
- D. the continuous presentation of the loud whistle and her sister has created a flinching response

B *Acquisition involves a neutral stimulus (basketball) repeatedly being followed by an unconditioned stimulus (loud whistle).*

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 17

Which of the below accurately summarises the elements for Hannah's learning?

	Neutral stimulus	Unconditioned stimulus	Conditioned response
A.	the loud whistle	flinching from loud whistle	the basketball
B.	the basketball	the loud whistle	flinching upon hearing the loud whistle
C.	the basketball	the loud whistle	flinching upon seeing the basketball
D.	the loud whistle	the basketball	running away

C *The neutral stimulus is the basketball as it did not originally produce flinching. The loud whistle is the unconditioned stimulus as this produces the flinching. The conditioned response is flinching to the basketball.*

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 18

Which of the following is correct about classical conditioning?

- A. it always involves a voluntary response
- B. it always requires repeated exposure to conditioned stimuli
- C. the learner is passive in the learning process
- D. the learnt response is permanent

C *The learner is passive in classical conditioning because they do not need to initiate a behaviour in order for learning to occur (unlike in operant conditioning).*

Use the following information to answer Questions 19 and 20.

Ita is learning to play the cello. She finds her teacher to be a lot of fun; she always starts the lesson with funny stories about cellos and, when teaching, demonstrates her technique, stopping regularly to check that Ita has understood. Ita enjoys her lessons, but her fingers cannot yet move quickly enough to form all of the positions that are needed. Her teacher tells Ita not to worry because, as she grows, she will be able to do more.

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

Question 19

As per observational learning, the teacher being a lot of fun and beginning with a funny story are helpful for Ita's learning in terms of

- A. negative reinforcement.
- B. attention.
- C. reproduction.
- D. pruning.

B *Attention involves the learner closely watching the model. This is more likely to occur if the model is valued by the learner (such as being entertaining).*

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

Question 20

Which of the following stages of observational learning is not evident for Ita when her fingers do not yet move sufficiently quickly to form all of the positions that are needed?

- A. reinforcement
- B. attention
- C. reproduction
- D. motivation

C Reproduction is the ability to perform the actions. Ita does not have this ability as her fingers cannot move quickly enough.

Use the following information to answer Questions 21 – 23.

Dania is learning her lines for the play that she will be performing by carefully reading over them. Then, Dania thinks about times that she has experienced something similar and links the lines of the play to those experiences. After a week, Dania finds that she has effectively learnt the lines and can recite them with ease.

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 21

In relation to the Atkinson-Shiffrin multi-store model of memory, which of the following is correct?

- A. the lines are held in her iconic memory for 0.2 – 0.4 seconds until she pays attention to them
- B. the lines are held in her echoic memory for three to four seconds until she rehearses them
- C. the lines are stored in her short-term memory for 12 – 30 seconds before she pays attention to them
- D. the lines are held in her sensory memory for an infinite amount of time before she pays attention to them

A As Dania is reading the lines to learn them, iconic memory is the appropriate type of sensory memory. Information is transferred to short-term memory through paying attention to the information.

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 22

When Dania thinks about the times that she has experienced something similar and links the lines to those experiences, she is undergoing

- A. maintenance rehearsal.
- B. context specific cues.
- C. memory retrieval.
- D. elaborative rehearsal.

D Linking new information to information that is already in one's long-term memory is a way of achieving elaborative rehearsal.

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 23

When Dania recalls her lines, she is

- A. retrieving them from short-term memory for their use in her sensory memory.
- B. reconstructing her memory of the play in her short-term memory.
- C. simultaneously re-encoding them into her long-term memory.
- D. retrieving them from long-term memory for their use in her short-term memory.

D To remember information and bring it to our conscious awareness, we retrieve the information from long-term memory for use within our short-term memory.

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 24

Aboriginal and Torres Strait Islander peoples' ways of knowing are least likely to view the process of learning as

- A. independent of relationships within the community.
- B. patterned on Country.
- C. occurring through multiple modalities.
- D. being embedded in relationships.

A Learning is most likely to be viewed as embedded in relationships within the community, not independent of them.

Use the following information to answer Questions 25 and 26.

Simon can remember his first day of high school clearly. He remembers his nervousness and the excitement of the day and how he first met his friends in the school canteen at recess. He can also remember the top five countries by population that he learnt in geography class that year.

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 25

Simon's memory of his first day of high school is what type of memory?

- A. explicit emotional memory
- B. implicit semantic memory
- C. implicit long-term memory
- D. explicit episodic memory

D Simon's memory of his personal experience is an explicit episodic memory, as this life experience can be consciously retrieved.

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 26

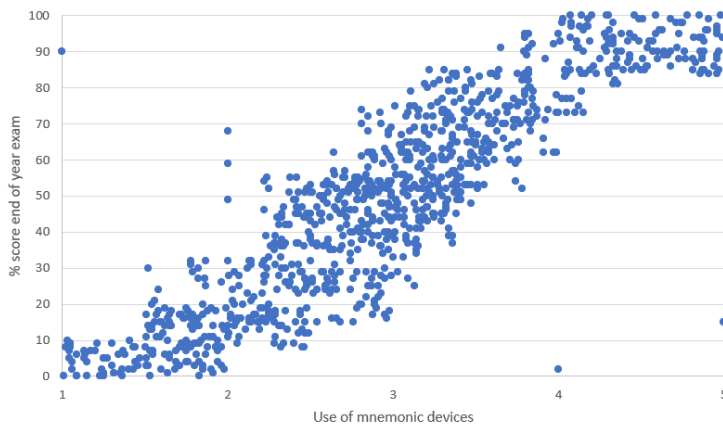
Simon's memory of the top five countries by population is an example of

- A. procedural memory.
- B. semantic memory.
- C. implicit memory.
- D. episodic memory.

B The list of countries by population is factual knowledge; therefore, semantic memory is involved.

Use the following information to answer Questions 27 – 29.

Atkinson University wishes to investigate the relationship between the use of mnemonic devices and academic success. They ask 1000 first-year uni students how much they make use of a variety of mnemonic devices (using a 10-item scale of 1-5, where 1 indicates that they have ‘never used the mnemonic technique’ and 5 indicates that they ‘always use the mnemonic technique’). This data was then plotted in the below graph against the students’ scores for their end-of-year exams.



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 27

What type of study is being conducted?

- A. a controlled experiment
- B. a mixed design
- C. a correlational study
- D. modelling

C This is an attempt to understand the relationship between using mnemonic devices and academic success without systematically manipulating an independent variable; therefore, it is a correlational study.

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 28

This approach to studying variables allows the researcher to

- A. establish a cause-and-effect relationship between the variables.
- B. describe the degree of a relationship between two variables.
- C. collect rich and detailed data over an extended period.
- D. prove that one variable leads to a certain outcome.

B Correlational studies describe the degree of a relationship between variables; correlation does not equal causation.

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 29

What can be concluded from the graph above?

- A. a weak cause-and-effect relationship between the use of mnemonic devices and the percentage score on the end of year exam.
- B. a strong cause-and-effect relationship between the use of mnemonic devices and the percentage score on the end of year exam.
- C. a negative correlation between the use of mnemonic devices and the percentage score on the end of year exam.
- D. a positive correlation between the use of mnemonic devices and the percentage score on the end of year exam.

D The graph depicts a positive correlation.

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 30

Sammy has recently started learning the piano. In order to remember the notes, his teacher uses some acrostics. Which of the following could be an acrostic Sammy uses?

- A. Every Good Boy Deserves Fruit
- B. FACE
- C. a jingle created about faces, in order to remember FACE
- D. picturing an E drawn on the floor, picturing a G on the pedals of the piano, picturing a B on the keys of the piano, picturing a D on the music stand, picturing an F on the top of the piano

A An acrostic uses the first letter of each item to create a sentence as a memory aid. A is an example of this.

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 31

A researcher wishes to investigate the relationship between heart rate and stress. They expose participants to a stress test and measure their heart rate by manually taking their pulses (by using a stopwatch and holding fingers over participants' pulses) before and after the stress test. Which of the following correctly identifies examples of repeatability and reproducibility for a subsequent study?

	Repeatability	Reproducibility
A.	similar increases in heart rate found in response to the same stress test	similar increases in heart rate as measured with a heart rate monitor in response to the same stress test
B.	differing changes in heart rate as measured with a heart rate monitor in response to a different stress test	differing changes in heart rate found in response to the same stress test
C.	similar increases in heart rate in response to a novel stressful situation	similar increases in heart rate found in response to the same stress test
D.	similar increases in heart rate as measured with a heart rate monitor in response to the same stress test	similar increases in breathing rate in response to a different stress test

A *A similar increase in pulse found in response to the same stress test utilises the same measurement and conditions; thus, repeatability is demonstrated. A similar increase using a heart rate monitor (which utilises changed conditions of measurement) demonstrates reproducibility.*

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

Question 32

Brain imaging studies in people with early-stage Alzheimer's disease show a loss of hippocampal volume. During later stages of the illness, the damage spreads to the pre-frontal cortex and other areas of the neocortex. Which of the following correctly shows the likely symptoms for a person suffering with Alzheimer's disease due to damage in the respective areas?

	Hippocampus	Neocortex
A.	not remembering who they are	forgetting how to tie shoelaces
B.	not recognising their childhood friend	forgetting that the water is running
C.	not remembering the new doctor who they met yesterday	forgetting the name of one of their colleagues
D.	forgetting their wedding	forgetting where they live

C *Not remembering the new doctor is a failure to encode a new long-term memory, due to damage to the hippocampus, whereas forgetting the name of one of their colleagues likely results from a problem retrieving a previously stored memory due to damage in the neocortex.*

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 33

Which of the following best describes autobiographical memory?

- A. memory that stores knowledge of how to complete tasks
- B. memory that stores emotional responses to stimuli
- C. memory that stores knowledge of personally experienced events
- D. memory that enables performance of a series of movements

C *Autobiographical memory is a form of memory that stores knowledge of personally experienced events.*

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 34

Which of the following statements about autobiographical memory is false?

- A. it includes episodic components
- B. the nature of this type of memory can change over the lifespan
- C. all individuals show a similar capacity for autobiographical memory
- D. it involves the hippocampus

C *The capacity for autobiographical memory can vary greatly between individuals; for example, people with aphantasia tend to report severely deficient autobiographical memory.*

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 35

Which of the following is correct in distinguishing between the investigation methodologies of classification and identification?

- A. classification is the process of recognising items as belonging to particular sets, whereas identification is the grouping of items into manageable sets
- B. classification utilises a within subjects design, whereas identification utilises a between subjects design
- C. classification involves the construction of a process, whereas identification involves the design of a model
- D. classification is the grouping of items into manageable sets, whereas identification is the process of recognising items as belonging to particular sets

D *Classification is the arrangement of items (phenomena, objects or events) into manageable sets, whereas identification is a process of recognition of phenomena as belonging to particular sets.*

Section B

VCAA Key
Knowledge

Question

Answer guide

Evie is in Year 10 and food technology is her favourite subject. She is one of the most competent students in the class and really enjoys cooking as well as creating new recipes. This wasn't always the case though; when she first started the classes, she couldn't chop an apple, but she can now chop like an expert.

Evie can remember her first lesson in Year 7 when she burnt her fingers on the boiling water while they were cooking pasta. The water splashed onto her hand and, before she knew what had happened, she had dropped the saucepan into the sink and the pasta went everywhere. She remembers that day so clearly as she felt very embarrassed.

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 1a (4 marks)
Name and describe the nervous system response involved when Evie dropped the saucepan.

Answer:

- *Dropping the saucepan (via the hand-withdrawal reflex) was a spinal reflex.*
- *The sensory receptors in her hand detected the heat and the message travelled along sensory (afferent) neurons to the spinal cord.*
- *Interneurons in the spinal cord relayed the response to...*
- *... motor (efferent) neurons, which carried the message to her skeletal muscles in the hand to withdraw from the hot liquid.*

Marking protocol:

One mark for each of the above points.

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 (2 marks)
With reference to the type of responses involved, explain why Evie dropped the saucepan 'before she knew what had happened.'

Answer:

- *Spinal reflexes are an unconscious response that occurs without the involvement of the brain.*
- *The conscious response of realising what had happened would have involved the brain receiving and processing the sensory information, which takes longer than Evie's spinal reflex/unconscious response.*

Marking protocol:

One mark for each of the above points.

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 1c (3 marks)
Describe how long-term potentiation is involved in Evie learning how to chop food expertly.

Answer:

- *As Evie practised over the years of food technology classes, the neural networks/pathways that are involved in chopping have been repeatedly stimulated.*
- *This has strengthened the synaptic connections that are used in the neural pathways responsible for chopping food.*
- *These strengthened neural pathways result in her more easily accessing the memory of how to chop, shown in her improved performance of the skill.*

Marking protocol:

One mark for each of the above points.

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

Question 1d (2 marks)

With reference to two brain areas that are involved, explain why Evie remembers the first food technology lesson so well.

Answer:

- *Evie's experience of burning her fingers would have involved significant fright, which would have activated the amygdala, which plays a key role in emotional processing (particularly when heightened emotions such as fear/fright are experienced).*
- *Her amygdala would have signalled to the hippocampus that the memory was significant and so the hippocampus would have encoded the episode well.*

Marking protocol:

One mark for each of the above points.

Greta and Imi enjoy attending yoga classes together. They have been going for months, but, more recently, Imi has started making excuses so as not to attend. When Greta asks Imi about this, she admits that she hasn't enjoyed the classes since the instructor started beginning and ending the classes with visualisation exercises. She says these types of exercises are incredibly frustrating as she is unable to visualise anything in her mind, even though she tries.

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 2a (1 mark)

Name the condition that Imi is describing.

Answer:

- *Aphantasia.*

Marking protocol:

One mark for the above point.

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

Question 2b (2 marks)

Identify and explain the type of coping strategy that Imi is using.

Answer:

- *Imi is using an avoidance strategy.*
- *By not attending the classes, she fails to deal with the problem of the visualisation exercises not being suitable for her.*

Marking protocol:

One mark for each of the above points.

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

Question 2c (3 marks)

How could Imi demonstrate coping flexibility in dealing with the problem involving the yoga class?

Answer:

- *Imi needs to evaluate her response to the situation, and recognise that not attending the classes is not an effective strategy as she misses out on an activity that she enjoys with her friend.*
- *As part of this evaluation, she should abandon her avoidance strategy and stop avoiding yoga class.*
- *Imi can try a more effective strategy like explaining to the teacher that the visualisations are not suitable for her and asking for a different mediation to complete.*

Marking protocol:

One mark for each of the above points. Note: Applications to the scenario may vary, but the answer must clearly identify an evaluation of current strategies, that she should abandon any ineffective strategies, and that she should try a new strategy for full marks.

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

Question 2d (2 marks)

List two key brain areas that are involved in the implicit memory of the yoga movements.

Answer:

- *Cerebellum.*
- *Basal ganglia.*

Marking protocol:

One mark for each of the above points.

Skinner University is conducting research on the role of reinforcement in the speed of learning responses. They asked 100 university students to participate as part of their coursework who were then randomly allocated to one of two groups:

- Group A receives reinforcement in the form of a shopping voucher each time that they improved their time performing the task.
- Group B does not receive any reinforcement.

In both groups, participants are asked to type a 200-word excerpt of a university textbook using an old typewriter machine. Any participants with experience in using a typewriter are excluded from the study. Each participant completes the task four times, with the time that they take to complete the task recorded for each attempt. Below is a table of the mean results from each group.

	Trial 1	Trial 2	Trial 3	Trial 4
Group A	5.2 minutes	4.4 minutes	3.8 minutes	1.9 minutes
Group B	5.1 minutes	4.8 minutes	4.7 minutes	4.8 minutes

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 3a (4 marks)
Using the three-phase model of operant conditioning, outline the process of learning for Group A.

Answer:

- *Antecedent: being asked to perform the task.*
- *Behaviour: performing the task quickly.*
- *Consequence: receiving a shopping voucher.*
- *This consequence is an example of positive reinforcement due to the addition of a desirable stimulus (the shopping voucher); this will strengthen the behaviour and make participants in Group A more likely to perform the task quickly in future.*

Marking protocol:

One mark for each of the above points.

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 3b (3 marks)
Provide three reasons why this research can be considered a controlled experiment.

Answer:

- *It investigates the effect of an independent variable on a dependent variable by systematically manipulating the independent variable (receiving reinforcement or not receiving reinforcement).*
- *All other variables are controlled wherever possible (such as experience with using a typewriter), which is a hallmark of a controlled experiment.*
- *A control group is used; Group B is a control group which acts as a baseline for comparison against Group A which is subject to the intervention.*
- *Random allocation between the two groups was used.*

Marking protocol:

One mark for any of the above points, to a maximum of three.

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 3c (3 marks)

Identify the experimental design that has been used in this study, and justify your answer.

Answer:

- *This is a mixed design (which consists of both elements of within subjects and between subjects designs).*
- *It has a within subjects element, as each participant completes the task four times, and...*
- *...it also has a between subjects element as comparisons can be made between half of the participants that are exposed to the independent variable (of reinforcement) and the other half that are not (Group B; the control group).*

Marking protocol:

One mark for each of the above points.

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 4a (3 marks)

Caitlin is revising the multi-store model of memory. She plans to use the method of loci to memorise the three stores alongside their duration and capacity.

With the use of an example, describe how Caitlin can use the method of loci to help her remember the multi-store model of memory.

Answer:

- *Caitlin can use three locations with which she is very familiar (e.g. locations in her home or on her walk to school) and learn these in a sequential order to which she will link the information.*
- *Caitlin can then visualise each store in that location; for example, she could visualise the front door as sensory memory, the corridor as short-term memory, and the lounge as long-term memory.*
- *When Caitlin wants to recall the information, she can mentally visit these locations to cue the memory of the information.*

Marking protocol:

One mark for each of the above points. Note: any example of the use of the method of loci should be awarded marks.

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 4b (3 marks)

Outline three differences between the method of loci and Aboriginal peoples' use of songlines.

Answer:

- *Songlines are deeply tied to the land/embedded in Country, whereas the method of loci is not.*
- *Songlines use a greater layering of knowledge, whereas the method of loci has less depth.*
- *Songlines are created by communities, whereas the method of loci is generally created by individuals.*
- *Songlines cover vast amounts of complex information and, therefore, tend to cover more breadth than the method of loci.*
- *Songlines are integral to the culture of Aboriginal peoples, whereas the method of loci is not.*
- *Songlines have a narrative structure linked to Country, whereas the method of loci may involve a random selection of information or unlinked information.*
- *Songlines may be sung, whereas the method of loci is not.*
- *Songlines are used to transmit knowledge over generations and time, whereas the method of loci is used to remember information for a specific use or occasion.*
- *Songlines have been used for thousands of years, whereas the method of loci is a relatively recent practice (ancient Rome/Greece).*
- *Songlines can help to provide a sense of identity and belonging to Aboriginal peoples, whereas the method of loci does not.*
- *Songlines may consist of navigational routes holding information about significant landscape features and other cultural information, whereas the method of loci typically does not.*
- *Songlines may incorporate stories, songs, dances or ceremonies associated with each location, whereas the method of loci does not.*
- *The version of knowledge transmitted through songlines may differ depending on the audience, whereas this is not the case with the method of loci.*
- *Songlines may be a demonstration of the learner being part of a multimodal system of knowledge patterned on Country, whereas the method of loci does not represent this same complexity.*

Marking protocol:

One mark for each of the above points, to a maximum of three. Note: any other valid response should be awarded marks.

Happy Children Childcare Centre is partnering with a local university to conduct research on the impact of stress on their educators. They are particularly concerned about the increased amount of sick leave that their educators have needed over the past 12 months. They believe that the amount of stress that the workers have been experiencing is contributing to how often they fall sick. One of the factors that the centre's management believes to be contributing to the level of stress is the shortage of educators to cover shifts, which contributes to educators not taking sufficient meal breaks and time off.

The university interviews the educators and find some consistent concerns about how their work increases their stress levels. The following is a list of some of these factors:

- Shortening meal breaks to cover when other educators are unwell and, therefore, not eating proper meals.
- Not taking the usual amount of time off to recover when they have been unwell.
- Postponing their holiday leave as they understand the impacts it would have on their colleagues.

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

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

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 5 (10 marks)

Analyse the type of stressors that are present and how these may be impacting staff health and wellbeing.

With reference to a biological model of stress, explain the relationship between stress and illness and suggest how this may be affecting the educators.

With reference to the gut-brain axis, describe a possible relationship between educators not eating proper meals and the stress that they are experiencing.

Sample answer:

- *The childcare educators are exposed to external stressors (situations and events in the environment) due to the centre being short-staffed and not having enough breaks both during and between shifts. There are also some internal stressors that can result from the aforementioned circumstances, such as hunger, fatigue and worrying about work.*
- *These factors can result in chronic stress if they continue over a prolonged period. Prolonged stress is likely to be problematic for health and wellbeing; thus, the childcare centre management is correct in its concern that there may be a link between the stress their staff are experiencing and the incidence of illness, causing an increase in the amount of sick leave in the past 12 months.*
- *Hans Selye's General Adaptation Syndrome is a biological model of stress that shows the typical pattern of physiological responses to stress.*
- *The Alarm reaction stage occurs when a person first encounters a stressor; initially, there is a shock that causes the body to respond as if it is injured and resistance to the stressor drops. This is then followed by countershock where the body releases stress hormones to help cope with the stressor, increasing resistance to the stressor. Initially, this is comprised of adrenaline and noradrenaline as part of the fight/flight response, followed by cortisol. Initial shock and then countershock may occur when a childcare educator is unexpectedly called upon to cover for another colleague who is sick.*
- *In the Resistance stage, the body's resistance to a stressor rises above normal. Elevated levels of cortisol continue to circulate in the body, keeping energy levels high and physiological arousal slightly higher than normal. This may allow the childcare educators to feel sufficiently energetic to complete their work.*
- *Cortisol has several advantages in helping someone cope with stress; it energises the body by increasing blood sugar and enhancing metabolism. Whilst this is helpful in the short-term, if stress is prolonged, cortisol will also remain in the blood stream for a long time.*

- *One of the effects of prolonged exposure to cortisol is impaired immune function, which will, therefore, increase the educators' vulnerability to disease. This may result in minor illnesses during the resistance stage.*
 - *During the exhaustion phase, the educators' resistance to the stressor drops below normal as physiological resources are depleted.*
 - *Elevated levels of cortisol can lead to a greater likelihood of colds, flu, hypertension, digestive problems, obesity, heart problems and diabetes. This may well be occurring for the childcare educators as they seem to be becoming unwell more frequently.*
 - *The problem of them being unable to take enough time off to recover when they are unwell may result in minor illnesses that occur at the end of the resistance stage developing further into more serious illness. Not resting also makes it more likely that they will progress to the exhaustion stage, wherein more serious illnesses are more likely to occur.*
-
- *The gut-brain axis refers to the bidirectional pathway that connects the brain and the enteric nervous system; therefore, stress can upset our gastrointestinal tract, and an imbalance in our gastrointestinal tract can affect our mood, arousal, behaviour and cognition. The gut microbiota (comprising of all the microorganisms that are present in the gastrointestinal tract) are a key part of this communication circuit. Stress can impact the balance of microbiota, while a change in the microbiota can also influence the experience of stress.*
 - *For the childcare educators, feeling stressed may upset their balances of gut microbiota. The lack of meal breaks may also result in them not eating a healthy diet or not eating enough, potentially upsetting their microbiota and gastrointestinal tract. This, in turn, may increase their feelings of stress, sadness or irritation, and would likely further reduce physiological resources to cope with the stress. The imbalance in gut bacteria may also affect immune system functioning, further contributing to their susceptibility to illness. It seems that the amount of stress experienced by the educators is further increased by not giving them appropriate opportunities to eat nutritious foods which can improve their overall health and resilience to stress.*

Marking Protocol:

This answer is globally marked (i.e. an overall mark is awarded for the entire answer). The following criteria could be used to assess a response:

9-10 Outstanding	<ul style="list-style-type: none">• All elements of the question addressed to an outstanding standard.• An insightful, well-structured and comprehensive application of sources of stress, the GAS model and the gut-brain axis.• Appropriate and relevant links to the case study of the childcare centre are made.• Precise and effective use of appropriate psychological terminology; key terms/concepts could include: internal and external stressors, adrenaline, cortisol, immune system functioning, alarm, resistance, exhaustion, gut-brain axis, microbiota and gastrointestinal tract.
7-8 High	<ul style="list-style-type: none">• All elements of the question addressed to a high standard.• A thoughtful, detailed and relevant application of sources of stress, the GAS model and the gut-brain axis.• An appropriate application of the above concepts to the childcare educators.• Formal and appropriate psychological terminology is used throughout the response.
5-6 Medium	<ul style="list-style-type: none">• All elements of the question addressed to a satisfactory standard.• A relevant application of theories sources of stress, the GAS model and the gut-brain axis to the childcare educators.• Formal and appropriate psychological terminology is mostly used.
3-4 Low	<ul style="list-style-type: none">• Not all elements of the question are addressed or addressed correctly (e.g. the GAS model may not be described or no link is made between cortisol and susceptibility to illness).• A superficial application of theories (including some components of the GAS model) to explain the relationship between stress and illness for the childcare educators.• Limited formal and appropriate psychological terminology is used throughout the response.• Few links are made between psychological theory and the scenario.
1-2 Very low	<ul style="list-style-type: none">• A superficial attempt at the question.• An incomplete or inaccurate application of theories to explain the relationship between stress and illness for the childcare educators.• Little formal and appropriate psychological terminology is used throughout the response.
0 marks	<ul style="list-style-type: none">• The question has not been meaningfully attempted.

Note: All extended responses in Psychology should be written in complete sentences and paragraphs.

Student
name:

Use a **PENCIL** for **ALL** entries. For each question, shade the box which indicates your answer.

Marks will **NOT** be deducted for incorrect answers.

NO MARK will be given if more than **ONE** answer is completed for any question.

If you make a mistake, **ERASE** the incorrect answer – **DO NOT** cross it out.

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