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Write your **student number** in the boxes above. **Letter**

Psychology

Question and Answer Book

VCE Examination – Monday 4 November 2024

- Reading time is **15 minutes**: 9.00 am to 9.15 am
- Writing time is **2 hours 30 minutes**: 9.15 am to 11.45 am

Materials supplied

- Question and Answer Book of 40 pages
- Multiple-Choice Answer Sheet

Instructions

- Follow the instructions on your Multiple-Choice Answer Sheet.
- At the end of the examination, place your Multiple-Choice Answer Sheet inside the front cover of this book.

Students are **not** permitted to bring mobile phones and/or any unauthorised electronic devices into the examination room.

Contents

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Section A – Multiple-choice questions

Instructions

- Answer **all** questions in pencil on the Multiple-Choice Answer Sheet.
- Choose the response that is **correct** or that **best answers** the question.
- A correct answer scores 1; an incorrect answer scores 0.
- Marks will **not** be deducted for incorrect answers.
- No marks will be given if more than one answer is completed for any question.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1

A neurochemical is found in the large fluid-filled space between numerous neurons. When the amount of neurochemical is high, the excitability of those neurons is lowered. This neurochemical is most likely to be

A. a dendrite.

B. an agonist.

C. a neuromodulator.

D. an excitatory neurotransmitter.

Question 2

Which of the following best describes the transmission of neural information?

A. Neurotransmitters are released from specifically shaped receptor sites on the pre-synaptic neuron.

B. The human nervous system communicates through the work of both cellular and chemical components.

C. Synaptic vesicles are found in the dendrites of a post-synaptic neuron to capture the neurotransmitters they receive.

D. Unlike neurotransmitters, neuromodulators do not rely on the need to locate a complementary shaped receptor site before temporarily binding to a neuron.

Do not write in this area.

Use the following information to answer Questions 3 and 4.

A research study investigated the changes to blood flow in the face that occur when encountering stress. Forty participants were involved in a study that placed them, one at a time, in a fake jewellery store.

Twenty participants were in the 'deception condition' and were told to enter the store and steal a necklace. Following this, these participants entered an interview room where they were asked eight questions about the scenario. Those in the 'deception condition' had been told to lie in all their answers.

The other 20 participants were in the 'control condition'.

During the interview, all participants were connected to a thermal imaging machine where changes to blood flow in the face could be measured. Higher results of thermal imaging indicated higher blood flow to that specific facial area.

Source: Adapted from A Derakshan et al., 'Network physiology of "fight or flight" response in facial superficial blood vessels', *Physiological Measurement*, vol 40, 2019 <https://doi.org/10.1088/1361-6579/aaf089>

Question 3

Any increase to the participants' blood flow to the face is most likely due to the

A. somatic nervous system, as blood flow is an unconscious response to a threat.

B. autonomic nervous system, as blood flow is an unconscious response to a threat.

C. somatic nervous system, as blood flow is a conscious response as they were told to lie.

D. autonomic nervous system, as blood flow is a conscious response as they were told to lie.

Question 4

Analysis of the thermal imaging of all facial areas found that increased blood flow correctly predicted the participants' deception at a rate of 67.1%. The researchers were then able to improve the deception prediction rate to 87.1% by analysing only a limited number of facial areas.

This improvement in deception prediction rate indicates

A. the brain diverts blood to specific areas in response to a stressor.

B. the increase in blood to facial areas is not a reliable indicator of stress.

C. an increase in blood flow to all facial areas occurs regardless of the stressor type.

D. the central nervous system processes, but does not coordinate, physiological responses to a stressor.

Question 5

There is overlap between the explanatory power of the General Adaptation Syndrome (GAS) and the scientific model of the flight-or-fight-or-freeze response. Which one of the following statements best demonstrates this overlap?

A. The suppression of the immune system in the resistance stage explains the 'freeze' response.

B. Only when resistance is above normal levels can the flight-or-fight-or-freeze response be activated.

C. The alarm reaction (shock) stage provides the individual with additional resources to confront the stressor.

D. The alarm reaction (counter shock) stage increases resistance to above normal levels to assist an individual to flee the stressor.

Do not write in this area.

Use the following information to answer Questions 6–8.

Burnout has been described as a physiological and psychological syndrome caused by the presence of too many work stressors. One literature review focused on the connection between Selye's General Adaptation Syndrome (GAS) and burnout in the medical industry. As a result of this review, researchers suggested that the first symptoms of burnout appear somewhere within the end of Stage 2 and the beginning of Stage 3 of GAS.

Source: Adapted from <https://www.academicradiology.org/article/S1076-6332(23)00562-7/abstract>

Question 6

The 'exhaustion' stage of Selye's GAS can explain the onset of burnout because

A. the increased susceptibility to physical illness enhances the likelihood of experiencing burnout.

B. the depletion of adrenaline levels can lead to a loss in muscle tone and a reduced ability to cope.

C. the presence of headaches diminishes the ability to apply approach strategies to work-related stressors.

D. the psychological impact of work stressors can diminish the ability to utilise context-specific strategies.

Question 7

This literature review found common trends for those experiencing burnout because

A. all three stages of GAS are needed to explain any form of burnout.

B. burnout is purely physiological, which GAS can accurately account for.

C. those working in the same industry will experience the same set of stressors.

D. the biological response to stress is non-specific to the stressor and individual.

Question 8

Recent data suggests that some members of the medical industry have experienced mental health difficulties due to burnout; however, very few of them seek any mental health treatment. One of the main reasons cited is stigma.

Using your knowledge of stigma around seeking treatment, what could be a suitable way to minimise the impact of stigma?

A. maintaining adequate nutritional intake

B. engaging in psychoeducation sessions for family

C. completing independent breathing retraining sessions

D. correcting memory biases through the use of GABA agonists

Do not write in this area.

Question 9

The 'Oxford Happiness Questionnaire' explores personality variables associated with mental wellbeing and functioning. The questionnaire contains a list of items presented as single statements that participants respond to by selecting from 'strongly agree' to 'strongly disagree'.

Which of the following describes one ethical guideline researchers need to follow when using this questionnaire and the type of data collected?

	Ethical guideline	Type of data
A.	voluntary participation, which involves the participant being able to discontinue their involvement in the questionnaire	primary data, as the data contains easy-to-summarise information
B.	informed consent procedures, which involves participants understanding the true nature of the questionnaire	primary data, as the data was collected from the participants by the researchers
C.	use of deception, because knowing the true purpose of the experiment may affect participant behaviour	secondary data, as the questionnaire produces both quantitative and qualitative data
D.	withdrawal rights, which ensures there is no pressure put on the participant to complete the questionnaire	secondary data, as the information is collected by the participants for the researchers

Do not write in this area.

Use the following information to answer Questions 10–12.

A study was conducted with the aim of investigating whether cognitive behavioural stress management coaching could decrease stress levels. Cognitive behavioural coaching is a new model of life coaching based on the principles of cognitive behavioural therapy.

In a controlled experiment, university students were first asked to complete a questionnaire on perceived stress levels and then create a personal stress-related goal. The participants were then randomly allocated into two groups.

Group A: 24 students received individual cognitive behavioural coaching. This involved 12 one-hour coaching sessions spread over four weeks.

Group B: 20 students received no intervention.

All students then completed a questionnaire immediately after the coaching period, and again six months later. The questions focused on participants' perceived stress levels as well as their stress-related goals.

Source: Adapted from S Junker, M Pömmer, & E Traut-Mattausch, 'The impact of cognitive-behavioural stress management coaching on changes in cognitive appraisal and the stress response: A field experiment.' *Coaching: An International Journal of Theory, Research and Practice*, 14(2), 2021, pp. 184–201. Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

Question 10

The design of this specific study allows researchers to draw which of the following conclusions?

Conclusion 1 – Cognitive behavioural coaching is more effective than a lack of any intervention on stress levels.

Conclusion 2 – Cognitive behavioural coaching has both short- and long-term impacts on reducing stress levels.

Conclusion 3 – The type of personal stress-related goal impacts the effectiveness of cognitive behavioural coaching.

Conclusion 4 – The duration of cognitive behavioural coaching sessions increases the chances of completing a stress-related goal.

A. conclusions 1 and 2 only

B. conclusions 1 and 3 only

C. conclusions 3 and 4 only

D. conclusions 1, 3 and 4 only

Question 11

Cognitive behavioural coaching in this study could have involved

A. engaging in daily mindfulness meditation training to calmly identify stressors.

B. employing a range of sleep hygiene strategies to experience better sleep quality.

C. training participants in how to identify and replace unhelpful actions that inhibit the achievement of their goals.

D. listing all available community support to create meaningful relationships with experts in the field of stress management.

Do not write in this area.

Question 12

According to Lazarus and Folkman's Transactional Model of Stress and Coping, the cognitive behavioural coaching was likely to assist participants in achieving their personal stress-related goal because the coaching

A. improves the ability to perceive the significance of an event.

B. teaches participants to focus only on the potential harm of every event.

C. better prepares participants to view their coping resources as irrelevant.

D. suggests that avoidance strategies have a benign effect on the individual.

Question 13

Consider the following statements related to stress.

Statement 1 – Context-specific effectiveness determines whether a coping strategy is approach or avoidance.

Statement 2 – The absence of coping flexibility could prolong the release of cortisol.

Statement 3 – Both acute and chronic stress involve a physiological stress response.

Which of the above statements is/are correct?

A. 1 only

B. 1 and 2 only

C. 2 and 3 only

D. 1, 2 and 3

Do not write in this area.

Use the following information to answer Questions 14–16.

The school-wide positive behaviour support framework has been introduced into schools by the Victorian Department of Education. The framework was developed with the intention to

- increase positive behaviours and interactions for students at school
- improve mental wellbeing
- increase time spent focusing on teacher instructions.

Source: Adapted from <https://www2.education.vic.gov.au/pal/behaviour-students/guidance/5-school-wide-positive-behaviour-support-swpbs-framework>

Question 14

The framework suggests that primary school teachers can increase positive behaviours during lessons by using positive reinforcement.

Which one of the following could be the most effective example of positive reinforcement?

A. keeping distracted students inside at recess

B. smiling at students as they enter the classroom

C. giving focused students no homework for that evening

D. providing students who stay on task with a sticker during the lesson

Question 15

Secondary school teachers have found that after-school detentions are an ineffective consequence for students who do not remain focused on teacher instructions during class time. According to operant conditioning, the best explanation for the ineffectiveness of after-school detentions is that

A. reinforcement should weaken the learned connection between an antecedent and behaviour.

B. after-school detentions are an unconditioned stimulus that do not provide a strong unconditioned response.

C. the antecedent and behaviour connection would be weakened if the behaviour was immediately followed by the consequence.

D. the antecedent should immediately follow the consequence so that the behaviour becomes associated with the antecedent.

Question 16

An increase in positive interactions between students could be directly linked to an improvement in mental wellbeing by

A. teaching students about the continuum of mental wellbeing.

B. running lessons on how to maximise student coping flexibility.

C. creating a peer mentoring system to provide genuine and energising support.

D. actively decreasing the number of internal stressors the students need to manage.

Do not write in this area.

Question 17

It is recommended that shift workers receive information on sleep hygiene from their employers because

A. sleep hygiene controls quality and quantity of sleep.

B. there is no correlation between shift work and mental wellbeing.

C. it is important to maintain a clean sleep environment to promote sleep.

D. shift work can increase the presence of zeitgebers that would enhance sleepiness.

Question 18

Which one of the following is most likely to be a guideline included in a set of information available to people who are unable to sleep?

A. Vary sleep onset times to ensure sufficient melatonin is available.

B. Increase caffeine intake, especially at times when sleep is needed.

C. Consume heavier meals before sleep to prevent night-time waking.

D. Get out of bed and do something relaxing in a dimly lit environment.

Do not write in this area.

Use the following information to answer Questions 19–22.

Study 1: The characteristics of 'event memories' in dogs

Recent research has summarised numerous case studies regarding the autobiographical memory of dogs. Findings suggest that dogs have long-term memories of past events, as 80% of owners reported that their pet had shown signs of remembering an event. The most reported long-term memories involved dogs locating hidden items.

The following is an excerpt of a case study collected during Study 1.

Case Study A: One owner reported that their dog had escaped through their fence to the neighbour's house, then in through the neighbour's cat door to eat the cat's food. Several years later, on a day when their dog had not been fed, it again escaped through the same fence and in through the same neighbour's cat door to get to the food.

Source: Adapted from A Lewis and D Berntsen, 'Pet memoirs: The characteristics of event memories in cats and dogs, as reported by their owners', *Applied Animal Behaviour Science*, 2020, 222 [104885] <https://doi.org/10.1016/j.applanim.2019.104885>

Question 19

The study defined an 'event memory' as an experience or event that occurred in the past and was later recalled. According to the Atkinson-Shiffrin multi-store model of memory, an 'event memory' would involve

A. all sensory memory being retained and retrieved.

B. the visual information being attended to and encoded.

C. the retrieval of short-term memory to echoic sensory memory.

D. the use of rehearsal to transfer sensory memory to short-term memory.

Question 20

In Case Study A, the dog remembered where to find the food several years later due to the

A. consolidation of the procedural memory of jumping through a fence.

B. encoding of the episodic autobiographical memory through a mnemonic.

C. consolidation of an episodic autobiographical memory from when it was younger.

D. role semantic autobiographical memory plays in constructing possible imagined futures.

Do not write in this area.

Question 21

The dog owner's memory of their dog's behaviour could be explained by the

A. amygdala storing the feeling of embarrassment caused by the event.

B. encoding of semantic autobiographical memory by the hippocampus.

C. storage of the implicit autobiographical memories in the hippocampus.

D. amygdala consolidating the spatial component of the location of the neighbour's house.

Question 22

Researchers conducted the investigation again six months later in Study 2. The table below shows the number of dog owners used in Study 1 and Study 2.

Study	Number of dog owners
1	106
2	256

Study 2 also involved an improved questionnaire with greater clarity and more prompts for details of their dogs' memories.

What was the purpose of conducting Study 2?

A. to test the reproducibility of Study 1 and improve the validity

B. to test the external validity of Study 1 and improve the repeatability

C. to generate a 'true value' from which the accuracy of Study 2 could be assessed

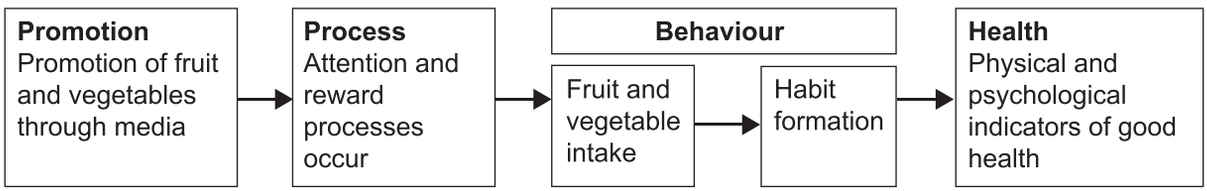
D. to decrease the impact of systematic errors and improve the overall precision of the data

Do not write in this area.

Use the following information to answer Questions 23 and 24.

There is growing evidence that food marketing influences children's food consumption. Currently, there is little research about the effects of healthy food promotion on children's dietary behaviour.

The following figure shows the 'healthy food promotion model' as devised by researchers as a way of summarising past research on the topic.



Source: Adapted from F Folkvord and RC Hermans, 'Food marketing in an obesogenic environment: a narrative overview of the potential of healthy food promotion to children and adults', *Current Addiction Reports*, 2020, vol. 7, pp. 431–436. Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

Question 23

The creation of the 'healthy food promotion model' is

A. the result of fieldwork and simulation building.

B. an example of modelling that could be proven with a case study.

C. formed through controlled experiments and tested through a correlational study.

D. the result of a literature review that could assist in the development of effective advertising.

Question 24

Both operant and classical conditioning can be used in addition to the model to explain how food marketing influences children's food consumption. Which one of the following most accurately applies both types of conditioning to the promotion of healthy foods to children?

	Operant conditioning	Classical conditioning
A.	The consumption of healthy foods should be followed by a reward.	The healthy food should originally elicit no response at first presentation.
B.	The learner must already eat healthy foods to be influenced by the promotion.	The learner must be actively looking at the promotion of healthy foods.
C.	It makes no difference if the learner is interested in eating healthy or not.	Their response to the promotion is an indicator of good health.
D.	Promote the healthy food after a reward is given.	Promote the healthy food after the presentation of a favourite television show.

Do not write in this area.

Use the following information to answer Questions 25 and 26.

Kahn et al. (2023) conducted an investigation involving 54 women to test whether mothers of infants with sleep difficulties were at an increased risk of poor driving. Participants were classified into three groups.

Group A: mothers of infants with sleep difficulties

Group B: mothers of well-sleeping infants

Group C: women without children

The women completed a questionnaire on their driving performance and sleep behaviours across a seven-day period. Following this, they completed a simulated driving task without any passengers.

Source: Adapted from M Kahn et al., 'Sleepless on the road: Are mothers of infants with insomnia at risk for impaired driving?' *Journal of Sleep Research*, 2023, <https://doi.org/10.1111/jsr.14083> Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

Question 25

Which one of the following results would most likely be found from this study?

A. Group A demonstrated greater lane deviation and higher maximum speed.

B. Group A was able to drive best when the simulator featured simple and repetitive roads.

C. Both Groups A and B showed improved driving ability during shorter trips compared to Group C.

D. Both Groups A and B showed more caution in their driving and reduced speeds compared to Group C.

Question 26

One participant in Group A experienced sustained wakefulness for 20 hours due to her infant's disrupted sleep. How would the cognitive functioning of this participant compare to a person with a legal blood alcohol concentration in a simulated driving test?

A. She would be more confident in her simulated driving ability.

B. She would be less able to focus her attention on the simulated driving test.

C. She would be more agitated when presented with a difficult driving scenario.

D. She would have been slower when using key parts of the car, such as the steering wheel and pedals.

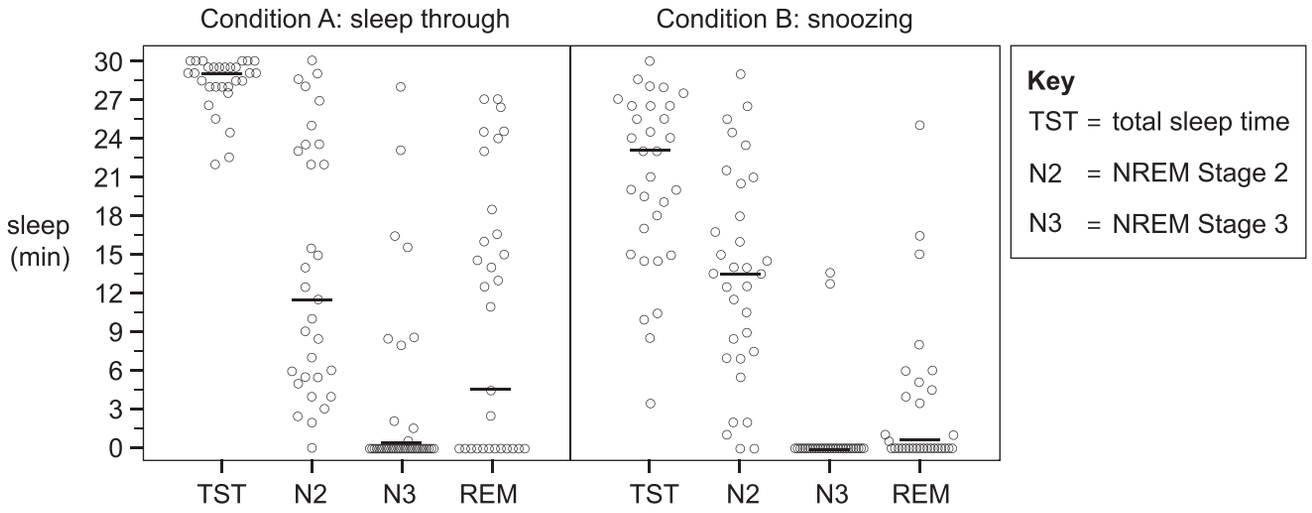
Do not write in this area.

Use the following information to answer Questions 27–30.

An investigation examined the effects of using several morning alarms within a short time period, known as 'snoozing', on sleep episode patterns and overall daytime functioning. Thirty-one participants were chosen for their regular use of the 'snooze' feature on their alarm.

Each participant underwent both a 'sleep through' condition for two nights and a 'snoozing' condition for two nights. During each condition, they were connected to an electroencephalograph (EEG) throughout all sleep episodes. The study also used measures of consciousness such as cognitive tests and self-reports to determine the impact of snoozing on memory and mood.

The following graph shows the distribution of time spent in different sleep stages in both conditions for the final 30 minutes before waking. Each data point represents a single participant. The solid bold lines represent the median value of each data set.



Source: Adapted from T Sundelin, S Landry and J Axelsson, 'Is snoozing losing? Why intermittent morning alarms are used and how they affect sleep, cognition, cortisol, and mood', *Journal of Sleep Research*, 2023 <https://doi.org/10.1111/jsr.14054> Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

Question 27

Which of the following statements about the graph is correct?

A. The same quality of data could have been gathered using a sample size of 15.

B. The solid bold lines also represent the mean values, given the number of outliers present in the data sets.

C. It would be accurate to claim the solid bold lines for REM sleep also represent the mode for both conditions.

D. The standard deviation of the NREM Stage 3 sleep duration was higher for Condition A than Condition B.

Question 28

The graph shows that the impact of 'snoozing' on the final 30 minutes of a sleep episode is a(n)

A. increase in the total sleep time.

B. increase in the amount of time spent in deep sleep.

C. increase in the proportion of time spent in light sleep.

D. decrease in the proportion of time spent in NREM sleep.

Do not write in this area.

Question 29

Which one of the following correctly identifies the roles of the different measures of consciousness used in this study?

	Cognitive tests and self-reports	Electroencephalograph (EEG)
A.	Used to verify that the participants had returned to normal waking consciousness.	Indicated the sleep episode patterns by analysing brain wave frequency.
B.	Conducted while the participants were in an altered state of consciousness.	Provided electrical activity patterns to act as a self-report measure.
C.	Used to produce the data seen in the graph.	Measured the mood of participants by amplifying the electrical activity of muscles.
D.	Identified the different altered states of consciousness that participants entered when asleep.	Recorded the results of a series of cognitive tests by studying hippocampal activity.

Question 30

To develop a more complete understanding of the impact of snoozing on daytime functioning, researchers should have

A. more clearly defined 'sleep quality' and 'sleep quantity' in their study.

B. provided an opportunity to test the behavioural functioning of participants.

C. included continuous daytime monitoring with an electro-oculograph (EOG).

D. instead compared the effects of snoozing with one night of full sleep deprivation.

Do not write in this area.

Use the following information to answer Questions 31 and 32.

Sleep quality and room temperature are connected. In one study, 10 healthy young adults slept in a temperature-controlled room. Each participant spent the first night of the study sleeping in a room set at 25 °C and the second night set at 29 °C.

Participants were required to record their self-reported sleepiness level before and after each sleep episode on a rating scale from 0 (not sleepy) to 5 (very sleepy). The results are presented in the table below.

Room temperature (°C)	Average reduction in self-reported sleepiness level
25	1.8
29	1.1

Question 31

Room temperature is considered a zeitgeber for sleep as it

A. operates on a 24-hour circadian rhythm.

B. is found to impact the rate of cortisol release.

C. is an external cue that can regulate the body's circadian rhythm.

D. is controlled by the same autonomic nervous system processes as sleep.

Question 32

If a third temperature condition of 20 °C were to be included in this study, it is likely that these results, on average, would show

A. increased sleepiness levels demonstrated by an average reduction score of 1.0.

B. a smaller average reduction due to lower temperatures promoting greater sleep.

C. a greater average reduction that indicates a larger decrease in sleepiness levels.

D. similar scores to the 29 °C condition, as the temperature change is too close for any meaningful variation.

Do not write in this area.

Use the following information to answer Questions 33–35.

In the 1940s, American psychologist Orval H. Mowrer developed a 'two-factor theory' for understanding the development of a specific phobia. He applied two behaviourist approaches to learning – classical and operant conditioning – in explaining how an otherwise harmless object could persist in causing a strong anxiety response. This theory informs our current understanding of the development of a phobia.

Question 33

One aspect of this theory is that

A. the use of negative reinforcement precipitates the phobia.

B. avoidance precipitates the unconditioned response to a phobic stimulus.

C. the constant desire to remove the phobic stimulus perpetuates the feelings of anxiety.

D. repeated associations between a neutral and unconditioned stimulus perpetuate the phobia.

Question 34

Which one of the following correctly applies behaviourist approaches to the development of a specific phobia?

A. Memory bias can interfere with the retention stage of learning.

B. High levels of motivation cause a reproduction of the phobic response.

C. The phobic response is both a conditioned response and a consequence.

D. The conditioned stimulus acts as an antecedent that triggers an avoidance behaviour.

Question 35

The application of systematic desensitisation to treat a specific phobia is effective because

A. the phobic stimulus becomes a neutral stimulus.

B. it prevents the possibility of any avoidance behaviours.

C. challenging unrealistic thoughts weakens the conditioned response.

D. the relaxation technique provides an alternative conditioned response.

Do not write in this area.

Use the following information to answer Questions 36–39.

Maintaining wellbeing in university students is of critical importance, as higher wellbeing is associated with better mental and physical health. One correlational study was conducted using online survey results from 550 university students.

The table below reports some of the data collected in this study, where a score of 70 on the mental wellbeing scale means optimum mental wellbeing.

	Average scores		
Student group	**Mental wellbeing (out of 70)**	**Perceived stress (out of 40)**	**Perceived loneliness (out of 5)**
All students	41.0	23.0	2.8
Living on campus	40.3	23.8	3.5
Living at home	41.4	23.0	2.4
Undergraduate (Years 1–3)	39.2	24.9	3.8
Postgraduate (Years 4+)	45.4	19.5	2.1

Question 36

One of the online surveys required responses to the following statements.

- I usually come through difficult times with little trouble.
- It does not take me long to recover from a stressful event.

These two statements were assessing student levels of

A. stress.

B. resilience.

C. wellbeing.

D. functioning.

Question 37

This investigation is considered a correlational study because it

A. collects primary data through online surveys.

B. controls three variables by reporting their average scores.

C. enables researchers to identify the factors that relate to mental wellbeing.

D. manipulates the independent variables of living location and university experience.

Do not write in this area.

Question 38

This study could use self-report rating scales due to the understanding that mental wellbeing

A. is influenced more by internal factors than external factors.

B. can be demonstrated by the absence of everyday stress and anxiety.

C. can be approached as the presence or absence of a mental disorder.

D. is a psychological construct that exists on a continuum with no fixed points.

Question 39

The trends in the data collected in the table may provide evidence for a biopsychosocial approach to maintaining mental wellbeing if

A. all three scales were measured out of the same score.

B. all participants were having an adequate nutritional intake.

C. the perceived stress scale accounted for only internal psychological stressors.

D. a score of 5 on the perceived loneliness scale measured greater feelings of loneliness.

Question 40

Phobias exist when the feelings of fear outweigh the possibility of harm.

Which one of the following correctly explains the biological response to a stimulus for people with and without a phobia?

	With a phobia	Without a phobia
A.	Neural activity in the amygdala is unregulated due to low levels of the neurotransmitter GABA.	Regular production and release of inhibitory GABA ensures regulation of neural activity in the amygdala.
B.	GABA receptor sites function with decreased efficiency, which indirectly activates neural activity in the amygdala.	Glutamate receptor sites function with decreased efficiency, which indirectly supresses neural activity in the amygdala.
C.	The amygdala is inhibited by GABA and the amygdala's neurons exhibit low rates of firing.	Neurons in the amygdala have a higher than normal quantity of GABA receptor sites.
D.	Excitatory GABA will promote feelings of fear when released in the amygdala.	Neuromodulators are released in the amygdala to promote levels of calmness when faced with a stimulus.

End of Section A

Do not write in this area.

Section B

Instructions

- Answer **all** questions in the spaces provided.
- Write your responses in English.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (10 marks)

The picture below demonstrates the learning of a new motor skill.

Source: Oksana Kuzmina/Shutterstock.com

a. Learning the motor skill of teeth brushing involves interactions between the basal ganglia and neocortex. Discuss how the basal ganglia and neocortex are involved in this example. In your answer, refer to the

- role of each brain region
- interaction between the two brain regions. 3 marks

Do not write in this area.

b. Next to the bathroom mirror, the child's parents have pinned this poster up on the wall.

T – Twice a day, morning and night
E – Every tooth should be clean and bright
E – Ensure you brush, don't let it slide
T – To keep your smile healthy and wide
H – Happy teeth make you feel so grand

Use the Atkinson-Shiffrin multi-store model of memory to explain why this poster will benefit the child's learning of healthy teeth-brushing habits. 2 marks

c. The father in this picture remembers learning to brush his teeth when he was young, as it was often an enjoyable experience. As his child's teeth start to grow, he imagines how he would teach the same teeth-brushing skills to his son.

Describe the role of episodic and semantic memory in constructing the possible imagined future of teaching his son to brush his teeth. 3 marks

d. Explain the role that long-term potentiation has in the 'retention' stage of observational learning, as it relates to this scenario. 2 marks

Do not write in this area.

Question 2 (7 marks)

The gut–brain axis is an area of emerging research. Researchers are interested in understanding the role of the vagus nerve in the gut–brain axis by using a range of investigation methodologies, including case studies.

a. Outline **two** roles of the vagus nerve in the gut–brain axis. As part of your answer, describe how case studies could be used to understand the role of the vagus nerve in the gut–brain axis. 4 marks

b. Using your knowledge of the gut–brain axis, explain why adequate nutritional intake acts as a biological protective factor for maintaining mental wellbeing. 3 marks

Do not write in this area.

Question 3 (5 marks)

Compare and contrast the use of bright light therapy for people with Delayed Sleep Phase Syndrome (DSPS) and people with Advanced Sleep Phase Disorder (ASPD). As part of your answer, explain the biological mechanism that allows bright light therapy to be an effective treatment for both sleep disorders.

Do not write in this area.

Question 4 (10 marks)

Research has recently discovered that ankle injuries impair spinal reflex response times. One controlled experiment aimed to investigate the impact of an ankle sprain on the spinal reflex response time in the soleus muscle of the lower leg. This experiment included 30 participants who had obtained an ankle sprain within the last three days.

Researchers initiated a spinal reflex by touching a stimulating electrode on a specific point on the lower leg. All participants' ankles were connected to an electromyograph (EMG) to record their spinal reflex response time in both their injured and uninjured ankles.

Researchers calculated a numerical ratio called the 'H-index'. A larger H-index value indicates a faster spinal reflex response time.

Average H-index results are shown in the table below.

Ankle	Average H-index
Injured	78
Uninjured	87

Source: Adapted from J Kim et al., 'Conduction Velocity of Spinal Reflex in Patients with Acute Lateral Ankle Sprain' *Healthcare*, vol. 10, 2022 <https://doi.org/10.3390/healthcare10091794> Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

a. A spinal reflex occurs due to a series of excitatory messages being sent along a neural pathway. Name the main excitatory neurotransmitter in the human nervous system. 1 mark

_____

b. Outline **one** role of each of the following two subdivisions of the human nervous system during the spinal reflex initiated in this experiment. 2 marks

Somatic nervous system _____

_____

_____

Spinal cord _____

_____

_____

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c. Describe the results of the experiment and interpret what the results show about the impact of an ankle injury on spinal reflex response times. 2 marks

d. The experiment used random sampling.

Demonstrate how random sampling could have been used by the researchers to ensure that they achieved representativeness in their sample. 3 marks

e. Researchers decided to calculate the H-index value instead of only reporting the time taken for the spinal reflex response to occur.

The following formula is used to calculate the H-index value.

$$\text{H-index} = \frac{\text{Height (cm)}}{\text{Time taken for spinal reflex response (seconds)}}$$

In terms of measurement errors, explain the benefit of researchers calculating the H-index value. 2 marks

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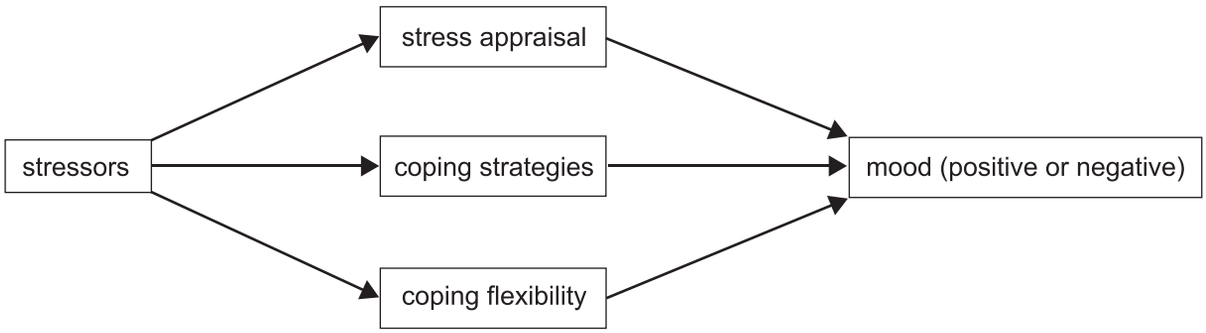
Question 5 (10 marks)

The use of mindfulness meditation is often linked to changes in mood. A within-subjects study investigated whether stress appraisal, coping strategies and/or coping flexibility could explain how mindfulness meditation can change mood in response to a stressor. Researchers hypothesised that the benefits of mindfulness meditation could be used to explain the way individuals cope with stress.

The figure below shows the relationships that were tested.



In this study, 157 students completed 30 minutes of daily mindfulness meditation for one week. Participants also completed a daily online questionnaire that asked them about their current appraisals of stress, coping strategies, coping flexibility and mood.

Results from this study demonstrated that by completing mindfulness meditation:

- 19% of the decrease in negative mood was explained by less frequent stress appraisals
- 13% of the increase in positive mood and decrease in negative mood was explained by using 'mindful' coping strategies
- the effect of mindfulness meditation on both positive and negative mood could not be explained by coping flexibility.

Source: Adapted from L Finkelstein-Fox, CL Park and KE Riley, 'Mindfulness' effects on stress, coping, and mood: A daily diary goodness-of-fit study', *Emotion*, vol. 19, 2018 <https://pubmed.ncbi.nlm.nih.gov/30138006/> Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

a. The daily questionnaire asked participants to list any internal and external stressors they had encountered that day.

Distinguish between internal and external stressors. 1 mark

b. Stress appraisal was considered from the perspective of Lazarus and Folkman's Transactional Model of Stress and Coping. The questionnaire asked participants to think of a stressor they had encountered and then record their primary and secondary appraisals.

Suggest **one** question the researchers may have included to understand the following:

i. the participants' primary appraisal of the stressor they encountered. 1 mark

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ii. the participants' secondary appraisal of the stressor they encountered. 1 mark

c. Suggest why coping flexibility does not explain the change in mood experienced after the participants in the study completed mindfulness meditation. 3 marks

d. Propose how the researchers could have applied the ethical guideline of debriefing. 2 marks

e. Considering the aim of the experiment, sleep deprivation could potentially impact the findings from the experiment.

Explain how sleep deprivation may impact the results, and recommend **one** improvement to the study to overcome this concern. 2 marks

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Question 6 (10 marks)

For a Psychology practical investigation, Pip decided to examine whether the timing and order of presenting two stimuli had an impact on the time taken for classical conditioning to occur. Pip used a torch light as a strong stimulus that made participants blink. The other stimulus in the experiment was the sound of an electronic bell. Pip repeatedly presented the two stimuli until learning had occurred for each participant.

Pip had seven participants, each allocated to a separate condition (A to G).

The table below shows the set-up of the experiment.

Condition	Order of presentation	Time delay between two stimuli (seconds)
A	torch light followed by electronic bell	0.50
B	torch light followed by electronic bell	1.00
C	torch light followed by electronic bell	2.00
D	torch light and electronic bell at the same time	0.00
E	electronic bell followed by torch light	0.50
F	electronic bell followed by torch light	1.00
G	electronic bell followed by torch light	2.00

a. List the **two** independent variables studied in this experiment. 2 marks

b. State the neutral stimulus and unconditioned response used in this experiment. 2 marks

Neutral stimulus

Unconditioned response

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c. Pip recorded the number of trials taken until the participants had been successfully conditioned. Identify what Pip would look for to indicate that learning had occurred. 1 mark

d. Using your knowledge of classical conditioning, predict which condition (A to G) would have the quickest rate of learning. Justify your answer. 3 marks

e. Outline how a further investigation could verify the reproducibility of this experiment. 2 marks

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Question 7 (11 marks)

The following are two extracts related to sleep across the human lifespan.

Extract 1

Why Does Aging Affect Sleep?

It is common for older adults to experience changes in the quality and quantity of their sleep. Many of these changes occur due to the body's internal clock called the suprachiasmatic nucleus (SCN). Aging affects people differently. While some older adults may have no significant disruptions in their sleep, others complain about getting less sleep and having worse sleep quality. Experts have found several common sleep disturbances in older adults such as a shifting sleep schedule, waking during the night, and daytime napping.

Research estimates that about 25% of older adults take naps. During their longest sleep episode (typically around six hours), older adults spend more time in the earlier, lighter stages of sleep and less time in the later, deeper stages.

Research shows that many older adults have not enough exposure to daylight, averaging around one hour each day. Older adults may have higher incidents of mental and physical health conditions that may also interfere with sleep.

Source: Adapted from R Newsom and J DeBanto, 'Aging and Sleep', 19/09/2023 <https://www.sleepfoundation.org/aging-and-sleep>

Extract 2

How Much Sleep Do Babies Need?

Babies spend most of their day sleeping. Newborn babies typically sleep 16 to 18 hours in each 24-hour day, but this sleep is accumulated across a series of naps. It is rare for newborns to sleep through the night without waking up. Caregivers may be able to develop a more regular sleep schedule when the baby is around four months old by regulating feeding times, night-time sleep segments, and daytime nap length.

All newborns nap during the day, with each nap lasting between one and four hours. Although total nap time decreases as they get older, it is typical for infants to continue to nap for two to three hours each day.

Source: Adapted from E Suni and N Vyas, 'How Much Sleep Do Babies and Kids Need?', 08/01/2023 <https://www.sleepfoundation.org/children-and-sleep/how-much-sleep-do-kids-need>

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a. With reference to either Extract 1 or 2, identify and provide a reason for two differences in the sleep patterns of newborns and older adults. 4 marks

Difference 1 _____

_____

Reason _____

_____

_____

Difference 2 _____

_____

Reason _____

_____

_____

b. Use information from Extracts 1 and 2 to critically evaluate the following statements.

i. 'There are substantial changes to the typical pattern of sleep across all stages of adulthood.' 2 marks

_____

_____

_____

_____

_____

_____

ii. 'Newborns rely more on internal factors than external factors to control their sleep-wake cycles.' 2 marks

_____

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_____

_____

_____

Question 7 continues on the next page.

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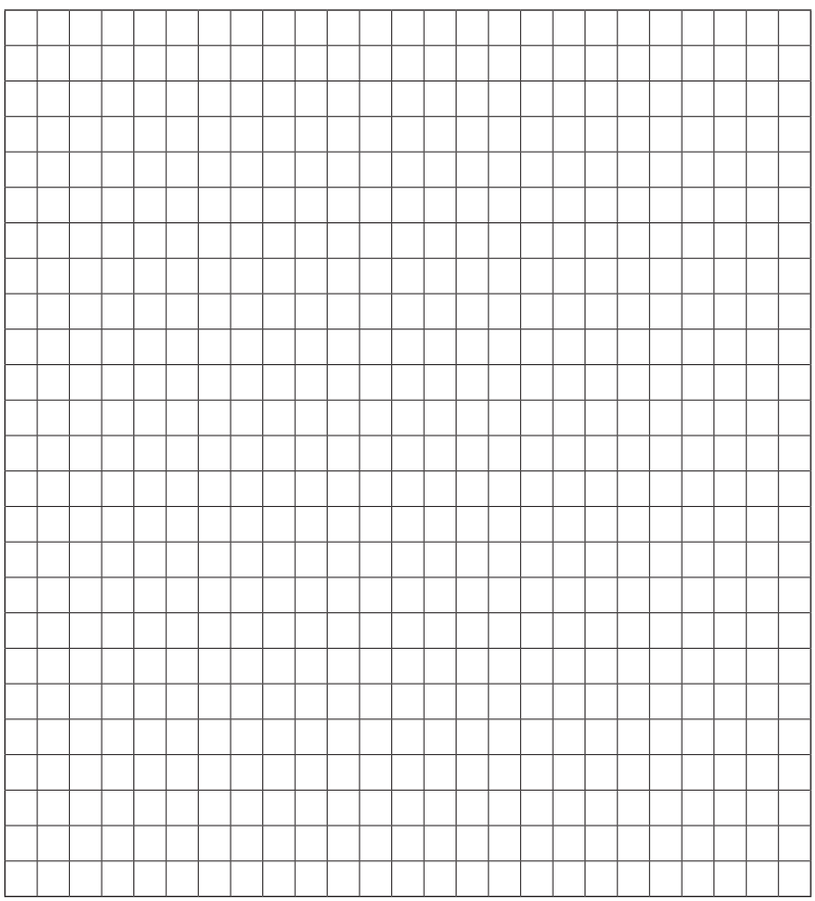
c. The table below has been created to show the percentage of infants who can experience an uninterrupted sleep episode.

Age	Percentage (%) of infants who can sleep 5+ hours consecutively	Percentage (%) of infants who can sleep 8+ hours consecutively
6 months	62	43
12 months	72	58

Source: Adapted from MH Pennestri et al., 'Uninterrupted Infant Sleep, Development, and Maternal Mood' *Pediatrics*, vol. 142, 2018 <https://publications.aap.org/pediatrics/>

Using graphing conventions, represent the results in the table by plotting consecutive sleep episode duration against the **difference** in percentages between six and 12 months. 3 marks



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Question 8 (7 marks)

The Watarrka Foundation offers the following statement to understand what kinship means to Aboriginal and Torres Strait Islander Peoples.

> With over 500 Indigenous nations across Australia, there exists a vast array of Aboriginal communities. The concept of kinship describes a person's responsibilities towards other people, the land and natural resources. Kinship is a system that determines how people relate to one another and their surroundings, with the aim of creating a cohesive and harmonious community.
>
> Source: <https://www.watarrkafoundation.org.au/blog/the-role-of-family-kinship-in-aboriginal-culture>

a. One approach to understanding learning is where the learner is situated within a system. Referring to the statement above, describe the role kinship has in Aboriginal and Torres Strait Islander ways of knowing. 2 marks

b. Identify **one** reason why the sharing of songlines is considered a cultural determinant for Aboriginal peoples, and outline how this cultural determinant acts as a protective factor for social and emotional wellbeing (SEWB). 3 marks

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c. Social and emotional wellbeing (SEWB) can be understood as a multidimensional and holistic framework for wellbeing. Describe how kinship and family supports the social and emotional wellbeing of Aboriginal and Torres Strait Islander Peoples. 2 marks

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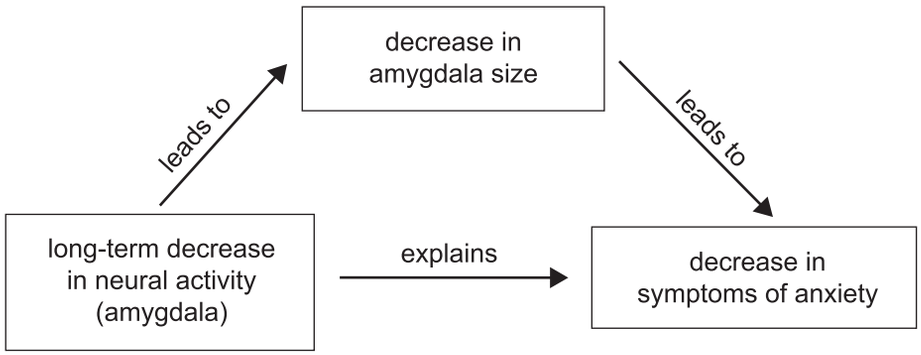
Question 9 (10 marks)

People with high levels of social anxiety tend to show increased excitatory neural activity in the amygdala brain region. Research suggests that this excitatory neural activity can be decreased by effective evidence-based interventions such as cognitive behavioural therapy (CBT).

The following model provides a possible explanation for the relationship between neural activity in the amygdala and symptoms of social anxiety after a period of CBT.



Source: Adapted from KNT Mansson et al., 'Neuroplasticity in response to cognitive behavior therapy for social anxiety disorder', *Translational Psychiatry*, vol. 6, e727, 2016 <doi:10.1038/tp.2015.218> Licensed by CC-BY 4.0 <https://creativecommons.org/licences/by/4.0/>

One possible way to extend this investigation is to consider whether the model is also able to explain the possible effectiveness of CBT for people with a specific phobia.

Using the model above and your knowledge of synaptic plasticity, explain and evaluate the potential use of CBT for people with a specific phobia.

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End of examination questions

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If you use any additional Question and Answer Books to complete your responses, write your **student number** on the front cover. At the end of the examination, place the additional Question and Answer Books inside the front cover of the first Question and Answer Book.

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