Advanced VCE
Practice Examination Information for Teachers

This practice examination has been designed to reflect the skills outlined in the Study Design and Assessment Handbook.
The content and stimulus material may differ from the Victorian Curriculum and Assessment Authority Examination, however, this practice examination will provide opportunity for students to practice the skills required to complete the task.
The suggested responses provide a guide that reflects the level of detail required to complete the VCAA Examination, however, they do not represent all possible answers that students could write.
These suggested responses contain sample answers, tips and guidelines.
This examination has been developed to be completed in 150-minutes with 15 minutes of reading time at the beginning of the session.
Students only require a pen to complete this task.
This task should be completed under test conditions.
Students should not have access to any notes, mobile phones, calculators or any other electronic device.

Copyright Statement

SECTION A – Multiple-choice questions

Question 1	**D**	**Question 26**	**D**
Question 2	**D**	**Question 27**	**C**
Question 3	**B**	**Question 28**	**C**
Question 4	**C**	**Question 29**	**D**
Question 5	**C**	**Question 30**	**C**
Question 6	**A**	**Question 31**	**D**
Question 7	**C**	**Question 32**	**A**
Question 8	**C**	**Question 33**	**A**
Question 9	**A**	**Question 34**	**D**
Question 10	**D**	**Question 35**	**C**
Question 11	**C**	**Question 36**	**B**
Question 12	**D**	**Question 38**	**D**
Question 13	**D**	**Question 39**	**C**
Question 14	**C**	**Question 38**	**A**
Question 15	**D**	**Question 40**	**B**
Question 16	**B**		
Question 17	**A**		
Question 18	**C**		
Question 19	**A**		
Question 20	**D**		
Question 21	**B**		
Question 22	**D**		
Question 23	**D**		
Question 24	**B**		
Question 25	**C**		

SECTION B – Short-answer questions

Instructions for Section B
Answer **all** questions in the spaces provided. Write using black or blue pen.

Question 1 (13 marks)

a. Describe what is meant by the term songline as it applies to Aboriginal ways of learning. 3 marks

A songline is a sequence of short sung narratives associated with specific locations in the landscape. These locations are linked by a walked (physically or imagined) path through Country. They contain cultural knowledge associated with the landscape, map the journey of Ancestral Beings and the living system of all entities that exits within the universe.

b. Analyse the similarities and differences between method of loci used in written cultures and sung narratives used in oral culture to enhance memory. 6 marks

Students can draw upon their understanding of these two techniques of memory enhancement to form an analysis of the similarities and differences.

Similarities

Sung narratives in oral cultures like Aboriginal songlines require the (physical walking or) visualisation of a set of locations that act as retrieval cues for information tied to that location (such as knowledge of Country). Method of Loci as used in written cultures also requires the visualisation of a familiar path or route with locations acting as retrieval cues for information that has been 'stored' at each spot.

Both sung narratives such as Aboriginal songlines and method of loci involve the consolidation of memories using the hippocampus, specifically making spatial associations with new information.

Aboriginal songlines and method of loci share the characteristic of vivid, grotesque, unusual or vulgar information, activating more of the brain's neurons and increasing the likelihood of the information being encoded and stored with more explicit detail and as a result being recalled more easily.

Differences

Method of loci in written cultures is generally used to store 1 dimension or level of knowledge for a specific purpose, such as remembering the words to a speech or essay. Songlines in Aboriginal culture is multidimension and the knowledge that is encoded at each location builds each time the songline is performed to layer more knowledge onto what is already known as the generations age.

Songlines in Aboriginal culture use Country as the basis of their knowledge system involving people and their relationships with the more-than-human entities embedded within it. Method of loci as used in written cultures can be used to enhance memory of any information the learner wants to encode and retrieve more easily.

When recalling information that has been encoded and stored using method of loci the learner visualises the route and locations to act as retrieval cues for the information. When a songline is performed in Aboriginal cultures across Country it will often accompany song, dance, rhythm, actions or drawings that all act as retrieval cues for the information stored at each location.

c. Describe the importance of the hippocampus in the consolidation and retrieval of memories using songlines.

4 marks

The hippocampus plays a vital role in consolidating short-term memories into long-term memories. The hippocampus is activated when information is encoded by associated with physical spaces so that when an individual deliberately makes a spatial association with new information – they become linked in neural pathways. When a story is told through a songline in a particular sacred location, both the location and the information in the story will trigger the memory and the retrieval of the other.

The hippocampus is specifically good at representing physical spaces through the creation of physical neural pathways, including for Aboriginal people, their knowledge of Country, skyscapes and seascapes resulting in a robust representation in the physical structure of their brains. The strength of these active synapses allows for greater recall in vivid detail when using songlines.

Question 2 (10 marks)

Amielle recently began lesson in piano. She attends class twice a week for an hour each time and practices at home for a minimum of 5 hours a week.

a. Describe the role of the neocortex and basal ganglia in Amielle learning to play the piano. 4 marks

The neocortex reorganises memory received from the hippocampus for consolidation and storage. When Amielle is in her lesson the neocortex receives consolidated information regarding corresponding notes and keys on the piano from the hippocampus and stores them in various locations throughout the neocortex.

The basal ganglia enables habit formation and the practice of sequences of movement. When Amielle is practicing at home her basal ganglia assists in the storage of the sequence of movements such as pressing keys on the piano in a song she is practicing and assists her in the formation of the habit of piano practice to enable her to complete her 5 hours per week.

b. Differentiate between the roles that neurotransmitters and neuromodulators will play in allowing Amielle to learn to play the piano with specific reference to at least one neurotransmitter and one neuromodulator. 6 marks

Glutamate is the primary excitatory neurotransmitter found in the central nervous system which plays a role in learning. When establishing a new neural pathway, when Amielle is learning a new song to play by pressing the keys in a specific order, glutamate is responsible for the activation of the pathway by causing the post synaptic neuron to become more likely to fire an action potential (this leads to synaptogenesis and the creation of the neural pathway involved in learning the song).

Neuromodulators like dopamine are released from single neurons and spread through large areas of the brain having a long lasting effect on multiple synapses. Dopamine plays a role in initiating movement and as such is responsible for the movement of Amielle's hands as she presses the keys on the piano.

Dopamine as a neuromodulator plays a role in signalling when a reward is available through the dopamine rewards system, motivating the individual to perform the behaviour that receives the reward. If Amielle is intrinsically motivated to play the piano, dopamine will be released to produce a state of motivation encouraging her to play for the reward of learning a new song and the satisfaction of how it sounds.

Question 3 (15 marks)

Gut microbiome targeted by insomnia treatment clinical trials in Queensland

Adapted from: Jessica Ross, ABC Sunshine Coast 28.6.23

Queensland scientists and doctors have been exploring whether the human gut could hold the cure to chronic insomnia.

The Sleep Disorders Centre at Brisbane's Prince Charles Hospital has been conducting Australian-first human trials of a bacteria-based treatment, developed by Sunshine Coast-based biopharmaceutical company Servatus.

Servatus chief executive Wayne Finlayson said the gut microbiome was home to bacteria that stimulated the production of sleep chemicals.

"Things like serotonin … melatonin, and GABA (gamma-aminobutyric acid) and dopamine, which affects your moods," Dr Finlayson said.

The team has been trialling introducing a combination of live, beneficial bacterial strains to the gut.

"Hopefully we can provide a mild treatment with human bacteria that you have naturally, affecting your sleep in a natural way," he said.
Sleep Disorders Centre director Deanne Curtin said the trial has involved 50 participants with chronic insomnia.

"The initial results are very promising," Dr Curtin said. "There's been some improvement in patients taking the live biotherapeutic agents. "It seems to have improved the quality and quantity of sleep."

She said traditional sleeping pills tended to lose efficacy over time as patients developed a tolerance. "People can become dependent on them," she said.

"There are also side effects and adverse effects, such as a hangover, groggy effect in the morning, effects on cognition and increased rates of falls in the elderly."
Clinical psychologist Amber Rattray said cognitive behavioural therapy was still the "gold standard" in treatment for insomnia.

"We might start with a focus on sleep hygiene ... Then we're looking at shifting negative sleep thoughts towards positive sleep thoughts and reducing anxiety about sleep, so we can actually get to sleep.

"If there are some initial factors, sort of a generalised anxiety or post-traumatic stress disorder, then obviously we need to treat that as well."
Dr Curtin agreed the "best evidence" for treatment was psychological support but said the majority of people did not seek help for it.

"So that's what we're really looking for here — an effective, safe agent that's non-traditional pharmaceutical that could be used in conjunction with psychology," she said.

The clinical trial will be expanded in coming months to test different dosage levels with a larger cohort of patients.

a. Explain the roles melatonin, the suprachiasmatic nucleus (SCN), the pineal gland and light play in regulating the sleep-wake cycle of humans. 5 marks

The pineal gland is responsible for producing and secreting melatonin into the bloodstream to regulate arousal and levels of alertness and as such regulate the sleep-wake cycle in humans. It receives information about the levels of light from the eyes from the suprachiasmatic nucleus (SCN). The SCN (within the hypothalamus) receives information regarding the amount and intensity of light via the optic chiasm and adjusts the sleep wake cycle by signalling to the

pineal gland to secrete more or less melatonin. The melatonin feedback loop enables the SCN to detect the level of melatonin in the blood and modify the output from the pineal gland to maintain an optimum level.

Melatonin is the name of the hormone secreted by the pineal gland into the bloodstream that is involved in sleep onset and in the regulation of the sleep–wake cycle. The amount of melatonin that can be found in the bloodstream at any one time varies with amount of light that is detected. For example, when levels of light are low, as is the case with night time, the amount of melatonin is increased, but when light is higher and more intense, during the day, melatonin levels are lower. Increased melatonin levels promote drowsiness and lower the levels of alertness.

Light is the main zeitgeber or synchronising agent that influences the human sleep-wake cycle. As an environmental cue it directly influences the SCN to increase or reduce the amount of melatonin that is released.

b. What is gut micro biome, and what role is it playing in relation to the sleep study at Brisbane's Prince Charles Hospital? 3 marks

Gut microbiome relates to the population of microbiota (the microorganisms including bacteria, viruses and fungi) in the digestive system that have an influence on health and wellbeing, including the production of sleep chemicals that regulate the sleep-wake cycle. The sleep study at Prince Charles Hospital is modifying the gut microbiome by introducing beneficial strands of bacteria to stimulate production of melatonin (serotonin, GABA and dopamine).

Describe the role that the gut-brain axis (GBA), including the vagus nerve, is likely to play in relation to the study. 4 marks

The gut-brain axis (GBA) is the network of bidirectional neural pathways that enable communication between microbiome in the gastrointestinal tract and the brain. The GBA includes the central, autonomic and enteric nervous systems as well as the vagus nerve and gut microbiome. The vagus nerve is responsible for communication between the gut and brain, sending sensory information regarding microbiome status from the gut to the brain, and motor information regarding incoming food and changes in movement to aid digestion.
The vagus nerve is responsible for communicating the presence of microbiota to the brain to have an influence on sleep. The study is altering the gut microbiome by introducing specific bacteria to promote the production and release of sleep hormones like melatonin. The presence of this bacteria is communicated to the CNS via the vagus nerve to have a direct influence on the production of melatonin to promote sleepiness and assist in the treatment of insomnia.

Describe the role of sleep hygiene in improving the sleep-wake cycle. 3 marks

Sleep hygiene relates to practices that tend to improve and maintain good sleep, in conjunction with the promotion of full daytime alertness and can be effective in establishing and maintain a productive sleep-wake pattern. Such practices include establishing a regular, relaxing sleep schedule and bedtime routine to promote the production of sleep inducing hormones like melatonin. Avoiding stimulating activities in the hour before bed including the use of digital devices that emit light and inhibit melatonin production are effective in promoting sleep onset and improving the sleep-wake cycle.

Question 4 (4 marks)

Explain the roles of cultural continuity and self-determination in the maintenance of mental health and wellbeing in Aboriginal and Torres Strait Islander people.

Self determination relates to practices that allow people to take part in the decisions that affect their lives and empowers people by giving them a sense of control. This gives Aboriginal and Torres Strait Islander people the power to make decisions that impact their people, community and Country, fostering a connection to community, culture and Country which are key domains within their multidimensional and holistic view of mental health and wellbeing.

Cultural continuity relates to the ability to preserve historical cultural traditions and carry them forward into the future, providing a sense of history, identity and belonging. It ensures the maintenance of cultural connection; an integral domain of social and emotional wellbeing through a living relationship with ancestors and Country, and as such the overall mental health and wellbeing of Aboriginal and Torres Strait Islander people.

Question 5 (13 marks)

Kusperpalle and Rostenkowski published findings after completing a study on mindfulness meditation and CBT in the treatment of stress and anxiety in adolescents. The study was designed to be a crossover between an ***active*** treatment and a ***control*** treatment. The active treatment consisted of one hour intensive Cognitive Behavioural Therapy per week for a period of 10 weeks combined with 20 minutes per day of mindfulness meditation. The ***control*** treatment consisted of Cognitive Behavioural Therapy alone.

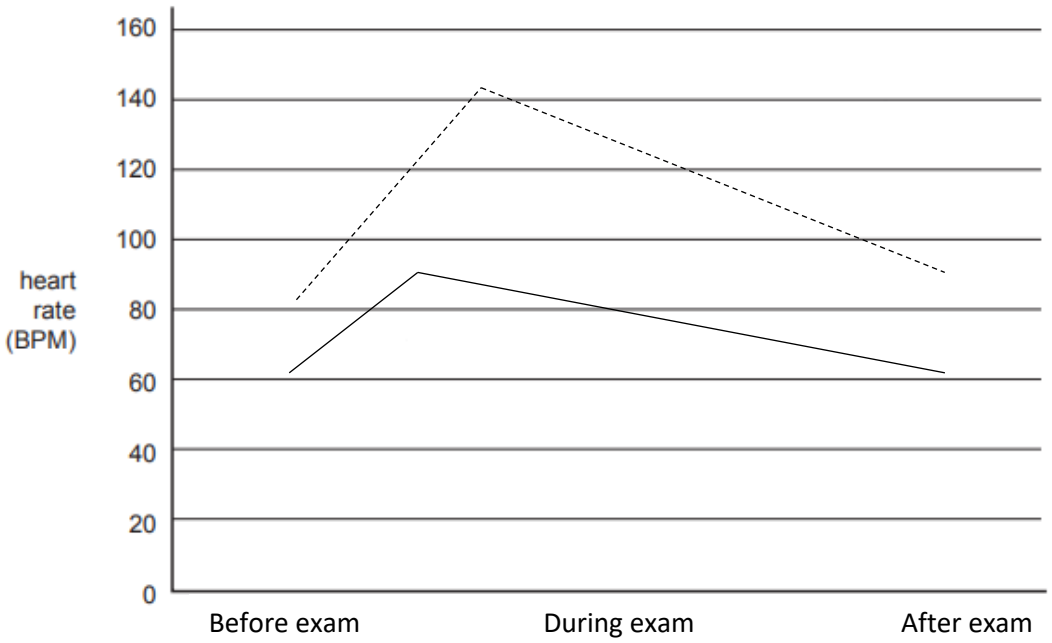
Kusperpalle and Rostenkowski used EEG recordings to monitor brain waves during mindfulness meditation practice and heart rate monitors were worn throughout the 10 week period.

Participants completed self-reports rating their overall experience of stress at controlled times throughout the study. The active intervention group reported lower average heartrates and reduced stress upon completion of the 10 week investigation. Kusperpalle and Rostenkowski concluded that mindfulness meditation when used in conjunction with CBT was an effective tool in reducing stress experienced by adolescents.

For his VCE Psychology practical investigation Daniel wants to replicate aspects of this study. He uses 2 Year 11 English classes preparing for their mid-year exams. All students are asked to wear a heart rate monitor for a 2 week period and complete a stress self-report questionnaire at 3 separate intervals during the investigation. Daniel facilitates the teaching of mindfulness meditation to one of the classes through the smiling mind app. The students in this class were required to complete 15 minutes of mindfulness meditation each day. Students in the other class were asked not to complete any meditation practices.

Daniel monitored student heart rates throughout the investigation as well as before, during and after their English exam.

Mean baseline heart rate compared to mean during and post exam heart rate



In conjunction with the results above, Daniel found that students in the mindfulness meditation group reported less overall stress and had a lower mean heart rate for the duration of the investigation.

a. Describe what is mean by the practice of mindfulness meditation. 1 mark

Mindfulness meditation is a type of meditation that enables individuals to become highly attentive to sensory information by focusing on their breathing, whilst thoughts and feelings are experienced freely as they occur. It involves paying attention and experiencing moment to moment awareness without judgement.

b. Describe the circumstances under which Kusperpalle and Rostenkowski's investigation would demonstrate 2 marks

i. precision.

precision relates to how closely a set of measurement values agree with each other. Kusperpalle and Rostenkowski's investigation involved the use of a heart rate monitor – this would show a high level of precision if three separate measurements taken at the same time under the same conditions on the same participant gave the same (or very similar) reading.

ii. accuracy.

the accuracy of a measurement relates to how close it is to the true value of the quantity being measured. During Kusperpalle and Rostenkowski's investigation – if the heart rate monitors gave a reading of 70 beats per minute and the heart was beating at 70 beats per minute (or close to) it would be considered to have a high level of accuracy.

Accuracy is not quantifiable; measurement values may be described as more accurate or less accurate.

c. Explain the purpose of using an EEG in the investigation and outline what it would show during meditation. 3 marks

An EEG detects, amplifies and records the electrical activity of the brain in the form of brain waves (1 mark). During meditation it would show brain waves with a high amplitude and moderate to low frequency (alpha and theta brain waves) (1 mark). The purpose of using an EEG in relation to the investigation is to indicate whether the participant was experiencing deep relaxation as is the case with mindfulness meditation. (1 mark)

d. Explain why Daniel's planned investigation would be considered a controlled experiment rather than a correlational study. 2 marks

Daniel's investigation would be considered a controlled experiment as he is manipulating one variable (the use of mindfulness meditation - IV) to investigate it's impact on another (heart rate and stress ratings - DV) in a controlled setting to determine a cause and effect relationship (1 mark). It is not considered a correlational study which investigates the possibility of a relationship between two variables without a control group (or IVs/DVs) or any manipulation from the experimenter.

e. Evaluate the use of a self-report questionnaire in Daniel's investigation. 2 marks

Strengths

- *useful for measuring characteristics that cannot easily be directly observed, such as feelings of stress*
- *can be more efficient, timely, cost-effective etc in relation to getting participants to fill out their own stress self report*
- *control of unwanted variables through use of standardised administration procedures in that all participants receive the same written instructions related to the questionnaire on stress*

Limitations

- *potential to introduce bias into answers as the self report on stress requires participants to answer honestly*
- *often rely on participant self-awareness and memory in relation to how stressed they have been feeling in the days leading up to the completion of the questionnaire*
- *data collected is more difficult to manage and report on when free response and open-ended questions are used such as 'describe the way the stress made you feel'.*

f. In terms of the nervous system, why would heart rate be used as a measure in Daniel's investigation? 3 marks

Marks were awarded for noting that:
- *the sympathetic nervous system is activated during a stress response*
- *heart rate is increased during the stress response*
- *because Daniel is interested in measuring the stress response, heart rate can serve as a (objective/physiological) dependent measure of the stress response.*

The researchers measure heart rate in this study because an increase in heart rate is an objective measure of the sympathetic nervous system's response to stress.

Question 6 (5 marks)

Describe how brain imaging techniques used in patients with Alzheimer's Diseases have contributed to the understanding of the roles of episodic and semantic memories in retrieving autobiographical events.

Magnetic Resonance Imaging (MRI) and functional Magnetic Resonance imaging (fMRIs) have been used on patients suffering from Alzheimer's Disease to help study the structural and functional changes that occur to the brain as the disease progresses.

Alzheimer's Disease begins with the memory problems in relation to more recently formed episodic and semantic memories. Patients with this condition may forget the events of the day (eg who visited them) or forget where they are up to in a conversation they are having. As the disease progresses they may develop amnesia for previously formed episodic-autobiographical memories, such as events associated with previous places of employment or friends or loved ones.

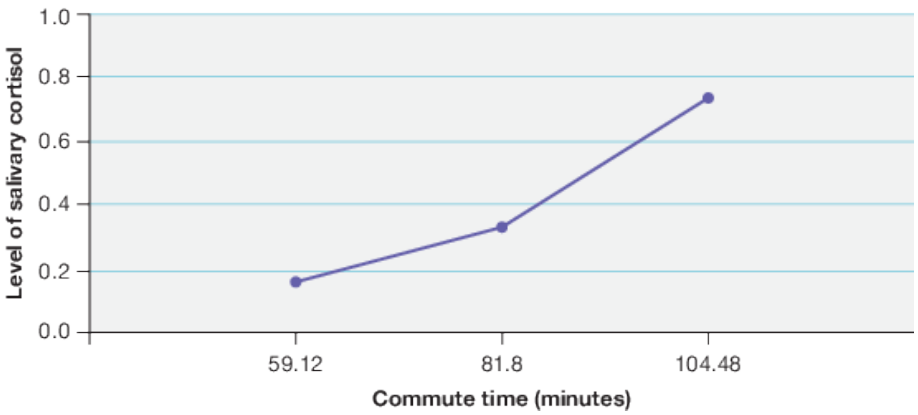
Brain imaging techniques show patients with Alzheimer's Disease show a loss of volume in the hippocampus as one of the earlier signs – explaining why amnesia occurs form episodic-autobiographical memories with the hippocampus experiencing difficulty in binding and consolidation of information from events into episodic memories as well as difficulty in retrieving episodic details from previously formed memories.

Imaging has also found that as damage spread to the prefrontal cortex and other parts of the neocortex patients lose the ability to retrieve semantic events and as a result have difficulty in retrieving all autobiographical events,

Question 7 (10 marks)
Evans and Wener studied a sample of 208 male and female suburban rail commuters who took the train to Manhattan, New York. The amount of cortisol in saliva produced by participants was used as a measure of stress. Upon completion of the journey, the researchers gave participants a proof-reading exercise to complete where they had to identify errors in a document. Their results demonstrated the greater the duration of the commute, the larger the magnitude of salivary cortisol elevations in reference to resting baseline levels, the less the commuter's persistence on the proof-reading task at the end of the commute, and the greater the levels of perceived stress. These effects were not moderated by gender.

Source: Evans, G.W., & Wener, R.E. (2006). Rail commuting duration and passenger stress. Health Psychology, 25(3), 408–412.

Results from the salivary-cortisol test are illustrated in the graph below:



a. Identify the independent and dependent variables in the cortisol measurement part of the study. 2 marks

The independent variable is the commute time and the dependent variable is the level of salivary cortisol

b. Identify the type of stress experienced by passengers due to commute time and justify your choice. 2 marks

Students receive one mark for identifying commute time as an external stressor and a second mark for the justification that commute time is a stressor originating from the environment outside the individual.

c. Construct a hypothesis for that reflects the research question posed by Evans and Wener. 3 marks

Students receive 3 marks for identifying the IV and DV, the direction of change and the population.
The greater the duration of a train commute, the greater the levels of perceived stress, and the less the commuter's persistence on a task at the end of the commute.

d. Outline the role of cortisol in acute and chronic stress. 3 marks

For 3 marks students need to outline the role that cortisol plays in acute and chronic stress. For example:

When released into the bloodstream during times of stress, cortisol helps to energise the body by inducing the release of glucose, providing a rise in blood-sugar levels and increased arousal which gives the organism the energy required to deal with the stressor. Prolonged release of cortisol in chronic stress can supress the activity of the immune system increasing susceptibility to infections and communicable diseases.

Question 8 (10 marks)

Maryam is a 20-year-old university student who lives at home with her parents and two younger brothers. She is studying mechanical engineering specialising in robotics and prefers to take most of her subjects online. As part of her course, Maryam must complete a semester abroad at MIT (Massachusetts Institute of Technology) in the United States of America.

The thought of flying causes Maryam significant distress despite never having stepped on a plane. She cannot remember a specific event that caused her to become afraid of flying but is certain that any flight she board will crash. Maryam is embarrassed to talk about her fear with her friends and family and when news reports of plane cases appear in contemporary media she changes the channel/station, quickly turns the page or changes the topic of conversation. She has spoken to her General Practitioner about the potential use of sedatives and she has recommended that Maryam see a psychologist to provide a more comprehensive treatment plan and assist her in understanding her phobia.

Using the information provided above, develop a summary of advice that the psychologist may have provided Maryam with. Include information relating to the biopsychosocial approach in explaining and treating Maryam's phobia.

Responses are to be marked holistically, taking into account the clarity and organisation of the content, and the degree of sophistication with which the relevant psychological concepts and terminology are integrated into the response, how well psychological concepts and terms were applied to relevant aspects of the scenario, and the extent and depth to which all requirements of the response were addressed.

Students who validly attempt all aspects specified in the question are to be awarded **at least five marks out of 10**, with the awarding of higher marks being dependent on the level of critical appraisal and application to psychological theory demonstrated.

It is acceptable for students to structure their responses in different ways, but the selected structure must ensure that required information for the response can be presented in a cohesive, logical way.

The following is a marking scheme that will guide the assignment of marks for this response.

9-10	A comprehensive, detailed and clearly organised response, structured as a summary of advice from a psychologist, that shows a high level of understanding of the biopsychosocial approach to both understanding and treating mental health. At this level, students will provide a succinct description of the topics required by the question: • Clear identification of the importance of the biopsychosocial approach and the fundamental role it plays in both understanding and treating mental health • Discussion of the role of potential biological (GABA dysfunction, LTP), psychological (classical conditioning as a precipitating factor, operant conditioning as perpetuating factor, cognitive biases – memory bias and catastrophic thinking) and social (specific environmental triggers, stigma around seeking treatment) in the development of Maryam's specific phobia • Discussion of potential biological (GABA agonists, breathing retraining), psychological (CBT, systematic desensitization) and social (psychoeducation) in the treatment of Maryam's specific phobia • The highest scoring responses will intergrate the required information with stimulus material from the case study.
7-8	Responses in this range will still show a relatively detailed and clearly organised summary of advice addressing **most of the concepts** required by the question. There will be a lack of detail in responses in this range relative to more sophisticated responses. e.g. students may only discuss one contributing biological, psychological and social factor with less synthesized information when compared to more sophisticated responses

5-6	A satisfactory summary of the biopsychosocial model of explaining and treating mental health with some satisfactory references to Maryam. Biopsychosocial factors have been identified but have not been explained with adequate detail **6 mark responses** will identify all that is required for 5 marks, and *additionally* will elaborate on one of the points below; • The importance of considering the biopsychosocial approach from a holistic point of view • Elaborate in greater detail **at least two** biological, psychological or social contributing or treating factors how they apply to Maryam **5 marks responses** will identity the role of the biopsychosocial approach to understanding and treating mental health. It will provide a brief description of some of the factors and the treatments. References to the scenario are evident and there has been some attempt to structure the response in a way that reflects a summary of advice from a psychologist. Responses that show less than this cannot be awarded anything more than a 4. *NOTE: a score of 5 is a passable mark that addresses all basics that are required by the question.*
3-4	A limited understanding of factors that contribute to mental health and the development of a specific phobia. Responses in this range will have demonstrated some understanding of the biopsychosocial approach.
1-2	A very limited summary was developed. There is a lack of structure and format relevant to the prompt. Little to no analysis of the role of the biopsychosocial approach with few references to the stimulus information regarding Maryam.
0	The response provided by the student is largely irrelevant and/or inaccurate